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FIELD INVESTIGATION TEAM ACTIVITIES AT UNCONTROLLED HAZARDOUS SUBSTANCES FACILITIES — ZONE I

NUS CORPORATION
SUPERFUND DIVISION

TJT 001 0001

02-9102-11-HR
REV. NO. 1

FINAL DRAFT
HAZARD RANKING SYSTEM DOCUMENTATION
TUTU WELLFIELD
ST. THOMAS, USVI
VOLUME 1 OF 5

PREPARED UNDER
TECHNICAL DIRECTIVE DOCUMENT NO. 02-9102-11
CONTRACT NO. 68-01-7346

FOR THE

ENVIRONMENTAL SERVICES DIVISION
U.S. ENVIRONMENTAL PROTECTION AGENCY

AUGUST 28, 1991

NUS CORPORATION
SUPERFUND DIVISION

SUBMITTED BY:

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SECTION I: SITE SUMMARY

SITE SUMMARY

Tutu Wellfield is located in a mountainous semi-rural area of eastern central St. Thomas, U.S.V.I.. The site, is an area of groundwater contamination with known and unknown sources. The area of confirmed groundwater contamination, verified in 1990 by Contract Laboratory Program (CLP) sample analysis, covers approximately 17 acres. However, contamination may be spread over an approximate 50 acres in the area. The Tutu section of Anna's Retreat is located in the Upper Turpentine Run Basin. An intermittent stream leading to Turpentine Run is within a few hundred feet to the southwest. Turpentine Run is also intermittent and drains southward approximately 2.8 miles (when flowing) to Mangrove Lagoon which is hydraulically connected to the Caribbean Sea. The Atlantic Ocean lies approximately 1 mile to the north.

In July 1987, a strong petroleum odor was detected in one of the several major commercially owned supply wells (the Tillet Well), which a provide public drinking water source throughout the island. The Virgin Island Department of Planning and Natural Resources (VIDPNR) requested assistance from the U.S. EPA in sampling this well and others in the area. From July through September in 1987 the U.S. EPA Technical Assistance Team (TAT), Roy F. Weston, Inc. sampled over 100 hundred wells and cisterns. Analysis performed with photovac gas chromatograph instrumentation detected volatile and chlorinated hydrocarbons such as benzene, toluene, 1, 2-trans dichloroethylene, trichloroethylene (TCE), and tetrachloroethylene (PCE) in several wells, including public supply, institutional, commercial, and domestic wells. Samples were also sent to US EPA's Region 2 Environmental Services Laboratory for Total Organic Carbon which subsequently detected contamination in wells and also in the sample blank. Some of these compounds were detected above and below the maximum permissible concentration levels, 10-Day Health Advisory Levels, and Removal Action Levels. Thirteen commercial (including the Tillet Well) and five private wells were subsequently closed down and alternative plans including trucking water to the area began. As of January 6, 1988, VIDPNR has issued 10 orders to close down 16 wells.

In July 1987, VIDPNR issued an Administrative Order on Consent to Tutu Texaco Service Station to investigate the release of petroleum from their underground storage tanks (USTs). In addition, Texaco was ordered to stop all work relative to disturbing the potentially contaminated area. In early August 1987, this Order was amended to include specific details required of the investigation (e.g. Sampling/Contingency Plan prior to tank excavation). In 1987, Tutu Esso Car Care Center was also issued a similar Administrative Order. In August 1987, nine Potentially Responsible Parties (PRP) were identified by the U.S. EPA. In addition to Tutu Texaco and Tutu Esso, one other gasoline service station (Rodriguez Auto Parts), two vehicle maintenance repair stations (Ramsay Motor Co. and Consolidated Auto Parts/Gasset Motors), two territorial government agencies (Virgin Island Housing Authority and Department of Education/LAGA Building), a dry cleaner (O'Henry Cleaners), and a silk screening operation (Jim Tillet, Inc./Tillet Gardens) were identified as PRPs. Potential sources at these locations include petroleum and waste oil USTs, drum storage areas, contaminated catch basins, oil separators, floor drains, a sump holding tank, a leaching pit, above ground tanks, and an evaporation pit. Potential wastes which may have been disposed of include solvent based auto flushes, treatments, degreasers, cleaners, and lubricants; freon; antifreeze; kerosene; hydraulic fluid; waste oils; spent PCE waste and filters; dry cleaning fluids such as 2-butoxyethanol, hexylene glycol, and dye stripper; ammonium hydroxide; and mineral spirits. In September 1987, CERCLA funds were approved for the removal response action at the site.

In September 1988, soil samples from O'Henry Cleaners, Ramsay Motor Co., Gasset Motors, Tillet Gardens, and Tutu Texaco were collected and analyzed. Volatile organics such as benzene, toluene, ethylbenzene, and xylenes (BTEX) were detected in soils on the properties of Ramsay, Gasset, Tillet, and Tutu Texaco. Soil samples were collected from a tank excavation at Tutu Texaco. Volatile organics including PCE were detected in the soils at O'Henry Cleaners. In August 1987 and June 1989, waste oil samples were collected from several storage and collection vessels including USTs at Ramsay Motor Co., Tutu Texaco, and Tutu Esso. Analysis of these samples detected BTEX; and other volatiles such as PCE and 1,1,1-trichloroethane. Additional soil samples were collected from soil piles and pit excavations at Tutu Texaco

and Tutu Esso; and surface soils from the properties of O'Henry Cleaners, LAGA Building, and Ramsay Motor Co.. Volatiles such as 1,1,1-trichloroethane, 1,2-trans dichloroethylene, BTEX, TCE, and PCE were detected. Semivolatiles such as phenols, polyaromatic hydrocarbons and other semivolatiles were also detected at a few of these properties.

After the initial monitoring well sampling in 1987, quarterly monitoring continued on 24 of the 100 wells. In addition to TAT Photovac gas chromatograph analysis between September 1987 and September 1990, confirmation analysis was perform by the U.S. EPA Region 2, Environmental Services Division (ESD) Laboratory and PRP solicited laboratories in the Contract Laboratory Program. Analyses of samples from these wells consistently detected 1,2-trans dichloroethylene, BTEX, TCE, and PCE. Tert-butylmethylether was detected in many wells during a the first Target Compound List sampling event conducted in October of 1987. These compounds were detected above and below their Maximum Contaminant Levels (MCLs). In addition, selenium was detected above the MCL. In September 1990, CLP analysis of 24 wells detected observed releases cadmium, TCE, PCE, and 1,2 dichloroethylene in nine wells. Cadmium and TCE were detected above their MCLs. The wells sampled are drilled into bedrock as it is the most productive aquifer in the area. The bedrock aquifer is the aquifer of concern. The groundwater contamination has migrated to the bedrock aquifer. Alluvial material overlies and is hydraulically connected to the bedrock. The ambient groundwater flow in this area is generally to the south. However, flow may be slightly different in response to pumping.

On January 6, 1988, an US EPA Action Memorandum to authorize funds for preliminary assessment and removal actions at the site was issued. In September 1988, USEPA an Action Memorandum (dated August 22, 1988) to continue authorization of removal activities at the site was issued. In June 1989, O'Henry Cleaners, Tutu Esso, and Tutu Texaco were issued an Administrative Order on Consent by the EPA for the investigation of the area. All parties claimed to be not guilty, however agreed to investigate the extent of plume contamination. In March 1990, the EPA issued another Administrative Order on Consent stating that O'Henry Cleaners, Tutu Esso, and Tutu Texaco should pay for water connections for three residences. On March 22, 1990, an Administrative Order was issued to ESSO Standard Oil S.A., Limited Texaco Caribbean, Inc., and L'Henri, Inc., alias O'Henry Cleaners by the US EPA. The Order stated that these PRPs shall take actions (described in the Order)" to abate the release or threat of release".

The site is defined as an area of groundwater contamination with known and unknown sources located within 1 mile of each other. The waste source quantity is also unknown. The contaminants detected in groundwater match those detected in soils and waste oils at the suspected and known PRP properties listed above, however definitive documentation of attribution to those sources is lacking. Tutu Esso and Tutu Texaco are gasoline stations and thereby might present constituents excluded from CERCLA remediation. However, while constituents detected in the groundwater can be attributed to some of the nine PRPs, we can consider contaminant contribution of the two gas stations because of oil waste disposal practices that have taken place there.

SECTION II: HRS SCORESHEETS

SITE NAME: TUTU WELLFIED SITE SCORE: 50.00

REVISED HAZARD RANKING SYSTEM
SCORING SPREADSHEET

VERSION 2.1

Developed for the U.S. Environmental Protection Agency
by
NUS Corporation

SITE NAME: TUTU WELLFIED

EPA ID #: VID982272569

LOCATION: ST. THOMAS, USVI

REGION: 2

DATE: AUGUST 28, 1991

RHRS SCORER: R.FEINBERG

PATHWAY			SCORES
GROUND WATER MIGRATION PATHWAY			100.00
SURFACE WATER MIGRATION PATHWAY			0.00
	Overland Flow/Flood	GW to SW	
Drinking Water Threat	0.00	0.00	
Human Food Chain Threat	0.00	0.00	
Environmental Threat	0.00	0.00	
Overland Flow/Flood Component	0.00		
Ground Water to Surface Water Comp.	0.00		
SOIL EXPOSURE PATHWAY			0.00
Resident Population Threat	0.00E+00		
Nearby Population Threat	0.00E+00		
AIR MIGRATION PATHWAY			0.00
OVERALL MIGRATION SCORE			50.00

SITE NAME: TUTU WELLFIED SITE SCORE: 50.00
SOURCE 1 NAME: AREA OF CONTAMINATED GROUNDWATER

HAZARDOUS WASTE QUANTITY		VALUE	SOURCE TYPE (choose one)
Constituents (lb)	101	101	0 Landfill
HWQ (lb)	0	0	Surface Impoundment
Volume (cu yd)	0	0	Surface Impoundment(buried)
Area (sq ft)	0	0	Drums
Contam Area(sq ft)	0	0	Tanks & Non-drum Containers
Final HWQ for the Source		101	Contaminated Soil
			Pile
HAZARDOUS SUBSTANCES			Land Treatment
ATTRIBUTABLE TO THE SOURCE			1 Other

* CODE	CONTAMINANT	CONTAINMENT	VALUES
L12	Dichloroethylene, trans-1,2	Ground Water Containment	10
L124	Trichloroethylene	(Table 3-2)	
L116	Tetrachloroethene	Surface Water (overland)	0
L51	Cadmium	(Table 4-2)	
0	0	Flood Plain (years)	
		(1, 10, 100, 500, NA)	NA
		Flood Frequency Value	0
		(Table 4-9)	
		Attractiveness/Access.	0
		(Table 5-6)	
		Air Containment (gas)	0
		(Table 6-3)	
		Air Containment (part.)	0
		(Table 6-9)	
		Air Source Type (gas)	0
		(Table 6-4)	
		Air Source Type (part.)	0
		(Table 6-4)	

* Type an "L" in front of the Code # if the substance is present or was deposited as a liquid (i.e., L##).

SITE NAME: TUTU WELLFIED SITE SCORE: 50.00

GROUND WATER MIGRATION PATHWAY SCORESHEET

LIKELIHOOD OF RELEASE to an AQUIFER	MAXIMUM VALUE		ASSIGNED VALUE
Is the Aquifer of Concern (AOC) KARST?	Y/N		N
Are all layers to the AOC KARST?	Y/N		N
Is there an Obs. Release to the AOC?	Y/N		Y
Is there an Obs. Release to ground water?	Y/N		Y
If Yes: CODE CONTAMINANT			
124 Trichloroethylene			
116 Tetrachloroethene			
51 Cadmium			
12 Dichloroethylene, trans-1,2-			
0 0			
1. Observed Release	550		550
2. Potential to Release			
2a. Containment	10		10
Net Precipitation (inches)		Calc.Val:	0
2b. Net Precipitation Value	10	0	0
Depth to Aquifer (feet)			0
2c. Depth to Aquifer Value	5		0
2d. Travel Time	35		0
Lowest Hydraulic Conductivity			0.00E+00
Thickness of Layer			0
2e. Potential to Release	500		0
3. Likelihood of Release	550		550
WASTE CHARACTERISTICS			
4. Toxicity/Mobility	*		10000
5. Hazardous Waste Quantity	*		100
6. Waste Characteristics	100		32
TARGETS			
Distance to Nearest Well (miles)			0
7. Nearest Well Value	50		50
8. Population			
Level I Population			243
8a. Level I Concentrations Value	**		2430
Level II Population			12
8b. Level II Concentrations Value	**		12
Potential Contamination			

Distance	Population	Value
0 - 1/4	0	0
1/4-1/2	0	0
1/2-1.0	1528	523
1.0-2.0	0	0
2.0-3.0	0	0
3.0-4.0	0	0

8c. Total Potential Contamination Value	**		52
8d. Total Population Value	**		2494
9. Resources	5		0

SITE NAME: TUTU WELLFIED		**SITE SCORE:**	**50.00**
10. Wellhead Protection Area	**20**		**0**
11. Total Targets	******		**2544**

GROUND WATER MIGRATION PATHWAY SCORE FOR THE AQUIFER

Ground Water Pathway Score: Uncapped	**	542.72
12. Ground Water Pathway Score	100	100.00

SECTION III: DOCUMENTATION RECORD

HRS DOCUMENTATION RECORD--REVIEW COVER SHEET

Name of Site: Tutu Wellfield

Contact Persons

Site Investigation: Not Applicable
(Name) (Telephone)

Documentation Record: Richard L. Feinberg (908) 225-6160
(Name) (Telephone)

Pathways, Components, or Threats Not Evaluated

The surface water, soil, and air pathways were not evaluated in this documentation record due to fact that this site is an area of groundwater contamination with known and unknown sources. (Ref. Nos. 3, pp. 1-5; 46, pp. 1, 4, 7; 50, pg. 7). In addition, the nearby surface water body (an intermittent stream which leads to Turpentine Run) is not known to be used for drinking water and there are minimal environmental threats. Turpentine Run is also intermittent stream that discharges approximately 2.1 miles downstream into the Caribbean Sea when flowing. Environmental targets such as mangrove lagoons and tropical reefs exist at or near the mouth of Turpentine Run, and desalination plants providing potable water exist further downstream (Ref. Nos. 36, pp. 13, 15, 20; 44; 45, appendix A pp. A-3, A-4, and A-5). Soil exposure may pose a threat to employees working at and residents living near suspected sources. However, until these sources are confirmed as contributing to the ground water contamination, soil exposure targets cannot be counted in the in HRS score (Ref. Nos. 8, pp. 2, 3, 4, 5; 9, pp. 1 - 6; 10, pp. 1 -7; 11, pp. 1 - 7).

HRS DOCUMENTATION RECORD

Name of Site: Tutu Wellfield

EPA Region: 2 Date Prepared: 4/30/91

Street Address of Site: Tutu Area/Anna's Retreat

County and State: St. Thomas, U.S. Virgin Islands

General Location in the State: Central eastern part of the island.

Topographic Map: Eastern St. Thomas, V.I.

Latitude: 18° 20' 30" N Longitude: 64° 53' 06" W

Scores

Air Pathway - Not evaluated
Ground Water Pathway - 100.00
Soil Exposure Pathway - Not evaluated
Surface Water Pathway - Not evaluated

HRS SITE SCORE - 50.00

WORKSHEET FOR COMPUTING HRS SITE SCORE

		S	S^2
1.	Ground Water Migration Pathway Score (S_{gw}) (from Table 3-1, line 13)	100.00	10,000
2a.	Surface Water Overland/Flood Migration Component (from Table 4-1, line 30)	0.00	
2b.	Ground Water to Surface Water Migration Component (from Table 4-25, line 28)	0.00	
2c.	Surface Water Migration Pathway Score (S_{sw}) Enter the larger of lines 2a and 2b as the pathway score.	0.00	0.00
3.	Soil Exposure Pathway Score (S_s) (from Table 5-1, line 22)	0.00	0.00
4.	Air Migration Pathway Score (S_a) (from Table 6-1, line 12)	0.00	0.00
5.	Total of $S_{gw}^2 + S_{sw}^2 + S_s^2 + S_a^2$		10,000
6.	**HRS Site Score** Divide the value on line 5 by 4 and take the square root	50.00	

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Reference Number	Description of the Reference
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2.	Superfund Chemical Database Matrix Data. May 1991.
3.	Letter from Scott B. Graber, Work Assignment Manager, CDM Federal Programs Corporation, to Caroline Kwan, U.S. EPA. September 19, 1988.[5 pages]
4.	Preliminary Assessment Report for Tutu Texaco, St. Thomas, U. S. Virgin Islands, NUS Corp. Region 2 FIT, March 24, 1989, revised May 26, 1989, TDD No. 02-8902-40.[30 pages]
5.	Leaking Underground Storage Tank Survey, St. Thomas, St. John, and St. Croix, U.S. Virgin Islands. Donald I. Hamlin Consulting Engineers, Inc. February 1986. [12 pages]
6.	Field Notes, Tutu Wellfield, CDM Federal Programs Corporation, April 8 and 9, 1988.[7 pages]
7.	Field Notes, Tutu Wellfield, CDM Federal Programs Corporation, September 6 - 15, 1988.[62 pages]
8.	Letter from Scott B. Graber, TES V Regional Manager, CDM Federal Programs Corporation, to Cathy Moyik, Regional Project Officer. May 30, 1990. and Letter from Scott B. Graber, Work Assignment Manager, CDM Federal Programs Corporation, to Caroline Kwan, U.S. EPA. May 2, 1990. Data validation and analysis sheets also included for the letter report.[443 pages]
9.	Letter from Scott B. Graber, TES III Regional Manager, CDM Federal Programs Corporation, to Caroline Kwan, U.S. EPA. March 31, 1989.[8 pages]
10.	Letter from Scott B. Graber, TES III Regional Manager, CDM Federal Programs Corporation, to Caroline Kwan, U.S. EPA. March 31, 1989.[7 pages]
11.	Letter from Scott B. Graber, TES V Regional Manager, CDM Federal Programs Corporation, to Caroline Kwan, U.S. EPA. February 2, 1990. Data validation and analysis sheets also included for the letter report.[90 pages]
12.	Letter from Sally Odland for Scott B. Graber, Work Assignment Manager, CDM Federal Programs Corporation, to Caroline Kwan, U.S. EPA. May 2, 1990.[3 pages]

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16. Letter from Scott B. Graber, CDM Federal Programs Corp., to Caroline Kwan, U.S. EPA. October 31, 1988.[4 pages]

17. Letter from Scott B. Graber, CDM Federal Programs Corp., to Caroline Kwan, U.S. EPA. March 6, 1989. Data validation and analysis sheets also included for the data summary.[53 pages]

18. Preliminary Assessment Report for Tutu Esso, St. Thomas, U.S. Virgin Islands, NUS Corp. Region 2 FIT, March 24, 1989, TDD No. 02-8902-43.[16 pages]

19. Field Notes, Tutu Wellfield, Esso Tank Excavation, CDM Federal Programs Corporation, June 5 - 10, 1989.[45 pages]

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21. Letter from Ana Gloria Ramos, P.E., Environmental Coordinator, Esso Standard Oil S. A. Limited, to Francine Lang, Director, Department of Planning and Natural Resources. February 22, 1988.[22 pages]

22. Esso Tutu Service Station Soil Gas Vapor Screening Survey Report, St. Thomas, U.S.V.I. Belgodere and Associates. June 14, 1988.[62 pages]

23. Laboratory Analysis of Soil at Tutu Esso Car Care Center, Tutu, St. Thomas, U.S. Virgin Islands. Soil Tech Corp. January 11, 1989.[74 pages]

24. Preliminary Assessment Report for Gasset Motors, St. Thomas, U.S. Virgin Islands, NUS Corp. Region 2 FIT, March 24, 1989, TDD No. 02-8902-41.[24 pages]

25. Preliminary Assessment Report for Ramsey Motors, St. Thomas, U.S. Virgin Islands, NUS Corp. Region 2 FIT, March 24, 1989, TDD No. 02-8902-42, Rev. No. 1.[23 pages]

26. Preliminary Assessment Report for LAGA Building/Virgin Islands Department of Education, St. Thomas, U.S. Virgin Islands, NUS Corp. Region 2 FIT, March 24, 1989, TDD No. 02-8902-44.[20 pages]

27. Preliminary Site Assessment Report for L'Henry, Inc., St. Thomas, U.S.V.I., Pedro Panzardi and Associates, October 1989.[38 pages]

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30. Memorandum from Ivan Garcia and Arnaldo Martinez, Roy F. Weston, Inc. TAT to Luis Santos (OSC), U.S. EPA Caribbean Field Office, Subject: Results of February 1990 quarterly sampling of Tutu Wells, St. Thomas, USVI. April 12,1990.[6 pages]

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32. Memorandum from Joseph Soroka, Chief, Organic Chemistry Section, to Kevin Kubik, Chief, Superfund Support Section, (Both of U.S. EPA, Region 2, Environmental Services Division). Subject: Detection Limits For Turpentine Run. April 4, 1991.[5 pages]

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37. Letter from Judy Steiger, Hydrologist, U.S. Geological Survey, to Caroline Kwan, U.S. EPA. August 10, 1990.[14 pages]

38. Memorandum from Judy Steiger, U.S. Geological Survey to Richard Feinberg, NUS Corp. Subject: Tutu Well Inventory. March 27, 1991.[22 pages]

39. Well Logs from selected wells in the Tutu Section of Anna's Retreat, St. Thomas, U.S. Virgin Islands. 1977 - 1981.[18 pages]

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40. Potentiometric Surface of the Turpentine Run Basin Aquifer in the Tutu Area, Eastern St. Thomas, U.S. Virgin Islands, September 11, 1987. U.S. Geological Survey Water Resources Investigations Report 88-4131.[1 sheet]

41. Well Appropriation Permits issued in St. Thomas/St. John as of July 31, 1987. Virgin Islands Department of Planning and Natural Resources.[12 pages]

42. Project Note: From Richard L. Feinberg to File, TDD. No. 02-9102-11, Cross Reference of Well Inventories Provided in the Documentation Record. April 26, 1991.[1 page]

43. Federal Reporting Data System, Public Water System - Comprehensive Report for Community and Non-Community Supplies, U.S EPA Region 2, Virgin Islands, Fiscal Year 1988. March 3, 1989, (pp. 5, 6, 47, 86, 93, 94, 106, 281, 295, 300, 310, 311).

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52. Telecon Note: Conversation between Sally Odland, Camp Dresser and Mckee, and Richard L. Feinberg, NUS Corp., May 23, 1991.[1 page]

53. Facsimile from Ben Nazario, Virgin Island Department of Natural Resources, and Richard L. Feinberg, NUS Corp., April 30, 1991.[3 pages]

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55. Project Note From Richard L. Feinberg, NUS Corp., to File, Subject: Calculation of Ground Water Population Apportionment, May 30, 1991.[1 page]

56. U.S. EPA Action Memorandum from Carlos O'Neill, U.S. EPA On Scene Coordinator (OSC) to Stephen D. Luftig, Director of Emergency and Remedial Response Division, thru George Zachos, Acting Chief, Response and Prevention Branch.January 6, 1988.[12 pages]

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TUT 001 0019

SD-Characterization and Containment

SOURCE DESCRIPTION

2.2 Source Characterization

Number of the source: Known sources and unknown sources

Name and description of the source: Groundwater contamination with known and unknown sources

In July 1987, it was reported that several wells used for public drinking supply in the Tutu area exhibited a strong unpleasant odor. Sampling and analysis of 24 wells in July and October of 1987 detected high concentrations of chlorinated organic compounds (trichloroethylene, tetrachloroethylene, 1,2-trans dichloroethylene, benzene, toluene, and xylenes). Subsequently, 13 commercial and 5 private wells were ordered closed and alternative plans including trucking water to the area began (Ref. Nos. 46, pp. 1, 4, B-1, B-9, B-12; 48, pg. 2; 50, pp. 1, 2, 3).

At least nine Potentially Responsible Parties (PRPs) were identified as to contributing to this groundwater contamination. These PRPs included three gasoline stations (Tutu Texaco Service Station, Tutu Esso Care Center, and Rodriguez Auto Parts); two vehicle maintenance repair stations (Ramsay Motors and Consolidated Auto Parts [Gasset Motors]); two territorial government agencies (Virgin Island Housing Authority [VIHA] and Department of Education/Laga Building [formerly a clothing manufacturing plant]); one dry cleaner (O'Henry Cleaners); and a silk screening business (Tillet Inc.). One of the three gas stations was abandoned (Ref. Nos. 3, pp. 1-5; 46, pp. 1, 3, 4, 6, 7, 11, 27, 32, 33-41, B-1, B-9; 22, pg. 5; 51, pp. 1-10; 52).

The following is a list of potential sources on the properties of the suspected PRPs:

- Tutu Texaco Service Station

  This facility has contributed to groundwater contamination via unleaded and leaded gasoline underground storage tanks (USTs), an oil separator, catch basins, a drum storage area, a collection pit/trap, floor drains, and waste oil spills. Three 4,000 gallon gasoline USTs were taken out of service in 1980 due suspected leaks and mechanical integrity test failure. These three tanks were excavated in September 1988. Large and small holes were discovered in the tanks during the investigation. Strong odors of petroleum hydrocarbons and air readings above background were detected on the HNu Photoionizer during the excavation. In 1987, soil on the property was observed being saturated with waste oil or petroleum products. During a 1989 NUS Corp. Region 2 FIT Preliminary Assessment site reconnaissance, it was observed that the drum storage area did not exhibit any containment. In addition, stains were evident on the grounds of the facility (Ref. Nos. 3, pg. 4; 4, pp. 1, 2, 3, 4, 27, 28, 29; 5, pp. 9, 11, 12; 6, pp. 2, 3; 7, pp. 56, 57; 16, pp. 1, 2; 28, pp. 13A, 14, 14A, 15).

cation indicated that besides gasoline and waste oil, the following
t the facility: freon, antifreeze, and a large variety of solvent based
s, degreasers, cleaners, and lubricants. The hazardous materials
were indicated to be xylenes, naphtha, ethoxylated nonyl phenol,
e, 1,1,1-trichloroethane, tetrachloroethylene (PCE), and ethylene
-5; 6, pg. 3).

oil samples collected from sumps, an oil water separator, a waste
n were submitted for Contract Laboratory Program (CLP) analysis.
ds were detected: acetone (2,200 ug/kg), 2-butanone (6,300
g/kg), toluene (43,000 ug/kg), ethylbenzene (14,000 ug/kg), total
, chloroform (260 ug/kg), and 1,1,1-trichloroethane (2,400 ug/kg)
September 1988, soil samples collected from a tank excavation
were submitted for CLP analysis and the following compounds
roethane (10 micrograms/kilogram [ug/kg]), 4-methyl 2-pentanone
1,000 ug/kg), xylene (58,000 ug/kg), benzene (4,600 ug/kg), and
g/kg). In some samples, estimated values of these and other
re significantly higher than those represented above (Ref. No. 10.
soil samples were collected from a pile and submitted for CLP
compounds along with their maximum concentrations detected:
ug/kg) and PCE (160 ug/kg). Other volatiles were detected at low
(Ref No. 8, pp. 1-5, 25). In July 1989, oil samples were collected
tor, collection pit, and five drums, and were submitted for CLP
llow compounds were detected at estimated concentrations:
xyl (1,600,000 ug/kg), benzene (46,000 ug/kg), ethylbenzene
,1-trichloroethane (3,900 ug/kg) (Ref. Nos. 9, pp. 1-5, 52, 53;
gas survey of the central Tutu area detected high concentrations
ns and a very low concentration of PCE in the unsaturated zone
Texaco (Ref. No. 14, pp. 1, 13, 15, 17, 22, 23, 28).

historical information indicate that Tutu Texaco has contributed
amination in the area. Waste units and former product storage
e of poor containment. Products used at the facility contain some
s found in groundwater. Soil and waste oil analyses from the
any of the same CERCLA and non-CERCLA eligible contaminants
r.

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via leaded and unleaded
s. In 1987, a petrotite leak
was questionable. In June
troleum, oily sheens in the
hotoionizer were detected
IT Preliminary Assessment
placed into the UST. No
ste units (Ref. Nos. 3, pg.
13, 16-26, 31, 34-36, 39,

nd waste oil, the following
riety of solvent based auto
hazardous materials found
c acid, and other solvents

separator were submitted
compounds were detected:
ne (200,000 ug/kg), total
g/kg), and PCE (110,000
sample was collected from
llowing compounds were
/kg), 1,1,1-trichloroethane
No. 17, pp. 1-4). In June
les and were submitted for
nzene (60 ug/kg), toluene
0 ug/kg), chlorobenzene (8
000 ug/kg), fluorene (300
mated values of these and
represented above. In July
or and an UST, and were
were detected at estimated
g), benzene (12,000 ug/kg),
,1-trichloroethane (42,000
, 13). In April 1988, a soil
zene, toluene, and xylenes
orinated hydrocarbons such
etected (Ref. No. 22, pp. 5,

The analytical data and historical information indicate that Tutu Esso has contributed to the groundwater contamination. Waste units and former product storage units have shown evidence of poor containment. Products used at the facility contain some of the same constituents found in the groundwater. Soils and waste oil analyses from the property have detected many of the same CERCLA and non-CERCLA eligible contaminants also found in the groundwater.

- Rodriguez Auto Parts (Esso)

The facility is suspected of contributing to the groundwater contamination via leaded and unleaded gasoline USTs, drum storage, an underground oil collection pit, floor drains, and a cement cistern used car wash water collection. The containment of these waste units is unknown (Ref. Nos. 3, pg. 4; 5, pp. 9, 11).

A CERCLA 104(e) notification indicated that besides gasoline and waste oil, the following products were present at the facility: Shell Sol (low aromatic white spirit/ Stoddard Solvent), miscellaneous solvents, kerosene, and grease. Another hazardous compound known to present on site is xylenes (Ref. No. 3, pg. 4).

There is a potential that this facility is contributing to the groundwater contamination. The products used on site contain hazardous constituents found in the groundwater. There are no analytical data and the containment of the waste units on site are unknown.

- Ramsay Motor Company

The facility is suspected of contributing to the groundwater contamination via a UST and 55-gallon drums. During a 1989 NUS Corp. Region 2 FIT Preliminary Assessment site reconnaissance, it was observed that the drums were not properly contained and small quantities of oil appeared to be leaking. Oil stains and pools were evident on the grounds during the reconnaissance. In addition personnel from NUS Corp. observed an oily material that had migrated from a nearby property. In June 1989, personnel from Camp Dresser and Mckee observed that oily material was still migrating onto the property. The containment or integrity of the UST is unknown (Ref. Nos. 3, pg. 2; 7, pg. 7; 12; 13; 20; 25, pp. 1, 2, 3; 28, pp. 15A, 16).

A CERCLA 104(e) notification indicated that besides waste oil, the following products were present at the facility: antifreeze, and a large variety solvent based auto flushes, treatments, degreasers, cleaners, and lubricants. The hazardous materials found in these products were indicated to be xylenes, naphtha, ethoxylated nonyl phenol, propane, butyl cellosolve, 1,1,1-trichloroethane, PCE, petroleum distillates, and ethylene glycol (Ref. Nos. 3, pg. 3; 6, pg. 6).

In August 1987, waste oil samples collected from a waste oil storage tank were submitted for Contract Laboratory Program (CLP) analysis. The following compounds were detected: 2-butanone (150,000 ug/kg), benzene (210,000 ug/kg), toluene (1,400,000 ug/kg), ethylbenzene (290,000 ug/kg) and total xylenes (1,700,000 ug/kg) (Ref. No. 15, pp. 2-4). In September 1988, two surface soil samples were collected and submitted for CLP analysis and the following compounds were detected: 4-methyl 2-pentanone (8 ug/kg), toluene (2 ug/kg), xylene (7 ug/kg), benzene (6 ug/kg), 2-hexanone (55 ug/kg), and ethylbenzene (18 ug/kg) (Ref. No. 9. pp. 1, 4). In June 1989, a surface soil sample was collected submitted for CLP analysis. The following compounds were detected: naphthalene (4,400 ug/kg), 2-methylnaphthalene (6,100 ug/kg), pyrene (2,000 ug/kg), and bis(2-ethylhexyl)phthalate (5,400 ug/kg). Other compounds were detected at estimated values. In July 1989, oil samples were collected from a UST and were submitted for CLP analysis. Some of the following compounds were detected at estimated concentrations: 2-hexanone (180,000 ug/kg), toluene (450,000 ug/kg), xylene (1,200,000 ug/kg), benzene (64,000 ug/kg), and ethylbenzene (130,000 ug/kg) (Ref. Nos. 8, pp. 1-5, 43-50; 11, pp. 1, 3; 12, 13).

The analytical data and historical information indicate that Ramsay Motor Company may have contributed to the groundwater contamination. Waste units have shown evidence of poor containment. Products used at the facility contain some of the same constituents found in the groundwater. Waste oil and soil analyses have detected some of the same CERCLA and non-CERCLA eligible contaminants also found in the groundwater.

- Gasset Motors/Consolidated Auto Parts

The facility is suspected of contributing to the groundwater contamination via 55-gallon drums (waste oil and raw material); and messy house-keeping of service yard and bays. During a 1989 NUS Corp. Region 2 FIT Preliminary Assessment site reconnaissance, it was observed that waste oil from a drainage ditch was discharging onto a nearby property (Ramsay Motors) and stained soil was evident in other parts of the facility. During the same reconnaissance it was observed that the drums were not properly contained. The containment of the UST is unknown (Ref. Nos. 3, pg. 3; 6, pg. 6; 7, pg. 58; 12; 24, pp. 1, 2, 3; 28, pp. 15).

A CERCLA 104(e) notification indicated that besides waste oil, the following products were present at the facility: engine fluids and miscellaneous chemicals (Ref. Nos. 3, pg. 3; 6, pg. 6).

TLIT 001 0023

In August 1987, waste oil samples collected from a gutter and a storm drain were submitted for Contract Laboratory Program (CLP) analysis. The following compounds were detected: acetone (2,100), 2-butanone (4,200 ug/kg), toluene (780 ug/kg), ethylbenzene (390 ug/kg), and total xylenes (2,600 ug/kg) (Ref. No. 15, pp. 2-4). In September 1988, two surface soil samples and a surface water sample were submitted for CLP analysis and the following compounds were detected: toluene (1,300 ug/kg), xylene (5,600 ug/kg), ethylbenzene (2,100 ug/kg), and styrene (6 ug/kg). Benzene was also detected at estimated concentrations (Ref. No. 9, pp. 1, 4, 5). In July 1989, an oil sample was collected from a drainage ditch and submitted for CLP analysis. Acetone was detected at a low estimated value, however this sample was mistakenly analyzed as a water (Ref. Nos. 11, pp. 5, 6; 12; 13).

The analytical data and historical information indicate that Gasset Motors/Consolidated Auto Parts may have contributed to the groundwater contamination. Waste units and former product storage units have shown evidence of poor containment. Products used at the facility contain some of the same constituents found in the groundwater. Waste oil and soil analyses have detected some of the same CERCLA and non-CERCLA eligible contaminants also found in the groundwater.

- Virgin Island Housing Authority (VIHA)

Formerly Tropical Motors (automobile dealership), the facility is suspected of contributing to the groundwater contamination via a UST. A CERCLA 104(e) notification indicated that hydraulic fluid was reportedly stored in the UST. No further information is known about the containment of this unit nor is there any analytical data from this property (Ref. No. 3, pg. 3).

In August 1987, waste oil samples collected from a UST were submitted for Contract Laboratory Program (CLP) analysis. The following compounds were detected: benzene (97,000 ug/kg), toluene (98,000 ug/kg), ethylbenzene (500,000 ug/kg), and total xylenes (2,900,000 ug/kg) (Ref. No. 15, pp. 2-4).

There is a potential for this facility to have contributed to the groundwater contamination due to past operations. However, very little is known about the past operations and more information is needed to characterize the site.

- Department of Education/Laga Building

Formerly a clothing manufacturing plant, the facility is suspected of contributing to the groundwater contamination via abandoned 55-gallon drums. During a February 1989 NUS Corp. Region 2 FIT Preliminary Assessment site reconnaissance, it was observed that the abandoned drums were not contained and were deposited in a haphazard manner on the property. These drums were badly corroded or perforated and some were empty. Access to these drums or the property was not restricted. In June 1989, Camp Dresser and Mckee observed that drums were still on the property. In addition, past operations at the facility include the extensive use of PCE (Ref. No. 7, pp. 31, 32; 14, 1, 2, 3, 24; 26, pp. 1, 2, 3; 28, pg. 17).

TUT 001 0024

In November 1987, a soil gas survey in the area revealed the highest concentration of PCE was found adjacent to a loading dock at the facility (Ref. No. 14, pp. 1, 21, 22, 23). In June 1989, surface soil and drum samples were collected and submitted for CLP analysis. The following compounds were detected: phenol (900,000 ug/kg), 2-methylphenol (320,000 ug/kg), naphthalene (4,100 ug/kg), and endosulfan sulfate I (92 ug/kg). The following compounds detected at estimated concentrations are noted due their high values: 4-methylphenol (1,300,000 ug/kg), 2,4-dimethylphenol (42,000 ug/kg), and naphthalene (7,700 ug/kg) (Ref. No. 8, pp. 1-5, 39-43).

The analytical data and historical information strongly suggests that the Department of Education/Laga Building may have contributed to the groundwater contamination. Abandoned drums have shown evidence of poor containment. Products used at the facility contain some of the same constituents found in the groundwater. Soil analysis has detected some of the same CERCLA and non-CERCLA eligible contaminants also found in the groundwater.

- O'Henry Cleaners

The facility has contributed to the groundwater contamination via a leaching pit, a sump holding tank, a raw material (PCE) storage area, aboveground fuel tanks, drains, effluent discharges for steam condensate from the presses and the clothes dryer), and 5-gallon containers of spent PCE residue or filters. Little information about the containment of these waste units is known, however spills of PCE reportedly have occurred. The PA indicates that O'Henry uses 1.5 to 1.75 gallons of PCE per month and has disposed of the PCE residues and spent filters at a "local dump site" in the past. The PA also indicates that a small amount PCE residue and waste was possibly disposed of on site in the past (Ref. Nos. 3, pg. 2; 6, pg. 5; 7, pg. 6; 13; 27, pp. 4-10).

A CERCLA 104(e) notification indicated that products other than PCE used on site include dry cleaning fluids such as 2-butoxyethanol, hexylene glycol, hydrofluoric acid, degreaser, unspecified volatile solvents, and dye stripper (Ref. Nos. 3, pg. 2; 33, pp. 5).

In September 1988, one soil sample was collected and submitted for CLP analysis and tetrachloroethane was detected at 440,000 ug/kg (Ref. No. 9, pg. 3; 13). In June 1989, three surface soil samples were collected and submitted for CLP analysis. The following compounds were detected: TCE (75 ug/kg) and PCE (180,000 ug/kg). Other compounds were detected at low estimated levels including 1,2 dichloroethylene (total) (Ref. No. 8, pp. 1-5, 31-36).

The analytical data and historical information indicate that O'Henry's Cleaners has contributed to the groundwater plume. Reportedly spillage and improper disposal of waste might have occurred. Products used at the facility contain some of the same constituents found in the groundwater. Soil analysis has detected some of the same CERCLA and non-CERCLA eligible contaminants also found in the groundwater.

TUT 001 0025

- Jim Tillet Inc.

The facility is suspected of contributing to the groundwater contamination via paint containers, a raw material storage area, floor drains, and evaporation pit. Dry residue was disposed at a local dump. In September 1988, during a Camp Dresser and Mckee visit to the property, spilled dry paint was observed on the ground (Ref. Nos. 3, pg. 3; 6, pg. 4; 7, pp. 18-20).

A CERCLA 104(e) notification indicated that products used on site included water-based dyes (ammonium hydroxide, mineral spirits) (Ref. Nos. 3, pg. 3).

In November 1987, a soil gas survey in the area, detected concentrations of hydrocarbons, PCE, trichloroethane, and TCE in the Tillet Garden area (Ref. No. 14, pp. 14-21). In September 1988, one soil sample was collected and submitted for CLP analysis and xylene was detected at a low estimated concentration (Ref. No. 9, pp. 1, 5).

There is a potential that this facility is contributing to the groundwater contamination. The products used on site contain hazardous constituents found in the groundwater. There are no analytical data and the containment of the waste units on site are unknown.

TUT 001 0026

From July 1987 to February 1990, photovac (portable field gas chromatograph) sampling results indicated that benzene, toluene, PCE, TCE, and dichloroethylene were consistently present in domestic wells. In addition, US EPA Region 2 Environmental Services Division Laboratory and Contract Laboratory Program analyses of many of these same wells detected the presence of PCE, TCE, 1,2- trans dichloroethylene, and cadmium (Ref. Nos. 29, pp. 1-18; 31, pp. 1-89; 33, pp. N-1 - N-19).

Location of the source, with reference to a map of the site: An area of contaminated groundwater with known and unknown sources located on the eastern end of St Thomas, USVI in the Tutu section of Anna's Retreat (Figure No. 1; Ref. No. 44).

Containment

Gas release to air

Not evaluated.

Particulate release to air

Not evaluated.

Release to ground water

An area of groundwater contamination in the Tutu Section of Anna's Retreat has been documented. Several suspected sources have been identified, including a dry cleaners, gas stations, and auto repair shops (Ref. No. 46, pp. 1, 4, 7). Several mechanisms for contaminant transport from these sources have been presupposed or documented including: leaking USTs; contaminated oil separators, catch basins, floor drains, ditches; uncontained drum storage areas; raw material storage areas; leaching and evaporation pits; aboveground fuel tanks; paint containers; and improper handling of wastes (Ref. Nos. 3, pp. 1-5; 6, pp. 2, 3, 4, 5, 6, 7).

Release via overland migration and/or flood

Not evaluated.

SD-Hazardous Substances
Source No.: 1

2.4.1 Hazardous Substances

Hazardous substance	Evidence	Reference
Cadmium 1,2 Trans Dichloroethylene Trichloroethylene Tetrachloroethylene	U. S. EPA Environmental Services Division analytical results, U. S. EPA Technical Assistance Team (TAT) Photovac results, Potentially Responsible Party analytical results	Ref. Nos. 29, pp. 1-18; 31, pp. 1-89; 33, pp. N-1 - N-19

TUT 001 0028

Source No.: 1

2.4.2. Hazardous Waste Quantity

The waste quantity for this groundwater plume cannot be ascertained. However, an observed release including Level I and II concentrations has been exhibited, therefore the default value for hazardous waste quantity (100) would be used as stated in section 2.4.2.2 of the HRS final rule Federal Register Vol. 55, No. 241, December 14, 1990, (pages 51519-51592).

TUT 001 0029

SD-Source Hazardous Waste Quantity Value
Source No.: 1

2.4.2.1.5. Source Hazardous Waste Quantity Value

Source Hazardous Waste Quantity Value: 100

TUT 001 0030

SD-Summary

SITE SUMMARY OF SOURCE DESCRIPTIONS

Source No.	Source Hazardous Waste Quantity Value	Containment: Ground Water	Containment: Surface Water	Containment: Gas	Containment: Air Particulate
1	100	non-zero	N/A	N/A	N/A

TUT 001 0031

3.0 GROUND WATER MIGRATION PATHWAY

3.0.1 GENERAL CONSIDERATIONS

Aquifer/Stratum 1 (shallowest)

Aquifer/Stratum Name: Turpentine Run Basin Alluvium

Description: In certain areas on the island, including the Turpentine Run Valley, alluvium overlies the bedrock (Ref. Nos. 35, plate No. 1; 36, pp. 4, 6). The alluvium consists of silt, fine sand, and clay and discontinuous beds/lenses of sand and gravel 2 to 3 feet thick (Ref. No. 36, pp. 5, 6). Well logs from the area show that the average range of thickness is between 20 and 45 feet thick. However, deposits have been found to be 70 feet thick in some places (Ref. Nos. 39, pp. 9, 10). These deposits are known to have a high porosity with a low permeability, therefore creating a low yielding aquifer. The sand and gravel beds/lenses may have a higher yield than the rest of the aquifer. The hydraulic conductivity of the alluvial deposits are estimated to be between 10^{-6} to 10^{-8} cm/sec. This unit primarily recharges the bedrock aquifer in this area of the island (Ref. Nos. 1, pg. 51601; 36, pp. 34, 38, 39). The site which is located in the Tutu area is in the uppermost section of the Turpentine Run River Basin. The alluvium is known to be under water table conditions in the vicinity of the site. However, there are few exceptions where the sand and gravel deposits are artesian (Ref. No. 36, pg. 34). The depth to groundwater in the area of the site ranges from 2 to 15 feet (Ref. Nos. 40; 36, pg. 37). Groundwater flows south, east, and west from higher elevations into the upper basin; and then exhibits a generally southerly flow throughout the lower basin (Ref. Nos. 40; 36, pp. 38, 39, 41, 42, 43; 22, pg. 8). The principal alluvium aquifer is in the lower Turpentine Run Basin as it is recharged by intermittent stream base flow and storm water runoff from the upper portion of the basin (Ref. No. 36, p. 44).

References: 1, 35, 36, 39, 40

Aquifer/Stratum 2 (deepest)

Aquifer/Stratum Name: Water Island and Louisenhoj Formations

Description: The Louisenhoj Formation overlies the Water Island Formation in the area of the site. Both of these formations are volcanic in nature. The Louisenhoj Formation consists of augite-andesite breccia, volcanic tuff, and conglomerate. These rocks exhibit a variety of colors including, but not limited to blue, brown, brick red, and purple. They have also been found to have greenish to grayish fragments. In addition, these rocks may contain a wide variety of minerals including plagioclase, clinopyroxene, chlorite, feldspars, pumpellyite, quartz,

magnetite, pyrite, and hematite. The Water Island Formation consists of volcanic flow breccias, tuffs, spilite flows, and keratophyre flows. Keratophyre is a reddish gray to greenish gray intrusive volcanic rock predominantly consisting of albite and quartz, with mica, chlorite, and iron oxides. Spilites are a greenish intrusive volcanic rock predominantly consisting chlorite and albite, with epidote, prehnite, calcite, and clinopyroxene (Ref. Nos. 36, pp. 4, 5, 6; 39, pp. 1-19; 35, pp. 88, 94, 95, 96, 97, 115, 120, 121, 122, plate No. 1). These formations were tilted uniformly northward to form a homocline. The homocline is cut by sets of faults trending north 45° west, north 55° east, and north. "Three well-defined joint sets parallel each of the major fault directions".The topography of the island show similar trends creating high yielding groundwater zones in the valleys (e.g. Turpentine River Basin) (Ref. Nos. 35, plate No. 1; 36, pg. 6). Dips appear to range from 35 to 75 degrees in the vicinity of the site (Ref. No. 35, plate No. 1). The hydraulic conductivity of these formations is estimated to be 10^{-6} to 10^{-8} cm/sec (Ref. No. 1, pg. 51601). The bedrock aquifer is principally recharged by infiltration, storm water runoff, and stream flow discharge. The bedrock aquifer is hydraulically connected to the unconsolidated aquifer, however the bedrock aquifer has a different potentiometric surface. Groundwater in the bedrock aquifer flows ultimately in a southerly direction following the joint and fracture sets (Ref Nos. 22, pg. 5; 36, pp. 34, 38, 41, 42, 43, 44; 39; 40).

References: 1, 35, 36, 39, 40

TUT 001 0033

3.1 LIKELIHOOD OF RELEASE

GW-Observed Release

3.1.1 OBSERVED RELEASE

Aquifer Being Evaluated: Bedrock Aquifer

Contaminants from groundwater contamination present in the downgradient domestic and commercial wells (Ref. Nos. 29, 31, 32, 33, 38, 40, 46, 47, 48).

Chemical Analysis:

- Background Concentration

Sample ID	Depth*	Screened Interval	Date	Reference
VIHA No. 3	17 ft +222 MSL**	73 to 142 ft +166 to +97 MSL	***	37, pp. 2 - 4;40

* Highest seasonal depth to groundwater for well listed above using available background data

** (MSL) - Elevation in feet measured in reference to mean sea level

*** Sample collected between September 24 - October 3, 1990

TUT 001 0034

Sample ID	Hazardous Substance	Concentration	Contract Required Quantitation Limit	Reference
VIHA No. 3 (Sept. 1990)	Cadmium	Not Detected	5 ug/L	Nos. 33, Table No. 2, pp. N-17, N-131; 60, pg. 30 of 56
	Tetrachloro-ethylene (PCE)	Not Detected	1 ug/L	Nos. 33, Table No. 1, pg. N-17; Table No. 2, pg. N-119; 60, pg. 30 of 56
	Trichloro-ethylene (TCE)	Not Detected	1 ug/L	Nos. 33, Table No. 1, pg. N-17; Table No. 2, pg. N-119; 60, pg. 30 of 56
	1,2 Trans Di-chloroethylene (DCE)	Not Detected	1 ug/L	Nos. 33, Table No. 1, pg. N-17; Table No. 2, pg. N-119; 60, pg. 27 of 56
VIHA No. 3 (Oct. 1987)	1,2 Trans DCE	Not Detected	1.6 ug/L*	No. 31, pg. 33; 32, pg. 146
	PCE	Not Detected	4.1 ug/L*	No. 31, pg. 33; 32, pg. 146

* Method Detection Limit

TUT 001 0035

- Contaminated Samples

Sample ID	Depth*	Screened Interval	Date	Reference
Four Winds No. 2	8.02 ft +156.98 MSL**	36 to 285 ft +125 to -120 MSL	***	37, pp. 2, 3, 5; 40; 42
Hartman Crusher	25.67 ft +114.33 MSL	40 to 125 ft +100 to +15 MSL	***	37, pp. 2, 3, 5; 40; 42
Elgin 2	14.37 ft +134.63 MSL	40 to 225 ft +109 to -79 MSL	***	37, pp. 2, 3, 5; 40; 42
Elgin 3	18.27 ft +133.73 MSL	40 to 325 ft +112 to -173 MSL	***	37, pp. 2, 3, 5; 40; 42
Matthias	10.00 ft +80.00 MSL	? to 50 ft ? to +40 MSL	***	37, pp. 2, 3, 5; 40; 42
Smith	8.54 ft +81.46 MSL	unknown	***	37, pp. 2, 3, 5; 40; 42
Harvey	23.57 ft +114.43 MSL	? to 160 ft ? to -22 MSL	***	37, pp. 2, 3, 5; 40; 42
Hartman Estate	35 ft +161 MSL	100 to 200 ft +96 to -100 MSL	***	38, pp. 5, 8, 11; 40; 42
Steele	62.74 ft +87.26 MSL	? to 150 ft ? to +25 MSL	***	37, pp. 2, 3, 5; 40; 42
Tillet	22.46 ft +163.54 MSL	10 to 100 ft +176 to +86 MSL	***	37, pp. 2, 3, 5

* Highest seasonal depth to groundwater for wells listed above using available background data

** (MSL) - Elevation in feet measured in reference to mean sea level

*** Sample collected between September 24 - October 3, 1990

TUT 001 0036

Sample ID	Hazardous Substance	Concentration	Contract Required Quantitation Limit	Reference
Elgin 2 (Sept. 1990)	Cadmium	11 ug/L	5 ug/L	Nos. 33, Table No. 2, pp. N-15, N-132; 60, pg. 30 of 56
Four Winds No.2 (Sept. 1990)	Cadmium Cadmium	6 ug/L* 5 ug/L*	5 ug/L 5 ug/L	Nos. 33, Table No. 2, pp. N-12, N-131; 60, pg. 30 of 56
Hartman Crusher (No.2) (Sept. 1990)	Cadmium	8 ug/L	5 ug/L	Nos. 33, Table No. 2, pp. N-15, N-131; 60, pg. 30 of 56
Elgin 3 (Sept. 1990)	TCE	14 ug/L	1 ug/L	Nos. 33, Table No. 1, pp. N-11, N-120; 60, pg. 27 of 56
Matthias (Sept. 1990)	TCE	11 ug/L	1 ug/L	Nos. 33, Table No. 1, pp. N-13, N-135; 60, pg. 27 of 56
Smith (Sept. 1990)	TCE	20 ug/L	1 ug/L[1]	Nos. 33, Table No. 1, pp. N-12, N-118; 60, pg. 27 of 56
Steele (Sept. 1990)	TCE	48 ug/L	1 ug/L	Nos. 33, Table No. 1, pp. N-12, N-118; 60, pg. 27 of 56
Harvey (Sept. 1990)	PCE	890J ug/L	1 ug/L	Nos. 33, Table No. 1, pp. N-12, N-118; 60, pg. 27 of 56
Hartman (No.3) Estate (Sept. 1990)	1,2 Dichloroethylene (DCE)	2 ug/L	1 ug/L	Nos. 33, Table No. 1, pp. N-11, N-118; 60, pg. 27 of 56
Matthias (Sept. 1990)	1,2 DCE	22 ug/L	1 ug/L	Nos. 33, Table No. 1, pp. N-13, N-135; 60, pg. 27 of 56
Smith (Sept. 1990)	1,2 DCE	58 ug/L	1 ug/L[1]	Nos. 33, Table No. 1, pp. N-12, N-118 60, pg. 27 of 56
Steele (Sept. 1990)	1,2 DCE	120 ug/L	1 ug/L	Nos. 33, Table No. 1,pp. N-12, N-118; 60, pg. 27 of 56

TJT 001 0037

Sample ID	Hazardous Substance	Concentration	Method Detection Limit	Reference
Harvey (Oct. 1987)	1,2-Trans DCE	49 ug/L	1.6 ug/L	Nos. 31, pg. 49; 32, pg. 146
Harvey (Oct. 1987)	PCE	2,000 ug/L	4.1 ug/L	Nos. 31, pg. 50; 32, pg. 146
Smith (Oct. 1987)	1,2-Trans DCE	100 ug/L	1.6 ug/L	Nos. 31, pg. 55; 32, pg. 146
Smith (Oct. 1987)	PCE	150 ug/L	4.1 ug/L	Nos. 31, pg. 55; 32, pg. 146
Tillet (Oct. 1987)	1,2-Trans DCE	600 ug/L	1.6 ug/L	Nos. 31, pg. 14; 32, pg. 146
Tillet (Oct. 1987)	PCE	140 ug/L	4.1 ug/L	Nos. 31, pg. 15; 32, pg. 146

J - Value is estimated (Ref. No. 33, pg. N-119).
This compound was flagged "J" because it failed the Method Detection Limit (MDL) Study. The MDL study consists of seven repeat analyses of target compounds at concentrations of 1 part per billion (ppb). The QC limits for mean accuracy (percent recovery) are 80 - 120 percent. PCE was just below the lower limit at 76 percent. This MDL study indicates that the laboratory instrumentation had difficulty recovering certain compounds (including PCE) at low concentrations (1 ppb) (Ref. No. 33. pp. 80, 81). Therefore, the PCE value of 890 ug/L may represent a lower limit. In addition, the sample was analyzed using higher detection limits.

There is a preponderance of evidence that PCE has been detected in this well at high concentrations. In October 1987, US EPA Region 2 ESD Laboratory analysis detected PCE at 2,000 ug/L in the Harvey Well (Ref. Nos. 31, pg. 50; 32). Photovac gas chromatograph analyses of samples from this well in 1987 and 1988 detected PCE concentrations between 500 ppb and 7,600 ppb (Ref. No. 29, pp. 6, 10)

1 - The data assessment explains that the sample from the Smith Well was originally analyzed using Method 524.2, however concentration values were not within the calibration range of the instrumentation and the laboratory defaulted to Method 624 to meet a holding time constraint. This was considered a breach of contract because Method 624 achieves higher detection limits than Method 524.2. One of the data objectives for Sampling, Analysis, and Monitoring Plan was to achieve lower detection limits. For HRS purposes, concentrations of TCE and 1,2 dichloroethylene contaminants were still above the higher detection limits set forth in Method 624. This indicates the presence of these compounds in this well (Ref. Nos. 33, pg. N-83; 60, pp. 9, 44, 45, of; 61; 62).

* - Duplicate Analysis

TUT 001 0038

- Level I Samples

Sample ID: Matthias
Reference for Benchmarks: Superfund Chemical Database Matrix

Hazardous Substance	Hazardous Substance Concentration	Benchmark Concentration	Benchmark
Trichloroethylene	11 ug/L	5 ug/L	MCL

Sample ID: Steele
Reference for Benchmarks: Superfund Chemical Database Matrix

Hazardous Substance	Hazardous Substance Concentration	Benchmark Concentration	Benchmark
Trichloroethylene	48 ug/L	5 ug/L	MCL

Sample ID: Harvey
Reference for Benchmarks: Superfund Chemical Database Matrix

Hazardous Substance	Hazardous Substance Concentration	Benchmark Concentration	Benchmark
Tetrachloroethylene	2,000 ug/L	350 ug/L	Reference Dose Screening Conc.

SampleID: Tillet
Reference for Benchmarks: Superfund Chemical Database Matrix

Attribution: This site is an area of groundwater contamination with hazardous waste substances that can be attributed to known and unknown sources as described in a Administrative Order Index No. II-CERCLA-00401, signed March 22, 1990. The Order further discusses the 1987 sampling and analytical results which lead to the closure of 24 domestic, commercial, and institutional wells in the Tutu area 1987. Additional sampling information from 1987 to 1990 and enforcement stipulations are further discussed in the Order (Ref. Nos. 46, pp. 1, 32; 51, pp. 1-25).

U. S. EPA Region 2 ESD laboratory analysis from this sampling consistently detected volatile organic compounds (VOCs) including, but not limited to 1,2-trans dichloroethylene (DCE), TCE, and PCE in many residential and commercial wells. These include the wells that detected observed releases according to the September 1990 CLP analysis as well as others. The following is a list of contaminant concentration ranges detected during the October 1987 sampling: 1,2-trans DCE at non-detected levels to 600 ug/L (Tillet); TCE at non-detected levels to 25 ug/L (Tillet); and PCE at non-detected levels to 2,000 ug/L (Harvey) (Ref. No. 31, pp. 14, 15, 50). In addition, tert-butylmethylether was detected in many wells during this sampling event. Highest concentrations of tert-butylmethylether were detected in the Tillet and Four Winds Plaza No. 1 wells at an estimated 470 ug/L (Ref. No. 31, pp. 14, 15, 17, 18). Low concentration of many other VOCs and semivolatiles were also detected, with the exception of methylene chloride (detected in the Harvey well at 120,000 ug/L) (Ref. No. 31, pg. 49). U. S. EPA Technical Assistance Team photovac sampling results from residential and commercial

TUT 001 0039

wells between July 1987 and February 1990 indicate that VOCs were detected consistently from the commercial and residential wells. The contaminant concentration ranges of the PCE, TCE, dichloroethylene (DCE), benzene, and toluene which were consistently found in these wells are as follows: PCE at non-detected levels to 7,600 ug/L (Harvey); TCE at non-detected levels to 711 ug/L (Tillet); and DCE at non-detected levels to 620 ug/L (Tillet); benzene at non-detected levels to 6,950 ug/L (Tillet); and toluene at non-detected levels to 492 ug/L (Tillet) (Ref. No. 29, pp. 1-19). Based on the US EPA ESD laboratory and photovac results, the residential and commercial wells were closed down by the VIDPNR between July 31, 1987 and September 2, 1987 to protect public health. The wells that were closed down include Tillet (Tutu Water Wells), Steele, Elgin Nos. 1, 2, and 3, Four Winds No. 1 (Plaza Associates), Harvey, Hartman Estate, Hartman Crusher, and Hartman Estate (Ref. Nos. 46, pp. 4, 11, 19, 32, B-5, B-9; 47, p. 3; 51, pp. 4, 5). The VIHA Nos. 1 and 3 were closed due to contamination, however the exact date of closure is unknown (Ref. Nos. 46. pg. 32). The Smith well was closed down or prohibited from being used in July 1987 as evidence of alternate supply and its operating status is discussed in the references (Ref. Nos. 46, pp. 11, 19, 32; 47, pg. 3). In September 1990, Contract Laboratory Program analysis of samples from downgradient wells detected an observed release of TCE, PCE, 1,2-trans dichloroethylene, and cadmium. Cadmium and TCE were found above the Maximum Contaminant Levels (Ref. No. 33, pp. N-1 - N-19).

Several suspected sources have been identified including gas stations, a dry cleaner, and auto repair shops. The soils from these properties were sampled and analyzed. The same indicator contaminants found in groundwater were also detected in soils from the suspected sources. Waste quantity and waste source fingerprinting has been vague. The amount of contaminants deposited at or releasing from these sources has not been defined. The groundwater contamination appears to be confined to the Turpentine Run Upper Basin (Ref. Nos. 29, pp. 1-18; 30; 31, pp.1-89; 32; 33, pp. N-1 - N-19; 46, pp. 1, 4, 6, 7, 8, 9, 11, 12, 32-37, B-1 - B-37; 47; 48, pp. 1-7).

In September 1988 and June 1989, sampling and analysis of soils occurred at several suspected sources of contamination including the properties of Tutu Texaco Service Station, Tutu Esso Car Care Center, O'Henry Cleaners, Consolidated Auto Parts (Gasset Motors), Ramsay Motor Co., Department of Education Building (formerly LAGA), and Tillet Gardens (Ref. Nos. 3, pp. 1-5; 7, pp. 1-62; 8, pp. 1-5). Low levels of volatile organics such as 1,1,1-trichloroethane, trichloroethylene (TCE), and tetrachloroethylene (PCE) were also detected in an excavated soil pile at Tutu Texaco (Ref. No 8. pg. 25). Volatile organics detected in soils on the O'Henry Cleaners property were tetrachloroethane (440,000 ug/kg), 1,2-trans dichloroethylene (20 ug/kg estimated), and tetrachloroethylene (180,000 and 190,000 ug/kg) (Ref. Nos. 8, pp. 1-5, 31 ;9, pg. 3. In addition, it is known that O'Henry Cleaners stored PCE, however their disposal practices were unknown (Ref. No. 50, pp. 6, 7). Semivolatiles detected in soils at the LAGA Building included but were not limited to phenol (900,000 ug/kg), 2-methylphenol (320,000 ug/kg), and 4-methylphenol (1,300,000 ug/kg estimated). (Ref. Nos. 8, pp. 1-4, 39). Inorganic E.P. Toxicity analysis of soils identified the presence of cadmium, lead, and barium at levels below the maximum allowable limits for this test. This analysis is inconclusive for HRS purposes because it only quantifies the leachable characteristics of those compounds. In addition, there are no background soils samples for comparison (Ref. Nos. 8, pp. 16, 23, 29, 35, 42, 49; 34, pg. 406)

In June 1989, waste oil samples were collected from underground storage tanks (USTs), oil/water separators, and other collection/storage vessels at Ramsay Motor Co., Tutu Texaco, and Tutu Esso. Analysis of these samples detected BTEX and other volatiles such as PCE and 1,1,1-trichloroethane (Ref. Nos. 11, 12).

Hazardous Substances Released

Cadmium, 1,2 Dichloroethylene, Trichloroethylene, and Tetrachloroethylene.

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3.2 WASTE CHARACTERISTICS

3.2.1 Toxicity/Mobility

Hazardous Substance	Source No.	Toxicity Factor Value	Mobility Factor Value	Toxicity/ Mobility	Ref. No. 2, Appendix B-1
Cadmium	1	10,000	1	10,000	pg. B-3
1,2 Dichloroethylene	1	100	1	100	pg. B-6
Tetrachloro-ethylene	1	100	1	100	pg. B-12
Trichloro-ethylene	1	10	1	10	pg. B-13

As stated in the HRS final rule in section 3.2.1.2 of the Federal Register Vol. 55 (55 FR), No. 241, December 14, 1990, (page 51601), the following applies to this site "For any hazardous substance that meets the criteria for an observed release by chemical analysis to one or more aquifers underlying the site, regardless of the aquifer being evaluated, assign a mobility factor of 1.

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3.2.2 Hazardous Waste Quantity

Source Number	Source Hazardous Waste Quantity Value (Section 2.4.2.1.5)	Is source hazardous constituent quantity data complete? (yes/no)
1	The waste quantity for this groundwater cannot be ascertained. However, an observed release including Level I and II concentrations has been exhibited, therefore the default value for hazardous waste quantity (100) would be used, as stated in section 2.4.2.2 of the HRS final rule (55 FR 51519-51592, December 14, 1990). Sum of Values: SEE ABOVE	NO

3.2.3 Waste Characteristics Factor Category Value

Highest Toxicity/Mobility = Cadmium at 10,000 (see section 3.2.1)

Hazardous Waste Quantity = 100 (see section 3.2.2)

The Waste Characteristics Factor Category Value (32) is derived from Table 2-7 in section 2.4.3.1 of the HRS final rule (55 FR 51592, December 14, 1990)

Toxicity/Mobility Factor Value X Hazardous Waste Quantity Factor Value: 1 X 10^6

10,000 x 100 = 1 x 10^6

= = = =

3.3 TARGETS

Well	Distance From Source	Aquifer	Level I Contam. (Y/N)	Level II Contam. (Y/N)	Potential Contam. (Y/N)	Ref. Nos.
Steele	0 feet	Bedrock	Y	N	N	37, pp. 2, 3, 5, 13; 38, pg. 7; 40; 42; 46, pg. 19; 53; 54
Matthias	0 feet	Bedrock	Y	N	N	37, pp. 2, 3, 5, 13; 38, pg. 7; 40; 42; 53; 54
Harvey	0 feet	Bedrock	Y	N	N	37, pp. 2, 3, 5, 13; 38, pg. 7; 40; 42; 46, pg. 19; 53; 54
Tillet	0 feet	Bedrock	Y	N	N	37, pp. 2, 3, 5, 13; 38, pg. 8; 43, pg. 6; 53; 54
Smith	0 feet	Bedrock	N	Y	N	37, pp. 2, 3, 5, 13; 38, pg. 7; 40; 42; 46, pg. 19; 53; 54
Bryan #1	4,000 feet	Bedrock	N	N	Y	37, pp. 2, 3, 5, 13; 40; 42; 53; 54
Bryan #2	4,000 feet	Bedrock	N	N	Y	37, pp. 2, 3, 5, 13; 40; 42; 53; 54
Demitry	2,675 feet	Bedrock	N	N	Y	37, pp. 2, 3, 5, 13; 40; 42; 53; 54

TUT 001 0044

3.3.1 Nearest Well

Well: Steele
Level of Contamination (I, II, or potential): I
If potential contamination, distance from source in miles:

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3.3.2 Population

3.3.2.1 Level of Contamination

3.3.2.2 Level I Concentrations

Level I Well	Population	Reference
Harvey*	10	46, pg. 19
Steele**	28	46, pg. 19
Matthias***	5	53, 54
Tillet****	200	53, 54

* On September 2, 1987, this well was closed by the VIDPNR to protect public health due volatile organic contamination (Ref. Nos. 46, pp. 4, 11, 32; 47, pg. 3; 51, pg. 5). An alternate drinking water has been provided since 1987 at and been maintained at least through March 1990 (Ref. No. 46, pg. 19; 51, pg. 6). A December 1988 Potable Water Alternatives report prepared by Roy F. Weston, Region 2 TAT indicates that this well served 10 people (Ref. No. 46, pg. 19). U.S. Geological Survey inventories from August 1990 and March 1991 indicate that this well was not being used (Ref. Nos. 37, pp. 2, 3; 38, pg. 7). In addition, a well appropriations permit list dated July 31, 1987 states that this well was permitted for domestic use in 1978 (Ref. No. 41, pg. 5). April 1991 and May correspondence with the VIDPNR indicates this well presently serves 4 people and the current usage is for flushing and secondary use (Ref. Nos. 53, 54). A population of 10 was assigned to this well because this was the population when the well was closed down or prohibited from being used. Present use of the this well also indicates that it is available for potable water usage.

** On September 2, 1987, this well was closed by the VIDPNR to protect public health due volatile organic contamination (Ref. Nos. 46, pp. 4, 11, 32; 47, pg. 3; 51, pg. 5). An alternate drinking water has been provided since 1987 and been maintained at least through March 1990 (Ref. No. 46, pg. 19; 51, pg. 6). A December 1988 Potable Water Alternatives report prepared by Roy F. Weston, Region 2 TAT indicates that this well served 28 people (Ref. No. 46, pg. 19). U.S. Geological Survey inventories from August 1990 and March 1991 indicate that this well was being used for irrigation/stock and domestic purposes, respectively (Ref. Nos. 37, pp. 2, 3; 38, pg. 7). April 1991 and May correspondence with the VIDPNR indicates this well presently serves 20 people. The current well usage is unknown (Ref. Nos. 53, 54). A population of 28 was assigned to this well because this was the population when the well was closed down or prohibited from being used.

*** In 1987, this well apparently was not closed down. However, PCE and TCE have been consistently detected in this well since 1987 (Ref. Nos. 30, pp. 6, 10, 14, 18; 31, pg. 52). U.S. Geological Survey inventories from August 1990 and March 1991 indicate that this well was being used for and domestic purposes (Ref. Nos. 37, pp. 2, 3; 38, pg. 7). April and May 1991 correspondence with the VIDPNR indicates that this well presently serves 5 people, however is presently used for flushing and secondary usage (Ref. Nos. 53, 54). The population served by this well obtains potable water from an alternate. It is not known whether this well was ever used for potable purposes. It was counted as part of the "Level I" population because it is not closed down and remains available for potable usage.

**** On July 31, 1987, the Tillet well (Tutu Water Wells) was closed by the VIDPNR to protect public health due to volatile organic contamination (Ref. Nos. 46, pp. 4, 11, 32, B-5, B-9; 47, pg. 3; 51, pg. 5). U.S. Geological Survey inventories from August 1990 and March 1991 indicate that this well was not being used (Ref. Nos. 37, pp. 2, 3, 5; 38, pg. 8). April and May 1991 correspondence with the VIDPNR indicates that this well is presently not being used, however it serves 200 people when operational (Ref. Nos. 53, 54). A population of 200 was assigned to this well because this was the population when the well was closed down.

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3.3.2.3 Level II Concentrations

Level II Well	Population	Reference
Smith*	12	46, pg. 19

* The Smith Well was closed down or prohibited from being used in July 1987 as evidence of alternate drinking water supply and its operating status is discussed in the references (Ref. Nos. 46, pp. 11, 19, 32; 47, pg. 3, 17; 51, pg. 6). A December 1988 Potable Water Alternatives report prepared by Roy F. Weston, Region 2 TAT indicates that this well served 12 people (Ref. No. 46, pg. 19). U.S. Geological Survey inventories from August 1990 and March 1991 indicate that this well was being used for domestic purposes (Ref. Nos. 37, pp. 2, 3; 38, pg. 7). April 1991 correspondence with the VIDPNR indicates that this well presently serves 8 people. In addition, it is not known whether the well is presently being used for drinking purposes (Ref. Nos. 53, 54). A population of 12 was assigned to this well because this was the population when the well was closed down or prohibited from being used.

= = = =

GW-Potential Contamination

3.3.2.4 Potential Contamination

Well	Distance Category	Population	Reference	Distance-Weighted Population Value
N/A	0 - 1/4 mile	0	N/A	0
N/A	1/4 - 1/2 mile	0	N/A	0
Bryan #1	1/2 - 1 mile	509*	37, pp. 2, 3, 5, 13;	523
Bryan #2	1/2 - 1 mile	509*	43, pp. 93, 94; 45,	N/A
Demitry	1/2 - 1 mile	509*	pg. 19; 53; 54; 55	N/A
N/A	1 - 2 miles	0	N/A	0
N/A	2 - 3 miles	0	N/A	0
N/A	3 - 4 miles	0	N/A	0

* Between 1987 and the present, wells owned and operated by the Virgin Island Housing Authority (VIHA) in the Tutu projects were closed. Residents of the projects then attained their potable water via trucking, bottled water, and water mains from other public supply wells. The Bryan and Demitry wells are presently two of the suppliers serving the VIHA via water main. In 1989, 1,528 people at the Tutu VIHA were reportedly being serve potable water via cistern. It is therefore assumed that the potential population has not changed and the Bryan and Demitry wells would serve a portion or all of the population at the VIHA. No information is available on apportionment of water to the VIHA. It is assumed that each of the three wells serve the VIHA equally (509 people/well) (Ref. Nos. 37, pp. 2, 3, 5, 13; 43, pp. 93, 94; 45, pg. 19; 53; 54; 55).

Sum of Distance-Weighted Population Values: 523

= = = =

3.3.3 RESOURCES

Well	Aquifer	Resource Use	Reference
N/A	N/A	N/A	

= = = =

3.3.4 WELLHEAD PROTECTION AREA

Area	Use	Reference	Value
There are no known wellhead protection areas within 4 miles of the site.			0

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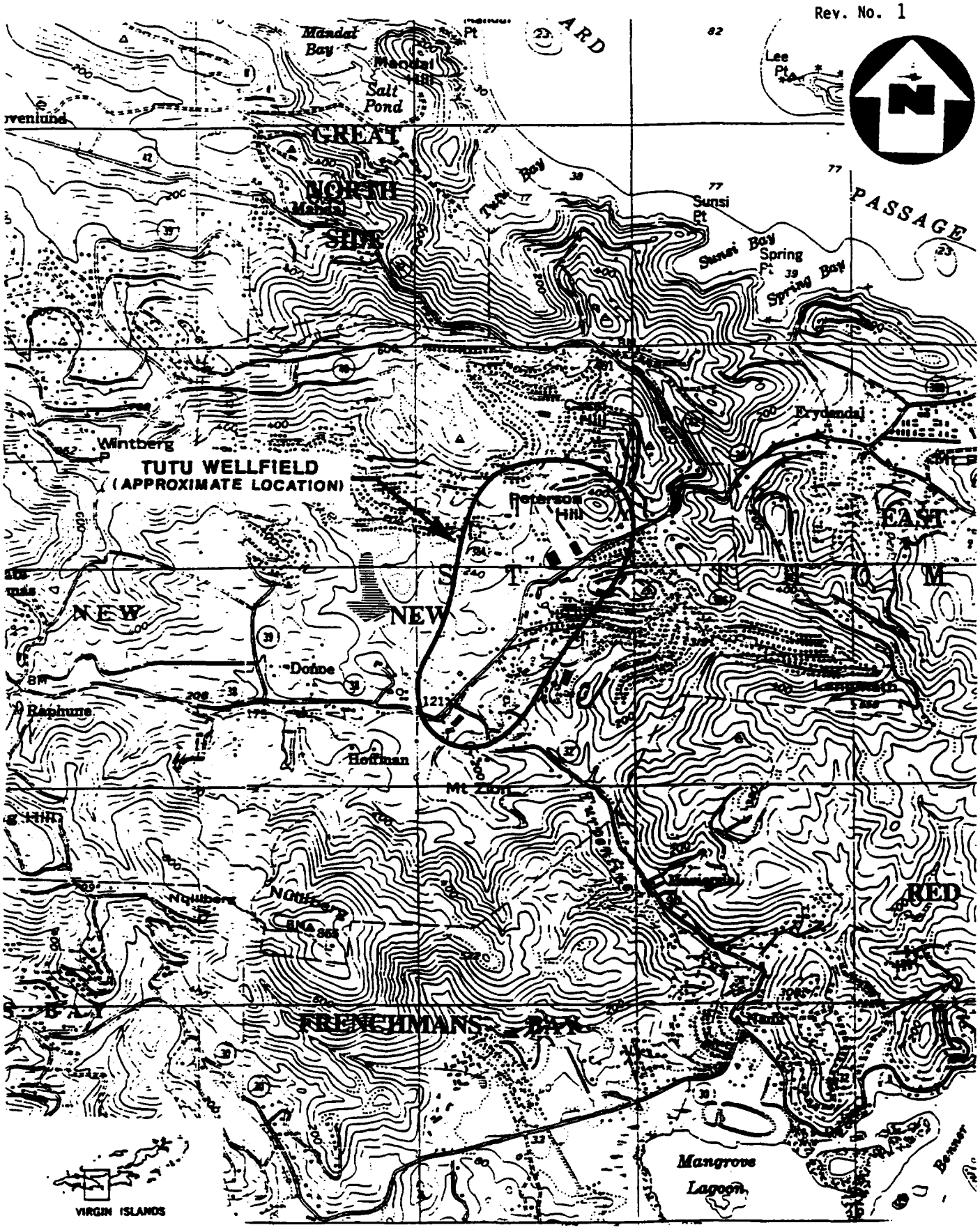
SECTION IV: FIGURES

Rev. No. 1



(QUAD) EASTERN ST. THOMAS, USVI

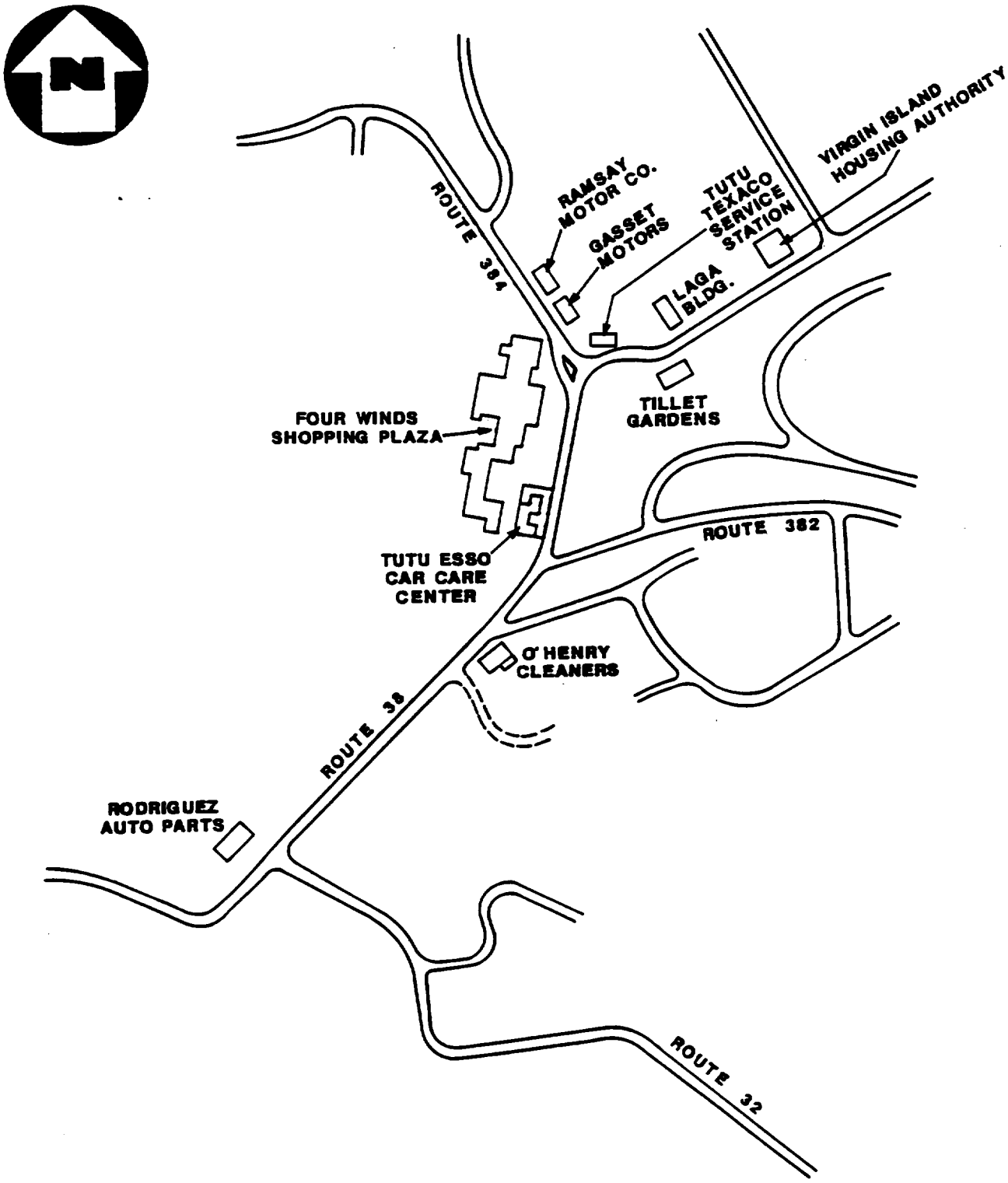
FIGURE 1

SITE LOCATION MAP

TUTU WELLFIELD, ST. THOMAS, USVI

SCALE: 1" = 2000'

NUS CORPORATION



SITE MAP

TUTU WELLFIELD

ST. THOMAS, U.S. VIRGIN ISLANDS

NOT TO SCALE

FIGURE 2

NUS CORPORATION

REFERENCE NO. 1

12-14-90
Vol. 55 No. 241

federal register

Friday
December 14, 1990

Book 2

United States
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Printing Office
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Washington, DC 20402

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(ISSN 0097-6326)

TUT 001 0056

REFERENCE NO. 2

from Larry Zaragoza, HQ

RECEIVED
DEC 7 1990
S & M BRANCH

SUPERFUND CHEMICAL DATA MATRIX

DATA SOURCES

November 27, 1990

REFERENCE NO. 2

SUPERFUND CHEMICAL DATA MATRIX

April, 1991

TUT 001 0060

REFERENCE NO. 3

September 19, 1988

Ms. Caroline Kwan
U.S. Environmental Protection Agency
26 Federal Plaza
New York, New York 10278

Project: EPA Contract No. 68-01-7331
Document No. T648-C02-EP-CJLY-1
Subject: Updated Technical Review of Documents
Tutu Wellfield/Supercat Laundromat CERCLA 104(e) Responses
W.A. 648 and W.A. 821

Dear Ms. Kwan:

Enclosed is the updated technical review of nine CERCLA 104(e) responses submitted by 1) O'Henry Cleaners 2) Ramsay Motors, Inc. 3) Consolidated Auto Parts Inc. 4) Rodriquez Auto Parts, Inc. 5) Esso Tutu Car Care Center 6) Texaco Tutu Service Station 7) Jim Tillet, Inc. 8) Caribbean Jeep and Car Rental and 9) Virgin Island Housing Authority.

It is recommended that further site investigations be conducted as soon as possible at the above mentioned facilities or other areas of concern to complete this review. Information on potential sources and potential contaminants of concern may not have been noted in the CERCLA 104(e) responses.

Please return any comments or suggested changes to me or Robert Goltz.

Sincerely,

CDM Federal Programs Corporation

Scott Graber
Work Assignment Manager

SG:mm

Attachment

cc: Jose Font, CFO
Francine Lang, DPNR
Amy Chester, ORC
NYC File
E. Sayed, CDM FPC - HQ

(SG2/7)

Respondent	Contaminant(s) of Concern	Process(es)	Potential Source	Potential Release/Route	Comments
O'Henry Cleaners	-Dry cleaning fluids (i.e. tetrachloroethylene - PCE) 2-butoxyethanol hexylene glycol Rust-Go (HF acid) -Ex-Pedite degreaser -Ez-Duz-it (unspecified, volatile solvents) Dye Stripper	Recycling of PCE Use/transfer of PCE Disposal of PCE	Leaching pit Sump holding tank Raw material storage area Above ground fuel tank 5 gallon containers of spent PCE (filter values or dry) PCE residue 55-gallon drums PCE 2000-gallon aboveground diesel tank	Spillage of PCE to groundwater/surface water/ soil/ air (inferred)	PCE may not be the only dry cleaning fluid used. No other information was available on the dry cleaning operation
[illegible]say Motors, Inc.	Used oil Kerosene -*STP degreaser (naptha, unspecified solvents petroleum distillates, ethoxylated nonyl phenol, propane) All grades SAE motor oil *GoJo hand cleaner (nonoxynol, petroleum distillates) -*STP Carb spray (xylene, butyl cellosolve, unspecified solvents) Transmission fluid -*Brake cleaner (1,1,1-trichloroethane, perchloroethylene, carbon dioxide propellent) *Kendall antifreeze and coolant (ethylene glycol plus unspecified additives) WD-40 Lubricant (petroleum distillates) Injector fluid Radiator flush Gasoline	Automotive service Car engine cleaning Deposition of oil gasoline, degreaser, kerosene to and from underground storage tank (UST)	UST (block and mortar tank) Drums	UST to groundwater/soil (inferred)	

1. Contaminant constituents included in parentheses, when known, for commercial products listed.
2. "*" indicates that listing of hazardous ingredients is supported by Material Safety Data Sheets (MSDS).
3. "**" indicates that hazardous ingredients are listed elsewhere in table, based on other respondent's MSDS.
4. "-" indicates that product probably contains a chlorinated solvent.

TUT 001 00063

Responder	Contaminant(s) of Concern	Process(es)	Potent/ Source	Potential Release/Route	Comments
Jim Tillett, Inc.	-*Water-based dyes (ammonium hydrocide, mineral spirits) including Plastique Silver Pearl No. 1120E1 Morton Thiokol No. 359 Morton Thiokol No. 475	Fabric silk screening aqueous residue is evaporated onto sand which is disposed of off-site	Paint containers; raw material storage area	One drain to unknown destination; second drain to evaporation pit.	All colors are claimed to be water-based.
Caribbean Jeep and Car Rental	Unleaded gasoline	Storage and transfer of product to and from UST	UST: leaded gasoline	UST/pipes to groundwater, surface water, soil	Based on limited knowledge of tenant; need to confirm/ expand information with owner (Esso, St. Thomas)
Consolidated Auto Parts, Inc.	Waste oil Engine Fluids -"Chemicals"(auto) Various grades of SAE motor oil	Automotive service Storage of waste products in drums (uncovered-inferred) Storage of raw materials	55 gal drums of waste oil Shallow ditch near the service bays Service yard/bays Drums of products	Drums to groundwater/ surface water/storm drains/ soils in site runoff noted in response Service bays/yard to storm drains	A list of chemicals used/ sold was not provided
Virgin Islands Housing Authority	Hydraulic fluid	Automobile dealership; storage of hydraulic fluid in UST	UST; hydraulic hoists	UST/hydraulic lines to groundwater/surface water/ soil (inferred)	Property was used by Tropical Motors as an automobile dealership containing hydraulic hoists, prior to use by VIHA. VIHA official revealed potential UST containing hydraulic fluid use to operate hoists. The UST existence has not been verified.

1. Contaminant constituents included in parentheses, when known, for commercial products listed.
2. "*" indicates that listing of hazardous ingredients is supported by Material Safety Data Sheets (MSDS).
3. "**" indicates that hazardous ingredients are listed elsewhere in table, based on other respondent's MSDS.
4. "-" indicates that product probably contains a chlorinated solvent.

TUT 001 0064

Respondent	Contaminant(s) of Concern	Process(es)	Potential Source	Potential Release/Route	Comments
Rodriguez Auto Parts	Oil Gasoline Kerosene Xylene -Shell sol (low aromatic white spirit/stoddard solvent) Grease	Automotive service Storage/transfer of waste products to pit and drums	Two (5000 gal) USTs: Super Premium and Regular Unleaded Underground pit used to collect oil from the garage collection (used until 7 or 8 yrs ago) Old car wash drain lines Cement cistern used (until 1986) to collect "gray" water from the car wash Drums of product	Old drain to sewer USTs/pipes to groundwater(GW)/soil/surface water (SW) Underground pit (cement) to GW/SW/soil Old car wash drain lines to GW/SW/Soil Cement cistern to sewer	Mr. Rodriguez may have purchased a franchise from Esso and would be an affiliate of Esso.
Texaco Tutu Service Station	Gasoline Used oil *Motor Flush (xylene, petroleum distillates) -**STP degreaser -**STP Carb spray Drive and Clean Gasoline Detergent	Automotive service Storage/transfer of products to and from USTs	USTs - Unleaded/leaded gasoline Oil Separator Car care floor drain Car care catch basins Drum storage area	USTs/pipes to groundwater/surface water/soil Catch basins to sewer	USTs were removed from service as follows: 1 (4,000 gals) tank July '80 Out of svce due to suspected leak (Petrotite Test); 2 (4,000 gals) tanks July '80 Out of service due to failing mechanical integrity test. The tank installation is not equipped with a lining system. It is indicated that the tank piping was replaced due to a pinhole in one of the pipes (Pipeline test performed). It seems feasible that chemicals were used but a chemical list was not provided. 1/10/77 letter indicated 2242 gals of premium gasoline loss attributed to pipeline leaks (other letters indicated losses).

1. Contaminant constituents included in parentheses, when known, for commercial products listed.
2. "*" indicates that listing of hazardous ingredients is supported by Material Safety Data Sheets (MSDS).
3. "**" indicates that hazardous ingredients are listed elsewhere in table, based on other respondnet's MSDS.
4. "-" indicates that product probably contains a chlorinated solvent.

TUT 001 0065

Respond	Contaminant(s) of Concern		Proce(s)	Potential Source	Potential Release/Rout
Esso Tutu Car Care Center	Gasoline Used oil -Freon R72 (halogenated hydrocarbon gas) Antifreeze (ethylene glycol) Battery fluid Power steering fluid **Motor flush STP gas treatment A.O.K. gas treatment -Fuel injection cleaner Diesel fuel Cond. Transmission Seal/cond. Wynns Friction Proof Wynns Spitfire trtmnt Wynns top cylinder oil Super radiator flush Water pump lube liquid radiator sealer R-6 Bar's Stop Leak Super octane trtment Dry gas treatment	Upholstery cleaner -Chrome cleaner -Mag wheel cleaner -Bug and tar remover Whitewall tire cleaner -Spoke and wire cleaner -Carburator cleaner -**Engine degreaser -**Brake cleaner Silicon spray Penetrating oil Rust Oleum undercoat WD40 lube spray Brake Quiet spray Ignition dryer spray White lithium grease Bat. term. protector High temp. brg. grease gear oil powder radiator sealer numerous car wax products Brake fluid A.O.K. Octane Boost	Automotive service Storage/transer of products to and/or waste products to and from USTs	USTs Unleaded/leaded gasoline UST - 2000 gal oil tank (cistern) in mechanic shop Car care area floor drain Mechanic shop floor drain	Drain lines to sewer USTs/pipes to groundwater/ surface water/soil

Comments

No records maintained on oil UST. Results of 7/27-28/87 tank test indicated that the structural integrity of the premium unleaded UST was questioned since the petrotite test was stopped due to a possible leak; stand pipe was decreasing.

. Contaminant constituents included in parentheses, when known, for commercial products listed.
2. "*" indicates that listing of hazardous ingredients is supported by Material Safety Data Sheets (MSDS).
3. "**" indicates that hazardous ingredients are listed elsewhere in table, based on other respondent's MSDS.
4. "-" indicates that product probably contains a chlorinated solvent.

TLT 001 0056

REFERENCE NO. 4

00170
02-8902-40

02-8902-40-PA
REV. NO. 1

FINAL DRAFT
PRELIMINARY ASSESSMENT
TUTU TEXACO
ST. THOMAS, U.S. VIRGIN ISLANDS

PREPARED UNDER

TECHNICAL DIRECTIVE DOCUMENT NO. 02-8902-40
CONTRACT NO. 68-01-7346

FOR THE

ENVIRONMENTAL SERVICES DIVISION
U.S. ENVIRONMENTAL PROTECTION AGENCY

MARCH 31, 1989
REVISED MAY 26, 1989

NUS CORPORATION
SUPERFUND DIVISION

SUBMITTED BY:

Diane Trube

DIANE TRUBE
PROJECT MANAGER

Joseph T Mayo

JOSEPH MAYO
SITE MANAGER

REVIEWED/APPROVED BY:

Ronald M Naman

RONALD M. NAMAN
FIT OFFICE MANAGER

(1 of 30)

02-8902-40-PA
Rev. No. 1

POTENTIAL HAZARDOUS WASTE SITE PRELIMINARY ASSESSMENT

PART I: SITE INFORMATION

1. Site Name/Alias Tutu Texaco

   Street Route 38 and Route 384

   City St. Thomas (Tutu District) State U.S. Virgin Islands Zip 08002

2. County N/A County Code N/A Cong. Dist. N/A

3 EPA ID No. New Site

4. Latitude 18° 20' 34" N. Longitude 64° 53' 18" W.

   USGS Quad. Eastern St. Thomas, U.S. Virgin Islands

5. Owner Texaco Caribbean Tel. No. 809-774-1931

   Street P.O. Box 3740

   City Charlotte Amalie State U.S. Virgin Island Zip 00801

6. Operator Unknown Tel. No.

   Street

   City State Zip

7. Type of Ownership

   ☒ Private ☐ Federal ☐ State
   ☐ County ☐ Municipal ☐ Unknown ☐ Other

8. Owner/Operator Notification on File

   ☐ RCRA 3001 Date ☐ CERCLA 103c Date
   ☒ None ☐ Unknown

9. Permit Information

Permit	Permit No.	Date Issued	Expiration Date	Comments
None				

10. Site Status

    ☒ Active ☐ Inactive ☐ Unknown

11. Years of Operation Unknown to Present

(2 OF 50)

12. Identify the types of waste units (e.g., landfill, surface impoundment, piles, stained soil, above- or below-ground tanks or containers, land treatment, etc.) on site. Initiate as many waste unit numbers as needed to identify all waste sources on site.

(a) Waste Management Areas

Waste Unit No.	Waste Unit Type	Facility Name for Unit
1	Drums	Waste Oil Drums
2	Underground Storage Tanks	Waste Oil Underground Storage Tanks

(b) Other Areas of Concern

Identify any miscellaneous spills, dumping, etc. on site; describe the materials and identify their locations on site.

No other spills, incidents of dumping, etc. were observed on the site during the NUS Corp. Region 2 FIT on-site reconnaissance on 2/15/89.

13. Information available from

Contact Amy Brochu Agency U.S. EPA Tel. No. (201) 906-6802

Preparer Joseph Mayo Agency NUS Corp. Region 2 FIT Date 03/31/89

PART II: WASTE SOURCE INFORMATION

For each of the waste units identified in Part I, complete the following six items.

Waste Unit 1 - Drums, Waste Oil Drums

1. **Identify the RCRA status and permit history, if applicable, and the age of the waste unit.**

   There are no known RCRA permits for this waste unit. The age of this waste unit is unknown. Until June 1986, the Water and Power Authority (WAPA) accepted waste oil and used it for fuel. A batch of waste oil was found to contain polychlorinated biphenyls (PCBs), and WAPA stopped accepting waste oil. Currently, there is no acceptable method for disposal of waste oil on St. Thomas. Waste oil generators must store all their oil.

2. **Describe the location of the waste unit and identify clearly on the site map.**

   The waste unit is located in the northern corner of the Tutu Texaco property.

3. **Identify the size or quantity of the waste unit (e.g., area or volume of a landfill or surface impoundment, number and capacity of drums or tanks). Specify the quantity of hazardous substances in the waste unit.**

   There are twenty-seven 55-gallon drums in the waste unit. Twenty-five of these drums contain waste oil generated from automotive repair and servicing operations. The remaining two drums reportedly contain dirt. There are also three 20-gallon drums and a few 5-gallon pails containing waste oil on site. The total quantity of waste in this unit is approximately 1420 gallons.

4. **Identify the physical state(s) of the waste type(s) as disposed of in the waste unit. The physical state(s) should be categorized as follows: solid, powder or fines, sludge, slurry, liquid, or gas.**

   Twenty-five of the drums contain liquid waste oil. Two of the drums reportedly contain dirt which is a solid.

5. **Identify specific hazardous substance(s) known or suspected to be present in the waste unit.**

   Twenty-five of the drums on site contain liquid waste oil from automotive repair and servicing operations. This oil may contain small quantities of gasoline, kerosene, or degreasing solvents. Sample analyses of waste oil from the Tutu Texaco station reportedly detected the presence of trichloroethane (TCA). However, the analysis results were invalidated because the sample holding times were exceeded.

6. **Describe the containment of the waste unit as it relates to contaminant migration via groundwater, surface water, and air.**

   The waste in the unit is contained in drums that are stored on a concrete surface. There are no berms or curbs to contain the oil in the event of a spill. There is evidence of spills in the storage area, and the bung on one of the drums was open.

   An OVA flame ionization detector noted a reading of 20 ppm from the open drum. There were no readings above background in the ambient air in the drum storage area.

   The lack of containment of the waste unit provides the potential for release to surface water by runoff from spills and for release to groundwater by runoff and subsequent percolation through soil.

Ref. Nos. 1, 21, 22, 24

PART II: WASTE SOURCE INFORMATION

For each of the waste units identified in Part I, complete the following six items.

Waste Unit 2 - Underground Storage Tanks, Waste Oil Underground Storage Tanks

1. **Identify the RCRA status and permit history, if applicable, and the age of the waste unit.**

   There are no known RCRA permits for this waste unit. The age of this waste unit is unknown. Until June 1986, the Water and Power Authority (WAPA) accepted waste oil and used it for fuel. A batch of waste oil was found to contain PCBs, and WAPA stopped accepting waste oil. Currently, there is no acceptable method for disposal of waste oil on St. Thomas. Waste oil generators must store all their oil.

2. **Describe the location of the waste unit and identify clearly on the site map.**

   The exact location of the waste unit is unknown as the tanks were not observed during the on-site reconnaissance conducted by NUS Corp. Region 2 FIT on 2/15/89. A preliminary investigation conducted by the Department of Planning and Natural Resources (DPNR) on 8/5/87 indicated the presence of two underground storage tanks. One tank had a concrete top and a concrete partition, and the second tank was covered with a square steel plate. The volume and composition of the tanks were not determined. The material in the tanks is reported to be waste oil.

3. **Identify the size or quantity of the waste unit (e.g., area or volume of a landfill or surface impoundment, number and capacity of drums or tanks). Specify the quantity of hazardous substances in the waste unit.**

   The capacity of the tanks and the quantity of waste in the unit are unknown.

4. **Identify the physical state(s) of the waste type(s) as disposed of in the waste unit. The physical state(s) should be categorized as follows: solid, powder or fines, sludge, slurry, liquid, or gas.**

   The physical state of the waste is liquid.

5. **Identify specific hazardous substance(s) known or suspected to be present in the waste unit.**

   The waste unit contains automotive waste oil. Substances such as gasoline, kerosene, and degreasing solvents may be present in the oil. Samples of Tutu Texaco waste oil were reported to contain TCA. However, the sample analysis results were invalidated because the sample holding times were exceeded.

6. **Describe the containment of the waste unit as it relates to contaminant migration via groundwater, surface water, and air.**

   The containment of the waste unit is unknown. The tanks are covered, but no other information concerning the tanks' waste containment properties is available.

Ref. Nos. 1, 21, 22, 24

PART III: HAZARD ASSESSMENT

GROUNDWATER ROUTE

1. **Describe the likelihood of a release of contaminant(s) to the groundwater as follows: observed, alleged, potential, or none. Identify the contaminant(s) detected or suspected, and provide a rationale for attributing the contaminant(s) to the facility.**

The potential exists for wastes on the Tutu Texaco Site to be released to groundwater. There is evidence (photo No. R3-P10) that spilled oil is staining soil and may be transported to groundwater. There are no berms or curbs to contain the waste from the drums in the event of a spill. One of the drums was open.

The drums on site contain automotive waste oil. Air monitoring instrument readings indicate that organic vapors are present in one of the drums. It is reported that samples of waste oil collected from the site contained TCA. However, the sample analysis results were invalidated because the sample holding times were exceeded.

There is insufficient information available to evaluate a release from the underground storage tank for waste oil as the construction and integrity of this tank are unknown. There are no reports of spills or leaks from this tank; however, waste oil in the tank is being stored in violation of U.S. Virgin Islands laws.

Ref. No. 1, 22, 24

2. **Describe the aquifer of concern; include information such as depth, thickness, geologic composition, permeability, overlying strata, confining layers, interconnections, discontinuities, depth to water table, groundwater flow direction.**

The rock units of St. Thomas and St. John are divided into three major groups: The Water Island Formation, the Virgin Island Group, and an unnamed group made up of one or more dioritic plutons. The Water Island Formation, which is late lower Cretaceous in age, consists of keratophyre and spilates. The Virgin Island Group, which is probably early Cretaceous or Albian in age, consists of andesitic-pyroclastic rocks and sedimentary formations. The Virgin Island Group is divided into four formations: the Louisenhoj Formation, which consists of augite-andesite breccia, tuff, and conglomerate; the Outer Brass Limestone which consists of partially silicified-tuffaceous-radiolarian-limestone; the Tutu Formation, which consists of tuffaceous wacke, including megabreccia near the base and limestone near the top; and the Hans Lollik Formation, which may be Eocene in age, and consists of augite-andesite breccia and tuff. The final group is made up of one or more dioritic plutons. These unamed dikes and plugs of quartz - andesine-hornblende porphory are Upper Cretaceous and Lower Tertiary in age. Alluvium deposits are quarternary in age.

The Water Island Formation, which consists of 95 percent volcanic flow breccias, was probably extruded on a relatively level ocean floor. The absence of terrigenous sediments from this formation indicates that there were no emergent islands present in the area at the time of extrusion. Emergent islands would have served as a source of weather sediments or detritus, which is not present in this formation. There is evidence that sea floor subsidence occurred during the greater part of the accumulation of this formation. However, the subsidence was not rapid enough to maintain a constant water level, thereby causing explosive erruptions near the top of the formation. Regional uplift occurred near the end of Water Island time.

The Louisenhoj Formation of the Virgin Island Group unconformably overlies the Water Island Formation and crops out on about half of the land area on St. Thomas. Pillsbury sound between St. Thomas and St. John was the origin of this formation. Evidence of this center is based upon the coarseness of volcanic ejecta in the formation in nearby eastern St. Thomas and western St. John. Material is less coarse and tuffs are more predominant further east and west away from the pluton. This augite-andesite formation ranges in thickness from 4,000 to 13,000 feet. In certain areas of St. Thomas and St. John conglomerates are interbedded with andesitic rocks at the base of this formation. The depositional environment of this conglomerate varies from location to location throughout the formation.

The Outer Brass Formation of the Virgin Island Group is mostly siliceous limestone, which overlies the Louisenhoj Formation. This limestone formation is an offshore deposit formed by radiolarian and foraminiferal remains including a minor amount of tuff. Thicknesses are known to be up to at least 600 feet.

Overlying the Outer Brass Formation is the Tutu Formation. The Tutu Formation is fine- to coarse-grained volcanic wackes, which are termed flysch. This formation is derived from eroding sediments from the Louisenhoj andesites. Exposed thicknesses are known to be as much as 6000 feet. Within this formation, a megabreccia lithofacies with an average thickness of 30 feet and a limestone member with thickness up to 300 feet are worth mentioning.

The Hans Lollik Formation, which consists of at least 10,000 feet of augite-andesite pyroclastic rocks, crops out on Little Hans Lollik Island. Dioritic plutons are located in Pillsbury Sound between St. Thomas and St. John; the narrows, between St. John and the British Virgin Islands; and south of St. Thomas. The exact delineation of these plutons is uncertain. Throughout the islands isolated dikes of quartz-andesine porphyries, andesine-hornblende porphyries, lamprophyres, breccias, and pegmatites appear.

Folding occurred after the deposition of the Virgin Island Group. Rocks were tilted to form a northward-dipping homocline, which is cut by sets of faults trending N 45°W, N 55°E and north. Well-defined joint sets parallel each of the major fault trends. Dips range from 15° to 90° with the average being 40°. Strike-slip faults have horizontal offsets of less than 1 mile. Two major strike-slip graben structures or fault systems exist. The first passes through Redhook, St. Thomas and the eastern tip of Lovango Cay. The second crosses St. John, from Contact Point on the southwest to Brown's Bay on the northeast.

Most recently, Pleistocene to Holocene alluvial deposits occurred primarily in coastal embayments. However, a narrow bank of alluvium extends up to Turpentine Run on the east end of the island. Most of these deposits are composed of silt, clay, and thin, discontinuous beds of sand and gravel. Maximum thickness of these is 50 feet.

Groundwater movement is limited to openings and joints along fault zones. Regional geologic information is insufficient to determine whether these fractures and fault zones are present in all of the above-described formations; however, for this report it is assumed that the fractures and fault zones are present in all of these formations. The valleys on the island are the result of weak zones caused by faulting and jointing and are primary recharge areas for groundwater. Alluvial deposits have a high porosity but low permeability, making this aquifer unfavorable for groundwater production. In coastal embankments throughout the island, saltwater intrusion is widespread in alluvial deposits. In most areas, alluvial deposits are interconnected with bedrock and act to recharge precipitation to the underlying bedrock.

The direction of groundwater flow in the Turpentine Run Basin Aquifer is south-southeast which is generally along the direction of flow of Turpentine Run. Depth to groundwater in the aquifer ranges from 5 to 60 feet, and the altitude of the water level ranges from 1 to 209 feet above mean sea level.

Ref. Nos. 9, 11, 16

3. **Is a designated sole source aquifer within 3 miles of the site?**

No sole source aquifer, as designated in the Federal Register, is located within 3 miles of the site.

Ref. No. 8

4. **What is the depth from the lowest point of waste disposal/storage to the highest seasonal level of the saturated zone of the aquifer of concern?**

Drums are stored on a cement floor at ground level. The lowest point of the waste oil underground storage tank is unknown but is assumed to be at least 6 feet. Depth to groundwater in Virgin Island Housing Authority (VIHA) well Nos. 1 and 2, which are located approximately 500 feet northeast of the site, is reported to be 56 and 60 feet, respectively.

Therefore, the depth from the lowest point of storage to the highest seasonal level of the saturated zone of the aquifer of concern is approximately 50 feet.

Ref. Nos. 1, 2, 9

5. **What is the permeability value of the least permeable continuous intervening stratum between the ground surface and the aquifer of concern?**

There are no continuous intervening strata between the ground surface and the bedrock aquifer. Soils are generally thin in the area around the site. The water-bearing formations in the Turpentine Run Basin Aquifer are composed primarily of fractured and jointed volcanic rocks. The range of hydraulic conductivities associated with these formations is 10^{-3} to 10^{-5} cm/sec.

Ref. Nos. 10, 11, 16

6. **What is the net precipitation for the area?**

Net precipitation is usually calculated by subtracting mean annual lake evaporation (a surrogate measure for evapotranspiration) from normal annual total precipitation. Mean annual lake evaporation information was not available for St. Thomas; however, evapotranspiration data were available. These data indicate that 95.8 percent of the incident precipitation on St. Thomas is lost through evapotranspiration. The normal annual total precipitation for St. Thomas is 43.74 inches, but because of orographic effects on the island, normal annual total precipitation can range from 35 inches to 50 inches over short distances. In the Turpentine Run Basin, normal annual precipitation is 40 inches. Calculations for net precipitation are provided below:

40 inches precipitation x 95.8 percent lost to evapotranspiration = 38.32 inches lost to evapotranspiration

40 inches precipitation - 38.32 inches lost to evapotranspiration = 1.68 inches net precipitation.

Ref. Nos. 3, 5, 12, 13

7. **Identify uses of groundwater within 3 miles of the site (i.e., private drinking source, municipal source, commercial, industrial, irrigation, unusable).**

Groundwater within 3 miles of the site is used as a source of private and municipal drinking water, and for commercial purposes. There are at least 41 wells within 2 miles of the site. Thirty-four of these wells are within 1 mile of the site. Sixteen of these wells have been closed because they are contaminated with volatile organic compounds.

Ref. Nos. 6, 9

8. **What is the distance to and depth of the nearest well that is currently used for drinking or irrigation purposes?**

Distance 500 feet **Depth** 150 feet

The nearest well is the VIHA well No. 2, which is located approximately 500 feet northeast of Texaco. This well is believed to be used for drinking. A nearby well, VIHA No. 1, was ordered closed because of contamination with volatile organic compounds. VIHA well No. 2 is not listed as being closed for contamination, and its designated use is for domestic purposes.

Ref. Nos. 6, 9

9. **Identify the population served by the aquifer of concern within a 3-mile radius of the site.**

It is difficult to estimate the population served by groundwater on St. Thomas as there are few records available on groundwater withdrawal, sale, and transport. The locations of some wells in St. Thomas are unknown, and there are reports of illegal drilling on the island. It is estimated that there are 500 to 600 private wells on St. Thomas. Most of these are used for nondrinking domestic purposes such as washing and flushing, although some may be used for drinking. There are a number of wells that are used for commercial purposes. Water from these wells is trucked to private houses and pumped into cisterns to augment the rainwater collected from roofs. Groundwater is also bottled and sold in supermarkets.

There are at least 41 wells in the Turpentine Run Basin. Recently 16 of these wells have been ordered closed because they were found to be contaminated with volatile organic compounds. One of these wells was a major supplier of water to the eastern end of the island.

Estimates of the population using groundwater as a source of drinking water range from none to approximately 11,000--the population of the Turpentine Run Basin which is not served by water from the desalinization plant. The actual population served by groundwater is probably less than 11,000, as desalinated water and water from wells outside the 3-mile radius is trucked into the area.

Ref. Nos. 9, 13, 15, 18, 19

SURFACE WATER ROUTE

10. **Describe the likelihood of a release of contaminant(s) to surface water as follows: observed, alleged, potential, or none. Identify the contaminant(s) detected or suspected, and provide a rationale for attributing the contaminants to the facility.**

A potential exists for contaminants to be transported to surface water. There were some spills in the drum storage area, and there were no containment structures around the drums to prevent migration of the spills.

The drums contain waste oil generated from automotive repair and maintenance activities. Air monitoring instruments indicated the presence of organic vapors in an open drum on site. Samples of waste oil from the Tutu Texaco Site were reported to contain TCA. However, the sample analysis results were invalidated because the sample holding times were exceeded. The waste oil may also contain small quantities of substances such as gasoline, kerosene, and degreasing solvents.

Ref. Nos. 1, 22, 24

11. **Identify and locate the nearest downslope surface water. If possible, include a description of possible surface drainage patterns from the site.**

The nearest downslope surface water is the Mangrove Lagoon, which is hydraulically connected to the Caribbean Sea. The distance from the site to the nearest surface water along the course of Turpentine Run, an intermittent stream that drains the Turpentine Run Basin, is 2.5 miles. There are a number of storm sewers near the site, and it is possible that these sewers may intercept much of the runoff from the site. It is unknown where the storm sewers discharge, but it is suspected that they discharge to Turpentine Run as it is the only drainage pathway from the basin.

Ref. Nos. 2, 4, 5

12. **What is the facility slope in percent? (Facility slope is measured from the highest point of deposited hazardous waste to the most downhill point of the waste area or to where contamination is detected.)**

The facility slope is relatively flat with a slight slope toward the south-southwest. Facility slope is estimated to be 0 to 3 percent.

Ref. Nos. 1, 2

13. **What is the slope of the intervening terrain in percent? (Intervening terrain slope is measured from the most downhill point of the waste area to the probable point of entry to surface water.)**

The slope of the intervening terrain cannot be calculated, as runoff may discharge to storm sewers and the path of these sewers is unknown. If runoff follows an overland route, the slope of the intervening terrain could be as follows:

- Elevation of waste area - 200 ft
- Elevation at point of entry - 0 ft
- Path length - 13000 ft

$$\frac{200 \text{ ft} - 0 \text{ ft}}{13{,}000} \times 100 = 1.5 \text{ percent}$$

Ref. Nos. 1, 2

14. **What is the 1-year 24-hour rainfall?**

One-year 24-hour rainfall data were not available for the U.S. Virgin Islands. However, it is known that rains exceeding 1 inch in 24 hours occur six or seven times a year on St. Thomas. It has also been reported that it is not uncommon for 24-hour rainfalls to be 2 to 3 inches.

Ref. Nos. 4, 6

15. **What is the distance to the nearest downslope surface water? Measure the distance along a course that runoff can be expected to follow.**

The nearest downslope surface water is the Mangrove Lagoon which is hydraulically connected to the Caribbean Sea. The distance from the site to the lagoon is 2.5 miles. It appears that most runoff from the site enters storm drains near the site. Since the point of discharge and the route of these storm drains are unknown, the distance to the nearest downslope surface water along the pathway is unknown.

Ref. No. 2

16. **Identify uses of surface waters within 3 miles downstream of the site (i.e., drinking, irrigation, recreation, commercial, industrial, not used).**

Surface water within 3 miles downstream of the site is used for recreation including swimming, fishing, and boating. The DPNR has designated the area of the Mangrove Lagoon for preservation and conservation recreation.

Ref. Nos. 2, 14

17. **Describe any wetlands, greater than 5 acres in area, within 2 miles downstream of the site. Include whether it is a freshwater or coastal wetland.**

There are no wetlands greater than 5 acres within 2 miles downstream of the site. However, there is a coastal mangrove wetland approximately 2.5 miles downstream. The Mangrove Swamp is designated as a preservation area in the Coastal Zone Management Program of the DPNR.

Ref. Nos. 2, 14

18. **Describe any critical habitats of federally listed endangered species within 2 miles of the site along the migration path.**

There are no known critical habitats of federally endangered species within 2 miles of the site. The Virgin Islands Tree Boa (Epicrates monensis granti) is an endangered species in the U.S. Virgin Islands; however, no critical habitat has been identified for this species.

Ref. No. 7

19. **What is the distance to the nearest sensitive environment along or contiguous to the migration path (if any exist within 2 miles)?**

There are no sensitive environments within 2 miles of the site that lie along or contiguous to the migration pathway.

Ref. Nos. 2, 7, 14

20. **Identify the population served or acres of food crops irrigated by surface water intakes within 3 miles downstream of the site and the distance to the intake(s).**

There is no population served or food crops irrigated by surface water intakes within 3 miles downstream of the site. The nearest surface water is saline. There is a desalinization plant which uses sea water to supply drinking water, but the intake is greater than 3 miles from the site.

Ref. Nos. 2, 13

21. **What is the state water quality classification of the water body of concern?**

No water quality classification is known to exist for the Mangrove Lagoon or the Caribbean Sea, although the mangrove swamp surrounding the lagoon is designated as a preservation area by the DPNR.

Ref. No. 14

22. **Describe any apparent biota contamination that is attributable to the site.**

There was no apparent evidence of biota contamination noted during the on-site reconnaissance conducted by NUS Corp. Region 2 FIT on February 15, 1989.

Ref. No. 1

AIR ROUTE

23. **Describe the likelihood of a release of contaminant(s) to the air as follows: observed, alleged, potential, none. Identify the contaminant(s) detected or suspected, and provide a rationale for attributing the contaminant(s) to the facility.**

The potential for release of contaminants to the air is very small. Above-background concentrations of organic vapors were detected in a drum; however, no readings above background were detected in the ambient air in the drum storage area.

The drums on site contain waste oil from automotive repair and servicing operations. The oil may contain small quantities of gasoline, kerosene, or degreasing solvents. Samples of waste oil from the facility were reported to contain TCA. However, sample analysis results were invalidated because the sample holding times were exceeded.

Ref. Nos. 1, 22, 24

24. **What is the population within a 4-mile radius of the site?**

Based on the 1980 census, the population within 4 miles of the site is approximately 36,000.

Ref. No. 17

FIRE AND EXPLOSION

25. **Describe the potential for a fire or explosion to occur with respect to the hazardous substance(s) known or suspected to be present on site. Identify the hazardous substance(s) and the method of storage or containment associated with each.**

No significant fire or explosion conditions are known or suspected to be present on the site.

Ref. No. 1

26. **What is the population within a 2-mile radius of the hazardous substance(s) at the facility?**

Based on the 1980 census, the population within 2 miles of the site is approximately 19,000.

Ref. No. 17

DIRECT CONTACT/ON-SITE EXPOSURE

27. **Describe the potential for direct contact with hazardous substance(s) stored in any of the waste units on site or deposited in on-site soils. Identify the hazardous substance(s) and the accessibility of the waste unit.**

There is little potential for direct contact with substances stored in the waste unit. Although the bungs are open on some of the drums and there are some spills, the drums are not located in an area that is frequented by customers. Access to the site is not controlled by a fence. There is potential for workers to come in contact with waste oil in the course of performing their jobs.

Ref. No. 1

28. **How many residents live on a property whose boundaries encompass any part of an area contaminated by the site?**

There is no evidence that any residential areas have been contaminated by the site.

Ref. No. 1

29. **What is the population within a 1-mile radius of the site?**

Based on the 1980 census data, the population within 1 mile of the site is approximately 11,000.

Ref. No. 17

PART IV: SITE SUMMARY AND RECOMMENDATIONS

Tutu Texaco is an automotive service station located in the Tutu area of St. Thomas, U.S. Virgin Islands. The primary activities at the site are gasoline sales and automotive repair and maintenance. The area within approximately 1 mile of the site is densely populated and contains some commercial properties. There are large housing developments northwest, north, and east of the site. Beyond 1 mile, there are scattered smaller villages and towns. The densely populated and highly commercial town of Charlotte Amalie is located approximately 2.5 miles west of the site.

On February 15, 1989, NUS Corp. Region 2 FIT conducted an on-site reconnaissance of the Tutu Texaco Site. A total of thirty-one 55-gallon drums were observed on the site. Twenty-five of the drums contain waste oil, two contain dirt, and four contain water pumped from a tank excavation. There are three 20-gallon drums and a few 5-gallon pails containing waste oil on site. In addition to the drums, there are a number of underground storage tanks below the site. An unknown number of these tank contain gasoline, and two of the tanks contain waste oil. There is evidence that the gasoline tanks are "not tight" (i.e., may be leaking - Ref. No. 23). The integrity of the waste oil storage tanks is unknown. The underground gasoline tanks and the drums containing tank excavation water are not evaluated as they are not considered to be hazardous waste under the petroleum exclusion of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA).

Samples of waste oil from the site were reported to contain TCA. However, the sample analysis results were invalidated because the sample holding times were exceeded. The waste oil may also contain small quantities of gasoline, kerosene, and degreasing solvents. Until June 1986, the Virgin Islands Water and Power Authority (WAPA) accepted waste oil generated by marinas, airports, and auto maintenance facilities. The waste oil was blended with fuel and burned as a source of power. WAPA stopped accepting waste oil when a batch was found to contain PCBs. The source of the PCBs is unknown. Currently, there is no permitted method of waste oil disposal on St. Thomas. Generators must store their waste oil, but the facilities are not inspected or issued permits. These conditions, combined with drum shortages and poor housekeeping, have resulted in generally poor waste containment at many of the facilities.

The waste oil drums on the Tutu Texaco Site are not properly stored or contained. There are oil spills visible on the ground, and oil-stained soil was observed on the Gassett Property adjacent to the drums. There are no berms to contain the oil in the event of a spill. Underground tanks for waste oil storage were described in a preliminary investigation completed by the DPNR in August of 1987. Waste oil was being stored in these tanks in violation of Virgin Islands Law. Based on the above

considerations, a recommendation of **MEDIUM PRIORITY** for further action is provided. Because of the spills, stained soil, and improper waste containment, the potential exists for transport of the wastes to surface water and groundwater.

The owner of the Tutu Texaco Site, Texaco Caribbean Inc., has been identified as one of nine potentially responsible parties in the contamination of groundwater in the Tutu area. In July and August 1987, EPA confirmed by sampling that volatile organic compounds were present in a number of wells in the Tutu area. Results of sampling conducted in October, 1987 (Ref. No. 24) show the presence of volatile organic compounds and metals in Tutu area well water. DPNR has issued orders to close 16 wells in the area. EPA removal action activities in the Tutu area included sampling of wells and cisterns, removal of contaminated water from cisterns, and supplying clean water on a regular basis to affected residents.

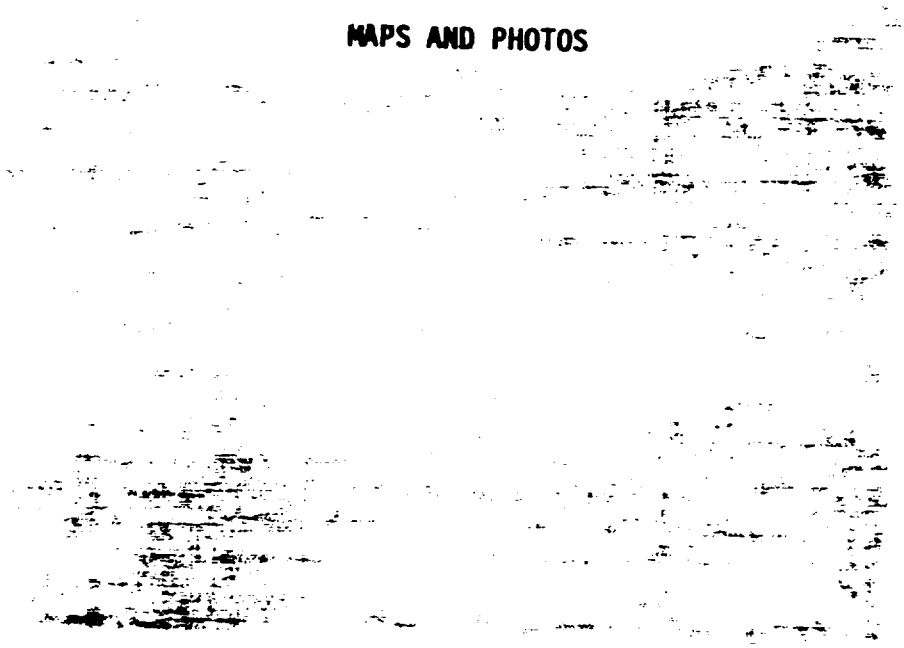
Locations for the collection of environmental samples at the Tutu Texaco Site are limited. The only available soil near the drum storage area is on the adjacent Gassett Motors property. A number of the wells in the vicinity of the site are known to be contaminated with volatile organic compounds. As a consequence, there may be few wells available that are useful in determining whether hazardous substances have been released from the facility. Sampling of waste sources on the site is recommended to determine whether the waste oil contains hazardous substances. Efforts should also be directed toward further definition of the population using groundwater for drinking and toward determining the volume, construction, and integrity of the underground oil storage tanks.

Sampling is not recommended if ongoing or planned removal actions or enforcement actions result in the collection of samples from the site by EPA or DPNR, or by Texaco Caribbean for the aforementioned agencies.

(15 OF 30)

ATTACHMENT A

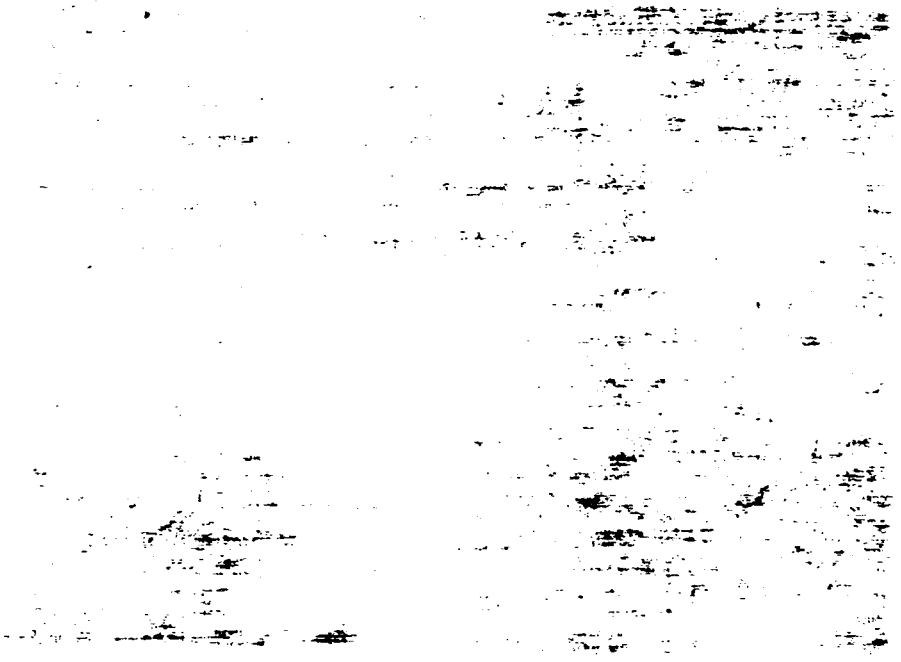
MAPS AND PHOTOS



TUTU TEXACO
ST. THOMAS, U.S. VIRGIN ISLANDS

CONTENTS

Figure 1: Site Location Map
Figure 2: Site Map
Exhibit A: Photograph Log



(17 OF 30)

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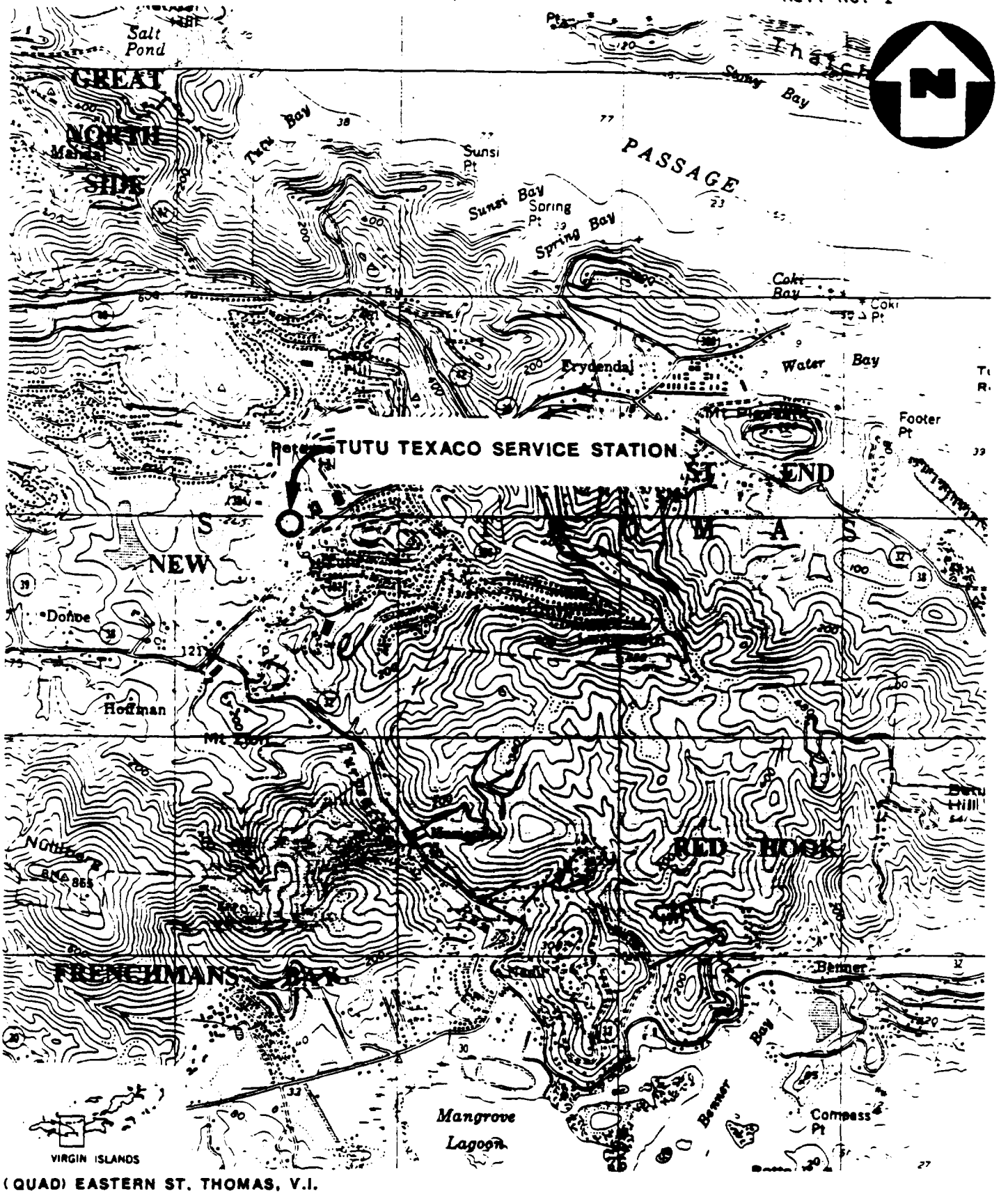


(QUAD) EASTERN ST. THOMAS, V.I.

SITE LOCATION MAP

TUTU TEXACO SERVICE STATION

ST. THOMAS, U.S. VIRGIN ISLANDS

FIGURE 1

SCALE: 1" = 2000'

NUS CORPORATION

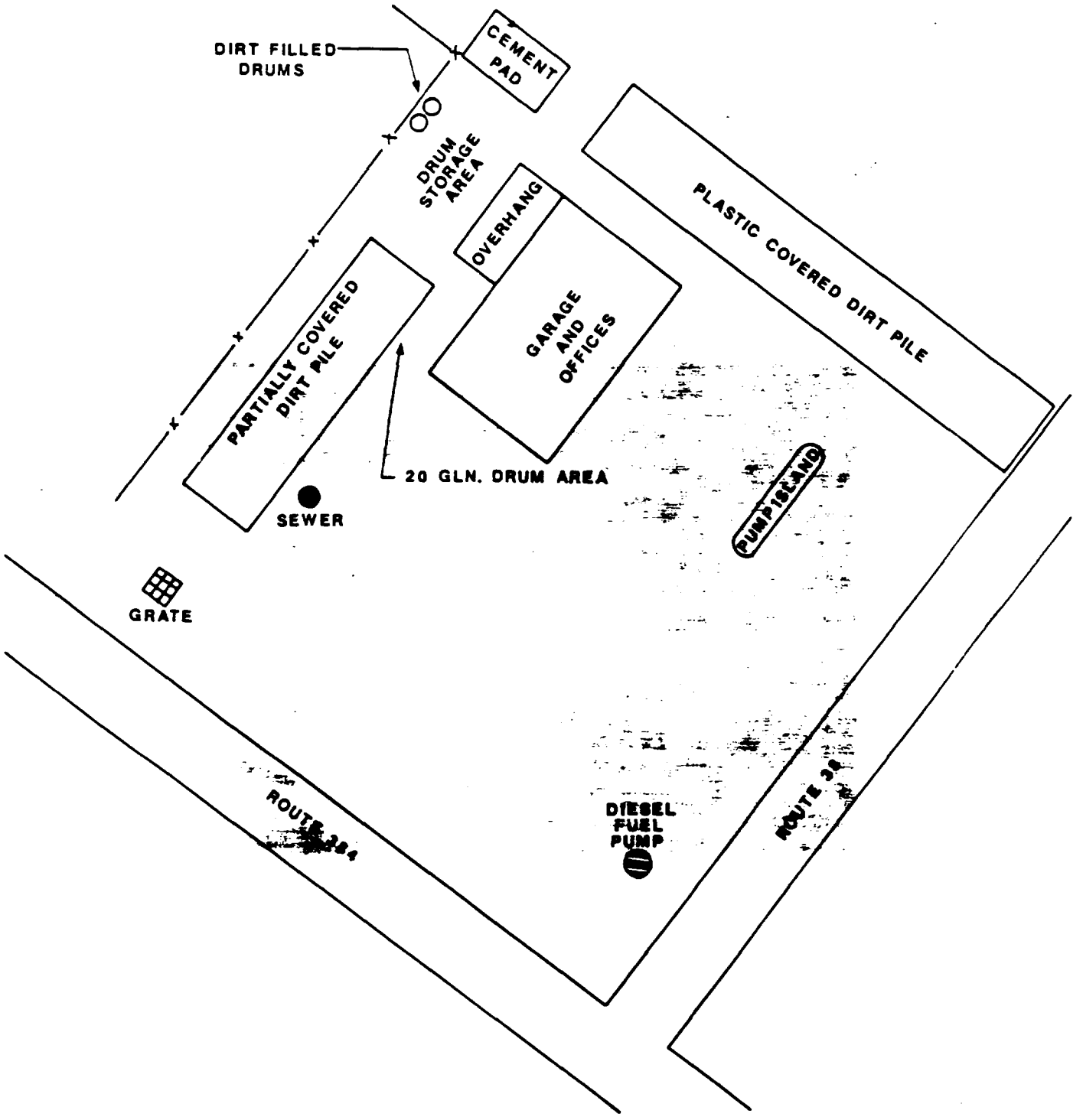


FIGURE 2

SITE MAP

TUTU TEXACO, ST. THOMAS, U.S. VIRGIN ISLANDS

(NOT TO SCALE)

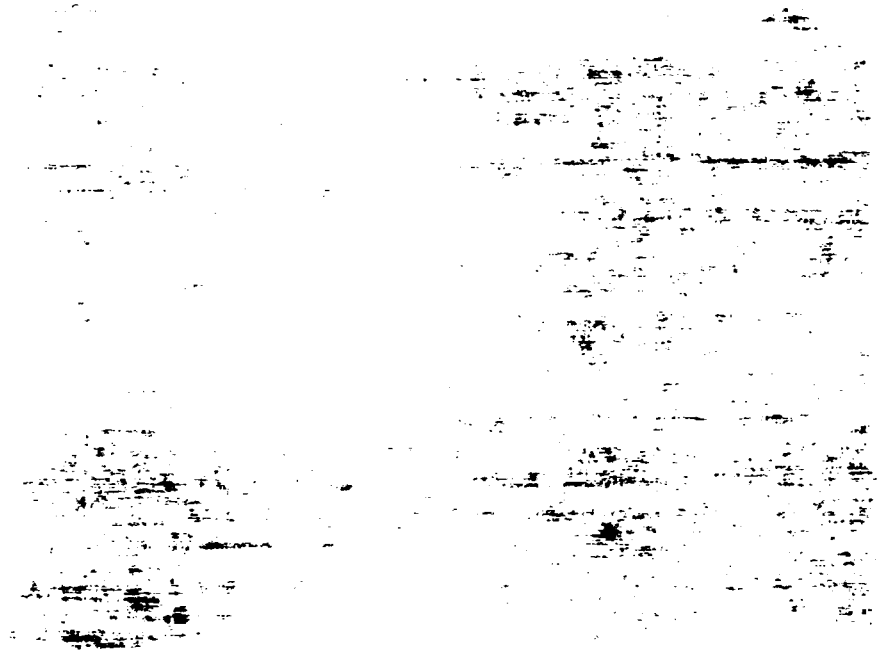
NUS CORPORATION

TUTU TEXACO
ST. THOMAS, U.S. VIRGIN ISLANDS
FEBRUARY 15, 1989

PHOTOGRAPH INDEX

ALL PHOTOGRAPHS TAKEN BY DIANE TRUBE

Photo Number	Description	Time
R3-P1	West side-Dirt pile	1300
R3-P2	Drums under overhang	1302
R3-P3	Tutu Texaco drum storage area.	1304
R3-P4	Tutu Texaco excavated dirt pile and pvc-pipe collection system.	1308
R3-P10	Tutu Texaco drums as seen from Gassett Motors. Note stained soil.	1353



NUS CORPORATION

TUTU TEXACO
ST. THOMAS, U.S. VIRGIN ISLANDS

R3-P1 February 15, 1989 1300
West side-Dirt pile.

(21 of 30)

NUS CORPORATION

02-6902-[illegible]
Rev. 0.1

TUTU TEXACO
ST. THOMAS, U.S. VIRGIN ISLANDS

R3-P2 February 15, 1989 1302
Drums under overhang.

(Part of SC)

NUS CORPORATION

2-5902-[illegible]-01
Rev. 0. 1

TUTU TEXACO
ST. THOMAS, U.S. VIRGIN ISLANDS

R3-P3 February 15, 1989 1304
Tutu Texaco drum storage area.

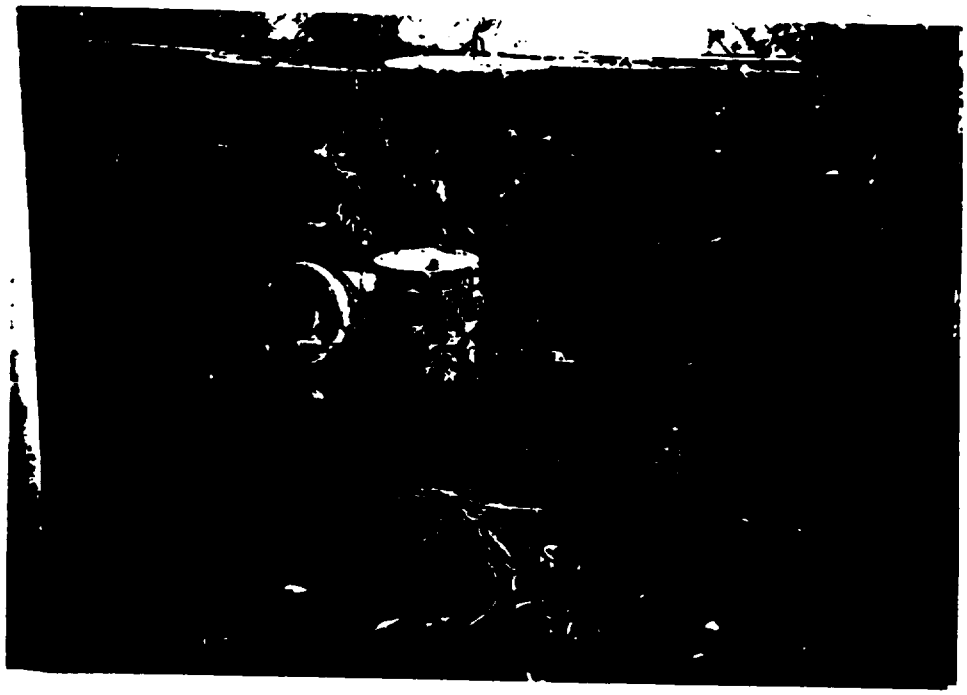
NUS CORPORATION

TUTU TEXACO
ST. THOMAS, U.S. VIRGIN ISLANDS

R3-P4 February 15, 1989 1308
Tutu Texaco excavated dirt pile and pvc-pipe collection system.

NUS CORPORATION

TUTU TEXACO
ST. THOMAS, U.S. VIRGIN ISLANDS



R3-P10 February 15, 1989 1353
Tutu Texaco drums as seen from Gassett Motors. Note stained soil.

ATTACHMENT B

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REFERENCES

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19. Telecon Note: Conversation between D. Goetz of Polycaribe and D. Trube, NUS Corp., on 3/14/89 at 1430 hours. RE: Wells and water use on St. Thomas.

20. Telecon Note: Conversation between L. Reed, DPNR, and D. Trube, NUS Corp., on 3/3/89 at 1640 hours. RE: Permits for site on St. Thomas.

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23. Records of Petro Site tests performed on Tutu Texaco Service Station underground tanks Nos. 1 and 3, by J.F. Martinex and Cia., Inc. on July 18 and July 11, 1987, respectively.

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REFERENCE NO. 22

(25 OF 30)

PRELIMINARY INVESTIGATION OF TEXACO VIOLATIONS

DATE: 05 AUG. `87
TO: TEXACO's FILE
FROM: LEONARD REED LReed
SUBJECT: TEXACO's VIOLATIONS (waste oil, etc.)

On 05 August 1987 at about 07:45 hrs. an inspection was conducted of the Texaco Tutu facility located at ?? Anna's Retreat. Mr. Vernon Morgan was contacted for information relative to the inspection. The inspection revealed that there were several violations of V.I. Laws/Regulations. The findings are as follows:

1. A large underground container with concrete top that is part of the entire surface area was on site. This container had a concrete partition that may have holes towards the bottom since the material contained therein was of the exact height in both compartments. The container was protected with a circular cast iron cover. The material contained appeared to be waste oil. It was not possible to determine the construction of the subsurface tank to include depth, width, length, type of bottom [concrete, dirt, etc.]. Waste oil is classified as a hazardous waste in 19 R&R ch. 56 sec. 1560-500. Said waste oil was generated in violation of 19 R&R sec. 1560-501. Said waste oil was also stored in the above tank in violation of sec. 1560-501.

2. There were there (3) service areas, each equipped with hydraulic hoist and waste oil collection trap that had pipes installed to transfer the waste to one (1) or more of the waste oil storage tanks. Each of the three (3) traps contained waste petroleum products in violation of 1560-501.

3. There was a filled septic tank on the property that will be in violation of 19 R&R sec. 1404-73 if further investigations revealed that there is public sewer available.

4. The soil of the unpaved area along the northern boundary was saturated with waste petroleum products. There were several containers of petroleum products stored in said area along with automotive parts all in violation of 1560-501. The auto tires contained in the above accumulation are capable of breeding mosquitoes in violation of 19 VIC section 1563 (5).

___ 5. There was a large distinctly circular area with a square steel plate cover that was also filled with waste oil. It was not possible to determine the length, depth, width, type of bottom [concrete, soil, etc.]. Said waste oil was generated and stored in violation of 1560-501.

6. The storm drain contained waste oil or similar petroleum products in violation of 19 VIC section 1563 (13) and 19 R&R section 1560-2 (j).

7. There were two additional man holes covered with square steel covers. It was not possible to determine the contents of said man holes due to the rear wheels of the most north of three (3) (semi trailers being on the said covers. These are suspect of containing petroleum products since the cistern and the septic tank were identified. FOLLOW UP IS NEEDED!

REFERENCE NO. 5

Copy pcs-tt FC INVSERL

L.U.S.T.
LEAKING UNDERGROUND STORAGE TANK SURVEY
ST. THOMAS, ST. JOHN AND ST. CROIX
U.S. VIRGIN ISLANDS

BY

WERNER WERNICKE, P.E.

AND

ALICE SEYMOUR

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FEBRUARY, 1986

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TUT 001 0100

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1.00 INTRODUCTION

Many petroleum products, and other chemicals, are stored in below ground tanks which can corrode, leaking toxic products into the underground environment.

In order to evaluate the occurance of such events the V.I. Department of Conservation and Cultural Affairs contracted with Donald L. Hamlin Consulting Engineers, Inc. to perform a survey of eleven gasoline service stations in the Virgin Islands (Leaking Underground Storage Tanks - L.U.S.T. - Contract No. PC-CCA-22-86). Information on underground storage tanks was obtained through visits to the facilities, interviewing persons having specific information about the facilities as well as mailing questionnaires to knowledgeable individuals.

2.00 CONCLUSIONS

Ten gasoline retail outlets (and one bulk plant) were surveyed of the approximate 50 service stations on the islands. Since all stations were not sampled, a degree of uncertainty exists as to the conditions at the other locations where pertroleum products or hazardous substances are stored in underground tanks.

The information was provided on a purely voluntary basis, and it would be reasonable to assume that a station operator with a serious tank leakage problem, either presently or in the past, may be reluctant to provide such information. Consequently the information obtained during this survey may have a built in bias.

The finding of the interviews indicates that leaks do occur, which are apparently terminated fairly rapidly once they are discovered by taking the tank out of service. How much petroleum product does leak into the ground is not clear, nor was it possible to determine its effect on ground water supplies in the area.

Stations which carry the large company brand names, such as Texaco, Esso, etc., have their tanks installed by those companies, which also replace any leaking tanks. Thus tank replacement occurs fairly rapidly once a leaking tank is confirmed.

The independent stations, i.e., those not carrying the larger oil company brand names, maintain, install or replace their own tanks. Only one independent operator was surveyed on St. Thomas and none of his tanks had been or were leaking. Thus, in the case of independent service stations, it is unclear as to how rapidly damaged tanks are replaced or the volume of product lost into the ground.

In all cases, some product is lost when a tank begins to leak. The volume of fluid lost depends on several factors such as size of the leaking hole, tank size,and content level, among other factors. The cummulative effects of many such small leaks on the water quality of an aquifer is not clear. Comprehensive testing of ground water would be needed to establish a linkage. The limited groundwater testing which has been carried out does indicate the presence of toxic or petroleum substances at some locations.

Most of the owner/operators of service stations interviewed had very little knowledge of the below ground facilities. Although this greatly increased the level of effort needed to get information, it did not appear to have any bearing on the leakage of tanks. A simple test is used on a regular basis to determine if tank contents are lost. Whether such testing method is adequate from a standpoint of protecting groundwater supplies or the environment in general is not certain.

Corrosion protection is not uniform for steel tanks, and corrosion and failure of such tanks does occur. Effective corrosion protection of steel tanks for their operating life will provide an effective method to prevent the release of toxic substances into groundwater supplies and the general environment.

3.00 UNDERGROUND TANK SURVEY

3.10 INTERVIEWS

The investigation into the potential for leaking underground storage tanks (L.U.S.T.) involved obtaining specific information on the history of installed underground tanks from owner/managers of automotive service stations (one bulk facility was included). In complying with the conditions of the contract, a total of eleven sites were selected on the three main islands, five on St. Thomas , five on St. Croix and one on St. John.

Most of the sites were chosen from areas where ground water exists and is utilized for human consumption. In the event of a leaking tank, the contents would likely find its way into the ground water supply. Such an event could adversely affect the water quality.

Owner/managers of service stations on St. Thomas, St.Croix and St. John were contacted by telephone and interviews were scheduled. Questionnaires were developed for use during the interviews to obtain consistent information (see Appendix). For three stations on St. Croix the interview forms / questionnaires were mailed. All efforts were made to interview owners or managers to obtain as complete information as possible. The questionnaire was set up

to obtain information on storage tank age, size, content and construction material as well as other information relevant to this survey. Service stations interviewed included subsidiaries of Esso and Texaco fuel suppliers. One independent operator was interviews on St. Thomas.

3.20 ST. THOMAS

A total of six (6) service stations were contacted by telephone on St. Thomas, five (5) agreed to an interview and appointments were scheduled. The process of scheduling the interviews was very time consuming. Interviews had to be rescheduled a number of times or interviewers waited at the station because of the absence of service station owner/managers. Due to their lack of knowledge, service station owner/managers had difficulty answering the following questions on the questionnaire:

#5 Depth below ground
#6 Construction material of tanks
#7 How long have tanks been installed

This information was eventually provided by Texaco and Esso Bulk Plant managers.

The results of the survey are found on Table 1.
See Figure 1 and 2 for the locaton of the service stations.

3.30 ST. JOHN

One service station was contacted by telephone and an interview scheduled. The station owner was very cooperative, however, he had difficulty answering the following:

#5 Depth below ground
#6 Construction material

These questions were eventually provided by the Texaco Bulk Plant manager. The results of the survey are found on Table 2. See Figure 3 for the location of the service station.

3.30 ST. CROIX

The survey task on St. Croix became an exercise in frustration. Over a dozen service stations were contacted by telephone requesting interviews with managers or operators. Some agreed to be interviewed only to cancel later. The most frequent response was that the distributor (bulk plant) should be contacted for the desired information.

Two interviews were carried out and only in one case could all the required information be supplied (airport fuel facility). At the other site only limited information was

available and the distributor (Esso) provided the needed details.

A parallel effort was carried out by sending the questionnaires to the Texaco distributor requesting completion of the questionnair and return to our office. Such information could not be provided by telephone (or interviews) as its release had to be approved by the San Juan main office. Survey information on three additional sites was obtained in this manner. It took three months for the information to be returned to our office. See Table 3 for the summary of the survey and Figures 4 through 7 for the locations.

4.00 SOILS/GEOLOGY

This survey of fuel facilities was centered as much as possible in areas where ground water aquifers are utilized for public water supplies, namely central St. Croix and the eastern section of St.Thomas (Jordan, 1975; Jordan, 1973; Geraghty-Miller, 1983).

The geology of an area is one of the major factors which determines the extent and characteristics of an aquifer. Deep soils or sedimentary formations are generally favorable for significant aquifers. Likewise, the presence of such soil/geology formations, at least in the upper 10 feet, is favorable for the installation of underground fuel tanks. Excavation into rock is costly and locations with deep soils are prefered.

On St. Thomas, four of the five sites surveyed are located in the Tutu watershed basin and the Bovoni area. Both areas contain aquifers from which public water supplies are withdrawn. The Tutu basin contains the largest and most heavily utilized aquifer on St. Thomas. On St. Croix, most of the stations surveyed are likewise located over the island's extensive central plain aquifers. On St. John significant aquifers are not found in the Cruz Bay area (Cosner, 1972).

The soils which exist at the survey sites are shown on Table 4. The depth of soil at the Tutu basin (Anna's Retreat) sites on St. Thomas ranges from 20 to 40 feet (Jordan, 1973). The depth to rock at the other sites is likewise sufficient for tank installations.

Hydrologic conditions during the wetter parts of the year will bring the water table in proximity of underground tanks. The bottom of buried tanks will usually be 8 to 10 feet below the surface. This has two implications.

1. Leaking contents have short pathways to aqifers and

2. the moisture will promote accelerated corrosion of steel tanks.

5.00 GENERAL OPERATING PROCEDURE

This section gives a brief discussion on the general procedures used at service stations to check on fuel loss through leakage or other causes.

Underground storage tanks for gasoline or diesel fuel are normally owned by the parent oil company. It is the oil company's responsibility to maintain these tanks. However, it is to the station operators advantage to properly monitor these tanks on a regular basis to check for loss due to leakage or theft or for intrusion of water.

The time elements may vary but in general it will follow this pattern daily. Each pump has a master meter which keeps a running total of every gallon pumped. This meter is read daily at start or close of business and checked against register tapes. On a weekly or daily schedule, the operator will dip his tanks with a properly calibrated stick. This tells him how much is in each tank and this will be compared to the meter readings. Every second or third week he will usually add water detecting paste to the lower 6" of the stick to check for water.

A representative from the parent oil company normally calls on all his stations once a month. At this time he will stick all the tanks. He then checks his reading against his record for the previous month, deliveries of fuel during the month and past and present meter readings. If these figures do not balance out the oil company resentative will usually call the station on a weekly basis for a time and the tanks are monitored closely to determine if they have a leak, a dishonest employee, or in a rare case, a faulty master meter.

Once a leak is suspected the tank level monitoring effort increases. If a leak is confirmed, the tank is taken out of service and replaced.

6.00 GROUND WATER INVESTIGATIONS

A survey of ground water conditions was carried out in the U.S. Virgin Islands during 1982 by the firm of Geraghty and Miller, Inc., (1983). The quantitative and qualitative characteristics of a number of wells were determined.

Pentane and barium, both chemicals associated with refinery operations, were detected in water from the Barren Spot wells at St. Croix's central plain aquifer. The report further indicates that hydrocarbons, principally from leaded

gasoline, were detected in a significant area within the Hess Oil refinery boundaries.

Organic solvents were found in well water samples from the V.I. Housing Authority well in the Tutu, St. Thomas area. Sources of such organic solvents include many light industrial processes, dry cleaning operations and mechanical repair shops which utilize such solvents and chemicals in their operations. Such chemicals may also be used in household products and could be introduced into the ground water supply through septic tank and leaching fields (Geraghty, Miller 1983).

A reconnaissance of ground-water quality in the Virgin Islands was carried out in 1984 by the U.S. Geological Survey in cooperation with the College of the Virgin Islands (Garcia, 1984). Nineteen wells were sampled throughout the islands. The survey did not find any abnormal concentrations of the chemicals tested for which included common ions, trace elements, priority pollutants, purgeable organic, base-neutral, and acid extractable compounds, as well as organochloride insecticides, polychlorinated biphenols and polychlorinated naphthalenes. Pentane, which was found predominant in the Geraghty-Miller survery, was however not tested for.

On the basis of the findings by Geraghty-Miller (1983), sources of hydrocarbon pollution of the ground water supply are present and pose a threat to the public water supply.

7.00 DISCUSSION

A number of findings were made based on the survey.

1. Leakage of tanks does occur and tanks are either repaired or replaced within a short time .
2. The gas station operators/owners had generally little knowledge about installation details of the tanks.
3. No apparent standard is used to minnimize corrosion of steel tanks.

At all stations surveyed, the method used to detect leaks is fairly consistent and timely. Each fuel tank is dipped once or twice daily to determine the fluid level and the presence of any water in the tank, adjustments are made for fuel added or pumped out during that period. If discrepancies are noted, the frequency of tank dipping increases. If a leak is determined to be the cause, the fuel in the tank is used up. The empty tank is sealed, removed or otherwise taken out of service.

During the time the tank is emptied by sale of the contents during the normal operations, the tank continues to leak. The severity of such a leak would depend on a number of

factors, such as the size of the leaking hole, the tank content level, the tank size, the presence or absence of ground water and other factors. Of course, prior to discovery of a leak, some of the contents will have been absorbed by the surrounding soil. Thus some loss of contents accompanies all situations where tanks leak.

The survey revealed that gas station owners/operators had generally little knowledge of the tank installation details. In most cases the suppliers (bulk plants) had to be called upon for specific information. The result was that much time was spent in attemting to locate the persons who had the needed information. In other instances owners/operators refused to provide any information. The reasons for such refusal were not clear.

The survey effort on St. Thomas/St. John proceded on a reasonable basis once cooperating individuals were identified. On St. Croix, however, with one exception, the survey proved to be time consuming task and at times frustating. Only through the intervention of Ms. Dinah Johnson of the Division of Natural Resources (DCCA) was the information finally provided.

Most of the tanks involved in the survey are constructed of steel. Some are coated with corrosion inhibiting material while others are not. It cannot be conclusively determined, based on the interviews, as to how severe the corrosion problem is. Too many unknowns are involved, not the least of which is the probable bias in the sampling. It is possible that the owner/operators who failed to cooperate had a history of leaking tanks. Location, depth to ground water and soils, among other factors, would certainly influence corrosion attack of the metal.

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Cosner O.J., "Water in St. John, U.S. Virgin Islands," U.S. Geological Survey Open-File Report, 1972.

TABLE 1. SUMMARY INFORMATION
LEAKING UNDERGROUND STORAGE TANK SURVEY
ST. THOMAS V.I.

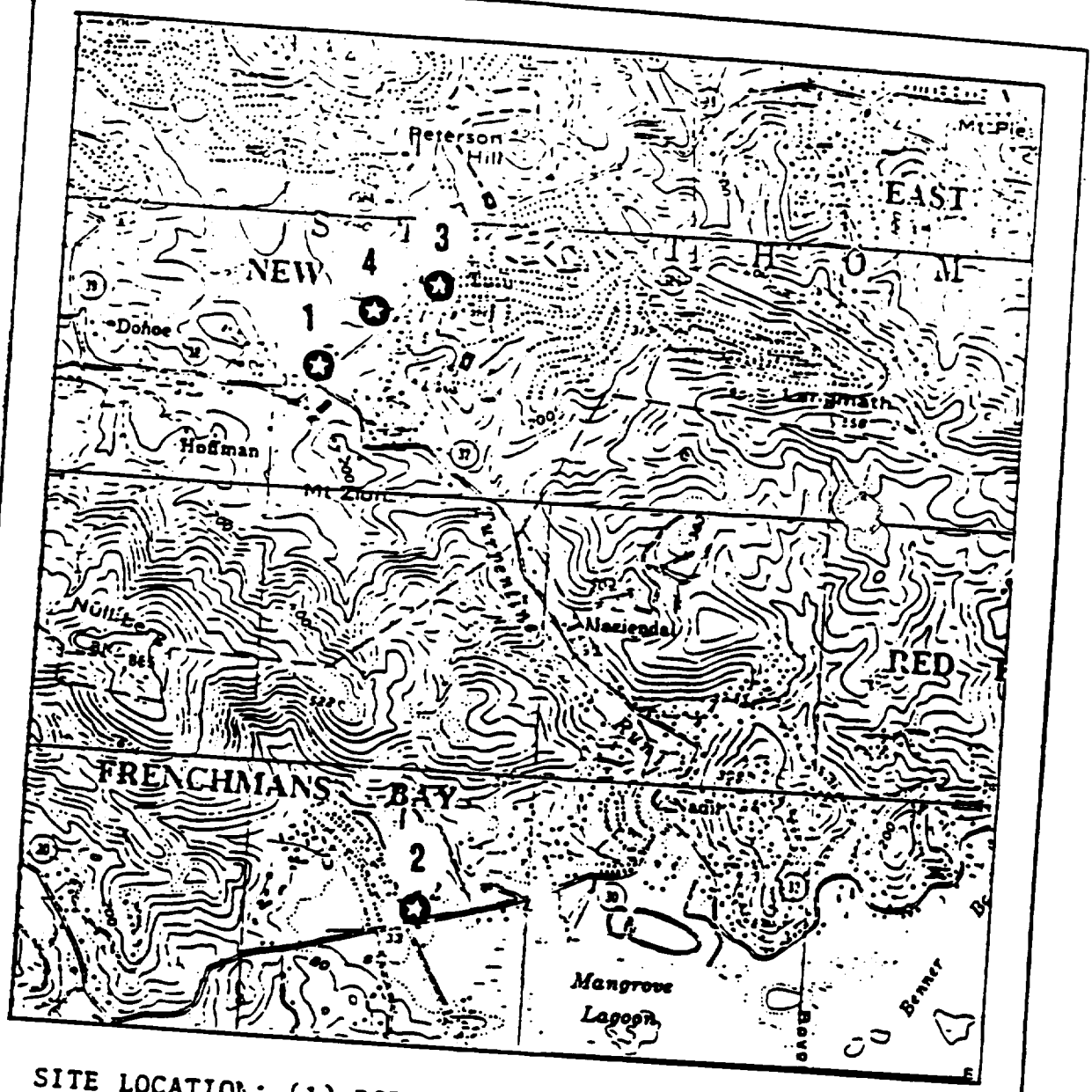
*STATION INTERVIEWED	# 1	# 2	# 3	# 4	# 5
NUMBER OF TANKS	2	2	3	3	3
SIZE OF TANKS (GALLONS)	(A) 5,000 (B) 5,000	(A) 6,000 (B) 6,000	(A) 4,000 (B) 4,000 (C) 4,000	(A) 6,000 (B) 6,000 (C) 2,500	(A) 6,000 (B) 8,000 (C) 6,000
TANK CONTENTS	(A) LEADED (B) UNLEADED	(A) LEADED (B) UNLEADED	(A) UNLEADED (B) UNLEADED (C) LEADED	(A) LEADED (B) UNLEADED (C) OIL	(A) UNLEADED (B) LEADED (C) UNLEADED
DEPTH BELOW GROUND (FEET)	2 to 3 ALL	2 to 3 ALL	2 to 3 ALL	4 ALL	1+10 in. ALL
CONSTRUCTION MATERIAL	STEEL	STEEL	STEEL	STEEL	STEEL
LEAKS	(A) NO (B) NO	(A) NO (B) NO	(A) YES (B) NO (C) NO	(A) NO (B) NO (C) NO	(A) NO (B) NO (C) NO
YEARS SINCE INSTALLED	(A) DON'T KNOW	(A) 11YEARS (B) 10YEARS	(A) 16 YEARS (B) 16YEARS (C) 16 YEARS	(A) 16 YEARS (B) 16YEARS (C) 16YEARS	(A) 5 YEARS (B) 5 YEARS (C) 5 YEARS

* See Figure 1&2 for Numerical Identification

Table 4

Geology/Soils

Gas Station and Location	Soil Type	Depth to Rock (ft)	Seasonal high water table (ft)
Esso Tutu (Anna's Retreat) St. Thomas See Figure 1	(LaB), Lavallee Gravelly clay loam, 2 to 5 percent slopes	20-40	10+
Rodriques Auto Parts (Esso) Anna's Retreat St. Thomas See Figure 1	(LaB), Lavallee Gravelly clay loam, 2 to 5 percent slopes	20-40	10+
Tutu Texaco Anna's Retreat St. Thomas See Figure 1	(GyB), Glynn clay loam, 2 to 5 percent slopes	20-40	10+
Bovoni Texaco Bovoni, St. Thomas See Figure 1	(SaA), San Anton clay loam, 0 to 3 percent slopes	6+	5+
Gotllieb's Quickway (Esso) Contant (Crown Bay Fill) St. Thomas See Figure 2	(Ma) Made land sand dredged from harbor	10+	5+
Texaco, Cruz Bay St. John See Figure 3	(PbC) Parasol clay loam, 5 to 12 percent slopes	6+	10+
Eastern Caribbean Airways, Alexander Hamilton Airport, St. Croix See Figure 4	(AgB), Aguilita gravelly clay loam, 2-5 percent slope	2 (soft lime stone)	10+
Sion Farm Esso, Castle Coakley, St. Croix See Figure 5	(ScB), Sion Clay loam 0-5 percent slopes	2 (soft lime stone)	10+



SITE LOCATION: (1) RODRIGUEZ ESSO ESTATE TUTU
ST. THOMAS, VIRGIN ISLANDS
(2) BOVONI TEXACO BOVONI
ST. THOMAS, VIRGIN ISLANDS
→ (3) TUTU TEXACO ESTATE TUTU
ST. THOMAS, VIRGIN ISLANDS
(4) TUTU ESSO ESTATE TUTU
ST. THOMAS, VIRGIN ISLANDS

-N-

0 2400oft
scale

FIGURE 1.
UNDERGROUND TANK SURVEY LOCATION
ESTATE TUTU & BOVONI
ST. THOMAS, V.I.

SERVICE STATION # 3

UNDERGROUND STORAGE TANK INVENTORY

QUESTIONAIRE

A. Date: December 12, 1985
Person Interviewed: Mr. Vernon Morgan Position: Owner

B. Location of Facility: TUTU TEXACO
Estate Anna's Retreat
St. Thomas, V.I.

2. Number of Storage Tanks: 3

3. Size of Tanks: (Gallons)
(1) 4,000 (2) 4,000 (3) 4,000 (4) _____

4. Contents of Tanks: Gasoline
(1) Leaded (2) Unleaded (3) Unleaded (4) _____

5. Depth below ground:
(1) 2to3 feet (2) 2to3 feet (3) 2to3 feet (4) _____

6. Construction Materials:
(1) Steel (2) Steel (3) Steel (4) _____

7. How long have tanks been installed:
(1) 11 years (2) 11 years (3) 11 years (4) _____

8. Have there been problems with leaks:
(1) No (2) No (3) No (4) _____

Specify: A leak occured between two tanks in 1985
Texaco repaired the problem in three weeks

Interviewer Louise Penn

REFERENCE NO. 6

CAMP DRESSER & McKEE INC.

MEMORANDUM

TO: Caroline Kwan

FROM: Scott Gruber CDM Federal Programs Corporation

PROJECT: Tutu Wellfield Area CDM # 648

SUBJECT: Informal 104(e) inspections

DATE: 02/30/89

Enclosed please find the field notes taken during the informal 104(e) inspections of facilities in the Tutu Wellfield Area. The inspections were conducted April 7th to 8th, 1988.

If you have any questions regarding this submittal, please don't hesitate to call me at (212) 393-9634.

TUT 001 0115

Texaco S.E Investigation

1963 in operation

Floor drains Unknown discharge

#1 floor drain
#2 floor drain
#3 waste pit

Storage pit - contains oil ? capacity @ least
1963 built 5' deep x 8' wide
nothing ever dumped from station
metal lid is not locked

#4 Oil water Separator

Oil Water Separator
2 years ago last time serviced
no records kept by the retailer

Drum Storage 55 gallon drums
4 months ago
10 drums (8½ full)
2 drums soil/oil

2/3 per day oil changes
5 days per week

Storage Area

1. Motor Oil 10-40 / 20-50 28 cases of 12 qts.
2. Transmission Fluid Type F / Dexron II
3. Texaco Coolant (8)
4. Ammco Concrete Floor Cleaning Compound Sodium metasilicate Pentahydrate Sodium Carbonate 1 Qt/5 bag
   Caustic detergent Ammco Corp
   ADA, Innerlyon 49355
5. Motor Flush de sludges rings valves
   cancerdate x/year, petroleum distillates 30 f/ oz. (6)
   Part #5-650 Northwoods industries, Bensalem PA 19020
6. Engine degreaser 16 oz spray (6)
   STP Corporation
   Boca Raton FL 33431

TUT 001 0116

7. STP Carb Spray Cleaner
Same as #6

8. Brake Fluid 12 oz (24) 1gal (2)

9. Marine Formula 6-66 1l
Petroleum distillates

10. Power steering fluid 12 oz (4)

11. 5 batteries

12. Outboard 2 cycle engine oil
petroleum distillates

13. Oil filters

14. Drive chain outside dealership
Dupont Newcastle Co
Wilmington Del. 19898

15 Refrigerant 12/Freon 12 small canisters
1402

Cistern w/ water
in back of station

Septic tank
in back of station

16. Rubber tube 1 gallon (1)
Gold Eagle Co
Chicago IL 60622

Sheet

Oil silt screening fabric

Water base paints

Evaporate — dry residue — bake — Ship

Actions

#1 drain to underground

#2 outside evap drain

Process: Cement grout mixed sand/gravel — paints
Evaporation grout cement base channel

evaporate — dry residue — bake dispose & dump

Only generator in property — propane run
No oils / gasoline

TUT 001 0118

Ordinary Dry Cleaners

Chemicals

Perchloroethylene 55 gallon drums
3 sales - 4 sales / add'l 1 drum

Discharge for methylene chloride units

Cooling system for dryer/washer (per)

Drain lines to ?

Pro-Te-Cal
Ingalls Scientific Supply Chemical
Wayne N.J. 07470

Soap
Steam

Wet Side Spotter for Protein Type Stains
Cross Spot Number

800-526-1188
201-997-3300

2-Butoxyethanol
Hexylene glycol
29CFR 1910.1200

A.L. Wilson Product Chemical Co.
Kearny N.J. 07032

Rust Go (HF Acid)

Dye Stripper
Removes Stains

NCP
Sink Sink
Masters Chemical Products Inc
San Antonio, Texas 78238

1 case/year

Ex-Plode
Manuel Cortez Esteves Inc.
Dependable
Guaynabo, P.R.
783-4150/0401

Ez-Dose II
DXO Corp. Inc.
Rockville Park N.J. 07662
Volatile Solvents

TUT 001 0119

Comments

Facility closed down ~ Feb, 1988
Property to be sold

Multi bay, right service area
broken shocks front end work
exhaust
tune ups
engine cleaning
oil / lubricant changes

dumping into 55 gallon drums
↓
WASTE
↓
burn as fuel oil

No records — pulled up — 1 AST
No clean requirements needed for oil

Doug Smith 6377603

Pictures

Storm drain #1
open to ocean
#2 Gutter @ back of service area
#3 Open drain

1 year ago - blacktopped
~ 45 years as a Consol. Paint Facility
before ownership Baxter Lenland

TUT 001 0120

Esso Station [redacted]

EPA experts?

1. letter on 100 ppm issue for BTEX
(they do have a 100 ppm mixture BTEX)

IN TANK UNLEADED PREM. TANK THAT FAILED PREVIOUSLY

1005 (~~1015~~ gal) Aug 17, 1987 ~~17.8~~ rate dip down in 6 months to 165 inch dip (1015 gallons) Feb. 17, 1988 getting previous

~~initially~~ 144 gallons before 861 gallons put in by accident

4/~~15~~ 88 — reading 1060 gallons

Questions:

1. If voltage drops how much could the results be offsetted to say it being run.
2. Why does stabilizer/condensate not connect less than 90 volts
3. Why would an FID 001. decrease noise and increase the breakdown/ch. time back when the PID column could not do that
4. Does PID vs FID change the instrument level of detection or is it the extraction agreements above that can do it
5. How much contamination from dirt could be in blank or is it the syringe

TUT 001 0121

REFERENCE NO. 7

FIELD NOTES
104(e) SAMPLING NOTES
TUTU WELLFIELD AREA
ST. THOMAS, U.S. VIRGIN ISLANDS

Prepared for

U.S. ENVIRONMENTAL PROTECTION AGENCY
Office of Waste Programs Enforcement
Washington, D.C. 20460

EPA Work Assignment No.	: 821
EPA Region	: II
Site No.	: 2P2G
Contract No.	: 68-01-7331
CDM Federal Programs Corporation Document No.	: T821-C02-RT-DAVK-1
Prepared By	: CDM Federal Programs Corporation
Work Assignment Project Manager	: Scott Graber
Telephone Number	: (212) 393-9634
Primary Contact	: Caroline Kwan
Telephone Number	: (212) 264-0151
Date Prepared	: March 16, 1989

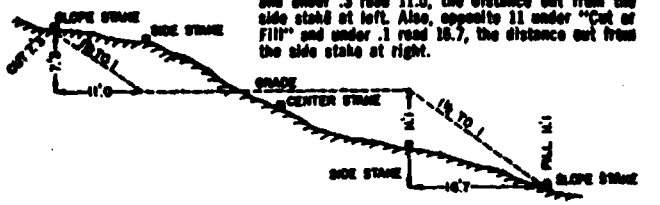
(WP11/29)

6-15

DISTANCES FROM SIDE STAKES FOR CROSS-SECTIONING

Roadway of any Width. Side Slopes 1½ to 1.

In the figure below: opposite 7 under "Cut or Fill" and under .3 read 11.0, the distance out from the side stake at left. Also, opposite 11 under "Cut or Fill" and under .1 read 16.7, the distance out from the side stake at right.



% Cut or Fill	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	% Cut or Fill
	Distance out from Side or Shoulder Stake										
0	0.0	0.2	0.3	0.5	0.6	0.8	0.9	1.1	1.2	1.4	0
1	1.5	1.7	1.8	2.0	2.1	2.3	2.4	2.6	2.7	2.9	1
2	3.0	3.2	3.3	3.5	3.6	3.8	3.9	4.1	4.2	4.4	2
3	4.5	4.7	4.8	5.0	5.1	5.3	5.4	5.6	5.7	5.9	3
4	6.0	6.2	6.3	6.5	6.6	6.8	6.9	7.1	7.2	7.4	4
5	7.5	7.7	7.8	8.0	8.1	8.3	8.4	8.6	8.7	8.9	5
6	9.0	9.2	9.3	9.5	9.6	9.8	9.9	10.1	10.2	10.4	6
7	10.5	10.7	10.8	11.0	11.1	11.3	11.4	11.6	11.7	11.9	7
8	12.0	12.2	12.3	12.5	12.6	12.8	12.9	13.1	13.2	13.4	8
9	13.5	13.7	13.8	14.0	14.1	14.3	14.4	14.6	14.7	14.9	9
10	15.0	15.2	15.3	15.5	15.6	15.8	15.9	16.1	16.2	16.4	10
11	16.5	16.7	16.8	17.0	17.1	17.3	17.4	17.6	17.7	17.9	11
12	18.0	18.2	18.3	18.5	18.6	18.8	18.9	19.1	19.2	19.4	12
13	19.5	19.7	19.8	20.0	20.1	20.3	20.4	20.6	20.7	20.9	13
14	21.0	21.2	21.3	21.5	21.6	21.8	21.9	22.1	22.2	22.4	14
15	22.5	22.7	22.8	23.0	23.1	23.3	23.4	23.6	23.7	23.9	15
16	24.0	24.2	24.3	24.5	24.6	24.8	24.9	25.1	25.2	25.4	16
17	25.5	25.7	25.8	26.0	26.1	26.3	26.4	26.6	26.7	26.9	17
18	27.0	27.2	27.3	27.5	27.6	27.8	27.9	28.1	28.2	28.4	18
19	28.5	28.7	28.8	29.0	29.1	29.3	29.4	29.6	29.7	29.9	19
20	30.0	30.2	30.3	30.5	30.6	30.8	30.9	31.1	31.2	31.4	20
21	31.5	31.7	31.8	32.0	32.1	32.3	32.4	32.6	32.7	32.9	21
22	33.0	33.2	33.3	33.5	33.6	33.8	33.9	34.1	34.2	34.4	22
23	34.5	34.7	34.8	35.0	35.1	35.3	35.4	35.6	35.7	35.9	23
24	36.0	36.2	36.3	36.5	36.6	36.8	36.9	37.1	37.2	37.4	24
25	37.5	37.7	37.8	38.0	38.1	38.3	38.4	38.6	38.7	38.9	25
26	39.0	39.2	39.3	39.5	39.6	39.8	39.9	40.1	40.2	40.4	26
27	40.5	40.7	40.8	41.0	41.1	41.3	41.4	41.6	41.7	41.9	27
28	42.0	42.2	42.3	42.5	42.6	42.8	42.9	43.1	43.2	43.4	28
29	43.5	43.7	43.8	44.0	44.1	44.3	44.4	44.6	44.7	44.9	29
30	45.0	45.2	45.3	45.5	45.6	45.8	45.9	46.1	46.2	46.4	30
31	46.5	46.7	46.8	47.0	47.1	47.3	47.4	47.6	47.7	47.9	31
32	48.0	48.2	48.3	48.5	48.6	48.8	48.9	49.1	49.2	49.4	32
33	49.5	49.7	49.8	50.0	50.1	50.3	50.4	50.6	50.7	50.9	33
34	51.0	51.2	51.3	51.5	51.6	51.8	51.9	52.1	52.2	52.4	34
35	52.5	52.7	52.8	53.0	53.1	53.3	53.4	53.6	53.7	53.9	35
36	54.0	54.2	54.3	54.5	54.6	54.8	54.9	55.1	55.2	55.4	36
37	55.5	55.7	55.8	56.0	56.1	56.3	56.4	56.6	56.7	56.9	37
38	57.0	57.2	57.3	57.5	57.6	57.8	57.9	58.1	58.2	58.4	38
39	58.5	58.7	58.8	59.0	59.1	59.3	59.4	59.6	59.7	59.9	39
40	60.0	60.2	60.3	60.5	60.6	60.8	60.9	61.1	61.2	61.4	40

KEUFFEL & ESSER CO. For Curve Tables see end of book.

648 (starting w/ page 1)

TUTU WELLFIELD AREA

"104 (R) Letter Response SAMPLING"

821 (starting w/ p. 48)

Supercat Laundromat Area

"104(R) Letter Response Sampling"

The paper in this book is made of 100% high grade rag stock with a WATER RESISTING surface sizing.

KEUFFEL & ESSER CO.

TUT 001 0124

9/6/88 ① CRQ

(Jsc) (SG)
Joseph Clapsaddle and Scott Graber representing CDM Federal Programs Corporation mobilize for leaves sampling activities to be conducted in the Tinton Wellfield area.

Upon arrival at DPNR office, find out that only 6 out of 15 packages have arrived via Federal Express from CDM NY regional office.

J. Clapsaddle / Scott Graber accompany Greg Rymer (DPNR) to the DPNR laboratory to pick up decontamination solvents and HCl solution for sample preservation. CDM FPC who had previously made arrangements w/ DPNR to use ~~the~~ deionized Analyte free water from the DPNR facility for decontamination and field ~~strip~~ blanks.

Upon inspection of the DPNR lab, Scott Graber decides to obtain DI water elsewhere. Greg Rymer indicates that he can get the water from the local hospital.

J. Clapsaddle

TUT 001 0125

9/6/88

laboratory. The decon / preservation solvents were obtained by G. Rymer at this time. G. Rymer mixed the 10% Nitric Acid solution and the 1:1 HCl solution in the laboratory. Buffer solutions were also obtained from the DPNR lab at this time (9/10).

S. Graber decides to use 5 gallon glass water bottles for the DI water. CDM also requests from DPNR/hospital lab that the water be taken continuously i.e. 1 batch of water, so CDM only has to analyze 1 water blank. The contact at the hospital lab agrees to this. CDM obtains 4-5 gal glass bottles and decons them at DPNR lab w/ phosphate free soapy water and several potable & DI water rinses. The hospital lab contact indicates that the bottles will be well rinsed with the hospital water before filling.

J Claypool

9/6/88

CDM FPC personnel also buy coolers, decon buckets, plastic, bleaching, and tape in several locations on the island, purchasing the items at the retail locations with the most competitive prices.

J Claypool

TUT 001 0126

(4) of (4)

9/7/88

CDM FPC Search the Island for an overnight mail service which will send soil samples, after discovering the Federal Express does No longer has the proper shipping permits to send anything other than documents, blood, and water. The only usable service appears to be Express Mail (US Postal Service) and they can not garentee 24 hr. delivery to all 46 locations being used by CDM FPC this week. Cash will have to be paid for these shipments because CDM FPC has no account number with the US. Mail Service.

J Claypoole

9/8/88

(5) of (6)

5:00 CDM FPC - Scott Graber & Joe Claypoole arrive at DPNR office to pick up sampling equipment and to decontaminate all of the sampling equipment

6:15 Soil Tech (CDM contractor at DPNR)

Equipment which was decontaminated:

- Vacuum pump apparatus
- 2 stainless augers
- 6 stainless sample spoons/trowels
- 3 stainless mixing bowls
- 4 - 5' teflon bailers w/ leaders and poly line

Decon. was carried out according to sample plan. Greg Ryner of DPNR indicated that he would be in charge of the used decon solvents.

OHENRY

8:00 CDM arrives at O'Henry Dry cleaning facility. (Greg Ryner/DPNR) and Joel Soule (Soil Tech) were on-site at this time. 3 soil samples were scheduled to be taken at this site.

Upon further field review of the site, 1 composite sample will be taken.

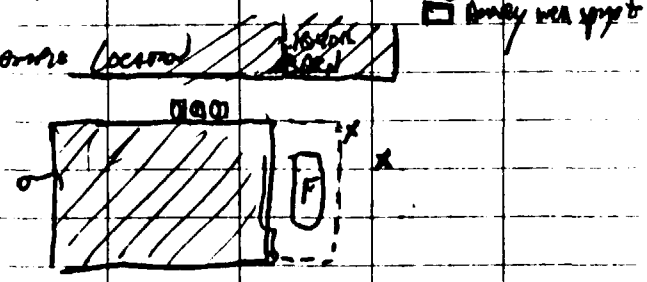
J Claypoole

TUT 001 0127

9/8/88

3 (55 gallons) drums are found stored on-site.

It was noted that both sides of the bldg. had effluent discharge (2" line) for the steam condensate from the steam presses and the clothes dryer.



F - Fuel tank
-- cement retaining wall
o steam condensate line
x Sample pt composite soil
□ PCE drum storage

Lithology (sample) : moist brown sandy clay w/ pebble to gravel sized subangular rock fragments

9/9/88

HNu readings:
900 am Background 0.5 units
900 am Sample location 35.0 units peak 50.0 units

(Intrusive)
Upon breaking ground, HNu readings continuous. Readings indicated > 5 units background - upgraded the level C for sampling duration

RAMSAY

9:45 Move sample equipment to the Ramsay Water Center. Upon inspection of the facility, CDM FPC make field decision to collect 2 samples: 1 from the holding tank filled with water from an on-site well, and the other behind the mechanics garage where it appears that continuous dumping of petroleum waste has occurred.

10:30 Trip blank is collected and accompanies ~~again~~ samples ~~discussed~~ until shipment.

10:45 Ground water sample is collected from the holding tank.

J Chappell.

TUT 001 0128

(8) of (62)

9/8/88

11:00 Since samples need to be delivered to the U.S. Post Office by 12:00 CDM FPC decide to take a field blank at this time and collect the soil sample another day.

11:15 Decontamination of mixing bowl and trowel is completed and a field blank is taken. The mixing bowl and trowel were used at O'Henry cleaners earlier in the day.

11:25 CDM FPC leave site. Jose Soto of BPA agrees to picking up decon equipment and other equipment so CDM FPC can make it to the Post office by 12:00. Jose Soto also agrees to dispose of the decon. solvents. (in 1 pail).

CDM FPC pack cooler and finish paperwork in car, on the way to the Post office.

J Claypoole

9/8/88

(9) of (62)

11:45 Arrive at Post office, where the representative indicates to us that the delivery can not be guaranteed in 24 hrs. In the zip code which the lab is in. CDM FPC sends the cooler anyway, and inquires about the zip code for the Hoboken, NJ Lab. U.S. post office Rep. indicates that the delivery can be guaranteed in 24 hrs to this location.

15:00 CDM FPC reps (J. Claypoole, Scott Gruber) go to the Ramsey facility to make sure all equipment was picked up and debris was cleaned from area.

After this, CDM Representatives did in oversight and cleaning of any other wastes of Tekoco Tank Excavation.

J Claypoole

TUT 001 0129

(10) of (12)

9/9/88

Weather: Very rainy and windy. Perimeter of Hurricane Hitting Island of St. Thomas.

Impossible to sample. ~50% Roads closed, Schools closed, Banks closed, etc.

J Claypoole

(11) of (12)

9/10/88

Joe Claypoole and Scott Graber attempting to resolve many issues which could not previously resolve due to limited time.

Since hand auger handle was confiscated on airplane on the flight down here, our FPC had to construct a handle from plumbing materials at a local hardware store.

Additional supplies were also purchased as well as oversight done at Tekaro Tank excavation.

J Claypoole

TUT 001 0130

9/12/88

5:00 J. Claypool, John Mazza pick up bottles, decon equipment, solutions, etc. at DPNR.

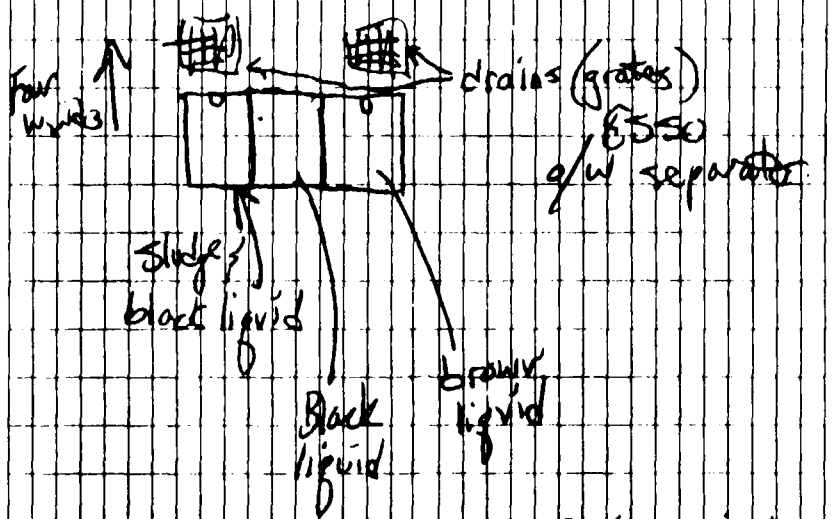
6:00 - Arrive at Exxon Service Station located adjacent to Fair Winds shopping Center.

Collect an "oil" sample from a holding tank located beneath the floor of the tire service center.

The manager (Danny) of the station informed CDM FIC personnel that the oil/water separator is no longer a functioning unit and serves as a temporary holding tank. He said that when the oil/water separator fills up, it is pumped into the holding tank beneath the tire care center floor which drains into the city sewer system.
Upon inspection of the oil/water separator, it was apparent that it did no longer function, i.e. there

J Claypool

was not a "clean section".



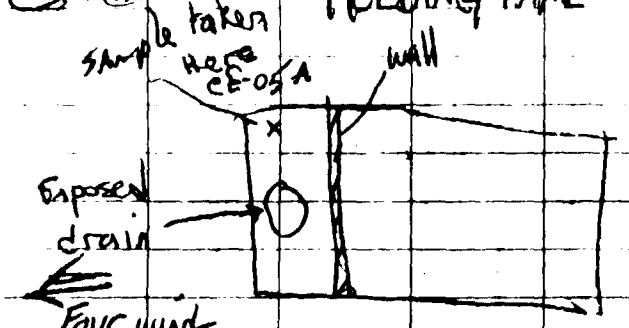
Since a clean section did not exist, it was decided that a sample was not necessary from each section, but a representative sample will be taken from the center section after a sample is collected from the holding tank.

J Claypool

TUT 001 0131

(14) of (15)

HOLDING TANK 9/12/88



location: Inside Tire service center.

Sample eE-05A collected with vacuum pump apparatus. Appears to be oil. Will be sent as high hazard sample.

Return to oil/water separator and collect grab sample from center section by submerging bottles. Black liquid, less viscous than 100% oil. This sample is called eE-06A.

11:15 Move to Ramsay Motors. Take subsurface soil sample in intermittant drainage ditch.

J Clapsaddle

9/12/88 (15) of (15)

Sample location is on South bank of Ramsay and consolidated, centered between tree line and road. Appears to be drainage pattern from old Laga building.

Sample eR-07B is collected by hand auger from 4'-10". Vials are collected by trowel from undisturbed sides of borehole. Brown sandy clay

Sample eR-08B collected from sub-surface soil w/ auger 3'9". Vials collected w/ trowel from undisturbed sides of borehole. Top 2" of soil at this location, in front of the back doorway of mechanics garage, has visual contamination of oil and grease. Brown sandy clay

12:20 Move all equipment to Consolidated auto parts location. Set up decon. area.

13:50 Sample collected from behind open air bay garage located

J Clapsaddle

TUT 001 0132

9/12/88

is back of facility. Grab sample from entire rear borders of the garage. Reportedly, the facility has recently paved and this sample should be a fairly representative one of the soil beneath the pavement.

Sample taken by filling VOA vials from various locations first, and collecting enough soil in stainless pan for homogenizing for other analyses. This sample was called eC-09s.

eC-10s was collected on up gradient gable end of open bay garage adjacent to drum storage area. This sample is composite, taken w/ decon'ed hand auger from 6-12". Vols collected from undisturbed sidewalls of borehole. Coarse sand 4-8" and then sandy clay w/pebbles.

J Clapper

9/12/88

Also adjacent to this drum storage area existed an area w/ several inches of standing water. A grab sample was collected at this location by submerging sample bottles in this water. VOA's first. This sample was called eC-11A.

15:30 All sample implements used, trowels augers, bowls were decon'ed and a field blank was taken by pouring DI water through the auger and over the spoon into the mixing bowl. The water was then poured in the appropriate bottles. This sample was called eC-12f.

A trip blank was also collected to accompany the surface water sample.

The samples were packed and sent to the appropriate labs. The BNA samples were put on ice and held until a lab was available.

J Clapper

TUT 001 0133

9/13/88

Joe Claypoole aids in Tut-Texaco tank excavation oversight while Scott Graber deals with issues at DPNR.

10:30 Joe Claypoole, Scott Graber, and Greg Rymer go to the Tillet property to prepare to sample the production well and take other soil samples.

Upon arrival at the Tillet facility, Eric Tillet requested us to sign a form which excludes the Tillets from any liability for personal injury while on their property. SG & JC sign the forms, but Greg Rymer refuses, indicating that he would need to commissioners permission to sign such a release form.

Eric Tillet attempts to turn pump on to production wells. After unsuccessful attempts, the electric meter to the pump house is checked, and the

J Claypoole

electric service is found to be disconnected. Eric Tillet indicates that his brother will be back by the end of the week, and he may be able to get the electric turned on, so the water can be sampled.

11:10 Move sample equipment to paint cleaning drain. Take one surface soil sample at the foot of the concrete drainway. +2 feet of fill material by 10 feet long was placed at this location by Eric Tillet over 2 years ago.

J. Claypoole & S. Graber escorted by E Tillet penetrate the gravel fill in several locations testing with headspace at each location. Rymer went back to Toledo.

Background values were observed at each location. SG. and JC decide to collect the sample at the foot of the drain line i.e. very beginning of gravel pile. This sample location is ~TT-14/s. Brown sandy clay w/ pebble size rocks (well rounded).

Rated BB 999

J Claypoole.

TUT 001 0134

(20) of (20)

9/13/88.

13:20 Move to drainline location inside fenceline.

The surface sediment sample was taken from the 2' drain pipe where it exits the building. There was visual evidence of green paint in the sediments. Background PID values. Saturated, coarse sand.

This sample location is called ETT-15 RAS # BR 999. SAS samples packed in ICA for later shipment.

J Clapoole

9/14/88

(2) of (2)

J. Clapoole assisting D. Marca in Texaco tank excavation oversight. Accepting 100% split samples.

11:00 Trip blank is prepared by J. Clapoole.

11:30 Grab sample from cistern located behind Texaco building is collected. Thin film of oily-like substance on top of water.

The CDM FPC number given to this sample is ETT-01W. RAS # BT 722

11:55 J.C. called SMO reported all RAS samples sent thus far. (Spoke w/ Tom Singer)

12:40 Soil sample collected from Texaco facility. Location adjacent to concrete slab next to chainlink fence. Directly North of 1st open bay with lift.

J Clapoole

TUT 001 0135

(22) of (23) 9/14/88

HNu readings from this sample peaked at 10. Sustained readings of 3.

Sample was collected in area which was obvious dumping ground for waste. 3-8' depth, just below grossly contaminated material.

#13 No field blanks were taken this day, because implements used on this day were cleaned on 9/12/88 and a blank was sent on that day.

Duplicate sample was sent of the Tutu Texaco lower soil sample. The CDM FAC #s are eT-025 and eT-025d

RAS #s are BT 723 and BT 724 respectively

J Chappell

9/14/88 (23) of (23)

The RAS samples were packed with the Texaco tank excavation samples.

Upon speaking with Laura Gavin (CDM C&P Coordinator) it became apparent that enough lab space was not available in the which the samples were addressed. The SMO refused to book all of the lab space requested by CDM until CDM reported that ½ of the lab space had been used. Since the SMO [illegible] contact (Diane Cutler) was not available today, samples could not be sent because additional lab spaces can't be rewarded until tomorrow.

CDM ices RAS / SAS samples down and leaves them at JPNR. SAS lab and SAS # was obtained from Laura Gavin at this time.

J Chappell

TUT 001 0136

(24) of (42)

9/14/88

COM FPC decides to send washer blank RAS sample which was collected by S. Cyrankiewicz. This sample is called G-18 WB and is collected at DPNR

RAS # BT 750

SAS # 4130B-27 (will be sent 9/16/88)

J Claypoole

(25) of (42)

9/15/88

6:00 J. Claypoole begins to pack and do paperwork on all SAS samples taken thus far in both projects.

9:20 J. Claypoole speaks w/ C. Gravin to get 2nd RAS Lab of the week. Lab was awarded and the name and address was relayed to J Claypoole, but case # was not available. i.e. paper-work can't be completed for samples taken yesterday or the ones being collected today by J. Mazza at the Tank excavations.

1300 Lab information confirmed and paperwork for samples completed.

J Claypoole

TUT 001 0137

(26) of (27)

9/15/89

John Mazza transfers samples eE-05A & eE-06A to 18 oz glass jar each

Samples are renamed

eE-05A → eE-63
eE-06A → eE-64

John Mazza also collected grab sample from Terrace oil/water separator. Looks like pure product (oil). This sample is called eT-62.

J Chappell

6-5-89 Susan Cotton (27) of (67)

1050/ Arrive at O'Henry Dry & cleaning
1055/ Site inspection
1100/ Leave O'Henry for IDPNR.
1255/ SA & JC return to O'Henry's after picking up equipment at IDPNR.
1310/ SA & JC pre-cleaning equipment before sample collection.
Teflon procedure
wash & scrub with soap
potable water rinse
10% HNO_3 rinse
potable water rinse
methanol rinse
hexane rinse
deionized water rinse
air dry
aluminum foil, shiny side out.
HNu - COM FPC # P1405 calibrated on 5-26-89 by Anthony Sims with 99 ppm isobutylene span set at 5.0, 11.7eV probe.
eO2 - 01 etc sampling locations at O'Henry
1400/ JC reports reading > 3 ppm above

Susan Cotton

TUT 001 0138

(28) 60 OF (60)

Bkgd. upgrading to modified level C

1415 / HNu reading 6 inches below ground sustained reading >20 ppm in the hole. Breathing zone nothing above 1.0 ppm bkgd. 0.2 ppm. Deflection >50 ppm in hole.

1425 / Picture #18 JC augering at O'Henry.

1450 / Sample e02-01 sample collected from 6-15 inches.

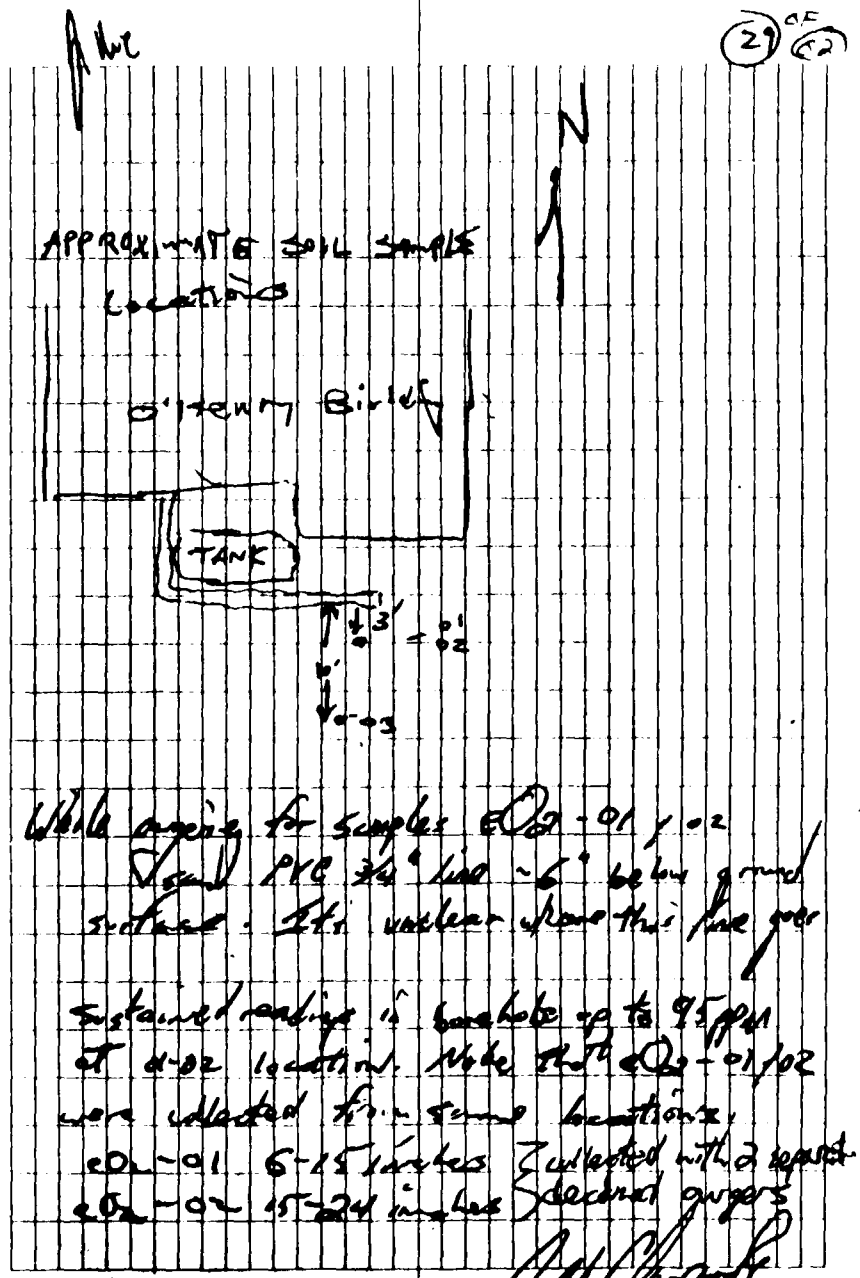
1515 / Field blk. collected.

1600 / Sampling complete loading bottles.

(VMC) Sample #e02-03 collected ~10' from cinderblock wall. Clayey soil much drier than 1st 2 samples. No sustained HNu readings above background in hole.

Photo #19, 20, 21 are of general area samples were collected behind O'Henry's building.

(29) OF (60)



While digging for samples e02-01 & e02-02 (soil) PID 2-4 ppm ~6" below ground surface. Strong vapors above this zone.

Sustained readings in borehole up to 95 ppm at e02 location. Note that e02-01/02 were collected from same location, e02-01 6-15 inches collected with 2 separate e02-02 15-24 inches Edelman augers

TUT 001 0139

(30) (F62)

jmc.

New gloves for each sampling event.

2 hand wiper buckets available stainless as well as 5 stainless trowels
2 stainless bowls.

Field blank taken after collecting 1st 2 samples. ie. decon ⇒ field blank
→ collect 3rd sample (32)
preserved VOA - checked 3rd vial.
preserved TPH sample.

Shipped: 3 soil samples
VOAs, Extractables
+ Field blank - VOAs, Extractables.

TPH & BTEX samples were collected but lab not available yet.

4:30 leave Alameda site

jmc Clapsaddle

(31) (F63)

6-6-89

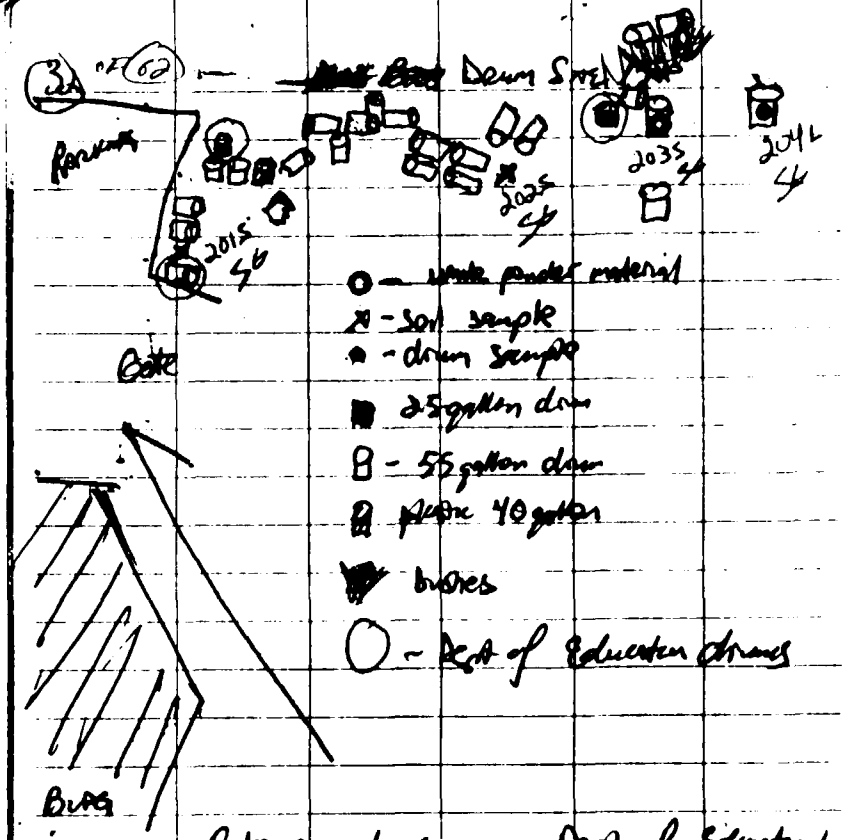
1350 S Gruver / J. Clapsaddle arrive at Light Bldg and inspect abandoned drums located in area behind the bldg. Preliminary assessment of area indicates 9 drums 55 gal corroded / rusted without products, 1 55 gal drum with unknown liquids yet sealed - 3 plastic drums, and 2-55 gallon empty drums.
1 unknown liquid sample in Unknown drum that is greenish
3 soil samples scheduled: EL02015 (reading) EL02045
EL02025 (grey green silty)
EL02035

Background reading 0.2 ppm
Breathing Area 0.2 ppm
Cut into surface soil 40 ppm @ EL02015

Sampling of soil samples conducted in Level C

1400 Soil samples taken in Level C (EL02015) 3-12" DEAN
1415 Field Blank taken (EL02FB1) PW=1 (50% recovery)
1500 Soil Sample taken in Level C (EL02025)
6" into surface soil: 10 ppm in hole: Hit 45 - Level C 20 ppm
Breathing area 0.2 ppm
Background 0.2 ppm
1510 Field Blank taken EL02FB2 (Recovery 67% - ppm)
1530 Sample taken EL02045
Difficulty in getty minutes on VOA samples due to viscosity of sample

TUT 001 0140



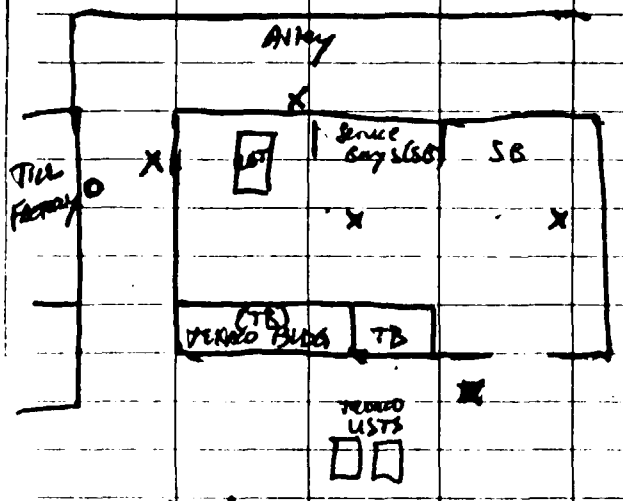
Gates are always open. Dept of Education indicated that some of the above drums were drums from them (marked with a circle around them. Most drums were identified as pesticides and lubricants. 55 gallon drum was insecticide & 25 gallon drums as lubricants

TUT 001 0141

(48) OF (52)

6/6/89

0900 Scott Gruber, Greg Rhymer (DPWR) and Dept. of Public Works arrived at the Supercat Laundromat Area. Approval by Kenneth Ellis (Property Mgr.) was acquired in order to break through the concrete and provide bore holes. Five holes were made (5 bore holes and 1 existing UST access) for the next day sampling events. Scott Gruber requested well logs for the Laundromat well, at this time, from Kenneth Ellis who indicated that he would have to search for them and deliver them to the hotel later this week. The holes were covered and the area secured for next day sampling.



X - Boring
O - UST (manway) access

Scott Gruber

(49) OF (52)

6/6/89

1030 left site for the day.

[illegible]

J.C.

6/7/89 0930 Arrive at Supercat Area
J. Clapsaddle, J. Marza, Scott Gruber (from RPE)
G. Rhymer (DPW&P) & (DPWR Public Rep)
K. Ellis (Supercat manager)

J. Clapsaddle, J. Marza decontaminating equipment: bailers, augers, measuring wells, trucks

Access to cistern through K. Ellis's Mr. Pinkle station had slight petroleum odor.

J Clapsaddle

TUT 001 0142

(50) of (52)

6/7/89

1130 G. Rayner was sent for polypropylene rope for bailer lead.

1240 G. Rayner returns w/ rope.

	RAS #	SAS #
ESC-02-01A	BX994	4658B-30
ESC-02-02A	BX995	4658B-31
~~ESC-02-03FB~~	~~BX996~~	
ESC-02-03FB	BX996	4658B-32

1217 Sample BX994 collected from cistern. Water was pale yellow w/ some suspended particulates. No HNU readings above background. (non potable water)

1235 ESC-02-04S BX997 4658B-33 VOA test vial ph 2 slight petroleum odor

1248 Collected sample from floor drain near file Woodworking Shop Inc. Sediment tan & black saturated medium sand.

1345 Take field blank of bailer BX996 pH check of TPH of field blank. Dispose

TUT 001 0143

JVC 6/7/89 (51) of (52)

pH 1.5

Cistern TPH pH 1.5

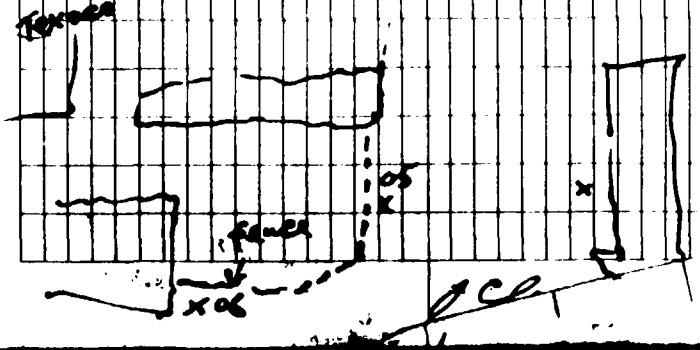
1352 Collect water from cleaned cistern + potable water

Sample # BX995 4658B-31

TPH pH 1.5

Water was clear w/ slight chlorine smell. Collected VOAs soon after. Collection of next bottle for extractables the water supply came on raising the water level about 6 inches. Finished collecting Sample [illegible] water samples collected w/ Teflon bailer.

1440 Decide to collect soil samples from locations below



(52) 6/7/89 jmc

sample eSC-02-05

Concrete & drainage gravel ~5" thick. Sample taken from 3"-12" below gravel/soil interface. HNu readings up to 10 ppm in hole. Sustained readings up to 6 ppm. Soil is clayey and stained black w/petroleum odor

0500 J. Claypoole moves to location eSC-02-05 see p. 51 for location.

See page 27 for HNu info. sample description same as eSC-02-05S depth - 3'-9" below gravel/soil interface concrete & gravel depth 6".

petroleum odor noticed

(53) 6/7/89

Courtroom Deep Rental Sample map

eTSC-02-01S

SLATE

Bu. Td

Fence

Q4

Bu. Td

BAYS

0610 move to location eSC-02-07

3'-14" below concrete gravel interface

brown clay no visual staining

Background: 0.2 ppm

in hole: 0.2 ppm

TUT 001 0144

54 OF 62 6/7/89 jmc

1715 Sample location ESC-02-09
Black, clay sized grains w/ petroleum odor
Background: 0.5 ppm
2' into hole 1.0 ppm

NOTE: Field blank ESC-02-08 taken at 1700 hr poured through auger head into bowl w/ trowel. Water transfered from bowl to bottles

1800 S. Claypoole collects sample ESC-02-015 adjacent to Texaco sign.
Soil is dark brown sandy clay w/ slight petroleum odor. HNu readings of .8 ppm above background in hole. Sample collected from 3"-8" below concrete/soil interface

1900 S. Claypoole decons all equipment wraps in aluminum foil and packs into car.

1915 Leave supercat area.

J Claypoole

55 OF 62 6/8/89 jmc

0815 S. Claypoole & COM FPC arrived at Sue Anton Ramsay (Ford) Auto facility will collect 1 soil and 1 oil sample at this facility.

0845 S. Claypoole collects grab sample of waste oil in UST located in NW consolidated garage. Sample # ER-02-011

S. Claypoole moves to area adjacent to Gasket (formerly consolidated) Obvious oil staining on surface soil/vegetation originating from Gasket and migrating toward Ramsay.

S. Claypoole collects soil sample with hand auger and trowel/bowl decaned yesterday. (See field blank already collected for 6/7/89 decon except for implements used) Sample # 10

Soil sample # ER-02-02 collected from area adjacent to Gasket fence on Ramsay property. Sample taken from 2'-3' below surface HNu readings in hole = 3 ppm

Background = .3 ppm

J Claypoole

cal. Gration info on p 27

TUT 001 0145

(56) of (62)

6/8/89

1230 J Clapsaddle arrive at Superfund area. Dave Antan to collect UST samples. Background HNu readings .003 ppm. Readings of 3.2 ppm in tank. Collect sample with a 40 ml vial taped onto a length of polypropylene line. Emerge sample and transfer into VOA vials. Material was grey-black and fairly non viscous. Sample location eT-02-[illegible] (Grab)

1300 Leave Superfund area, [illegible]

1500 J Clapsaddle, Gregg Rhynor meet up at Putn Tanner to collect samples.

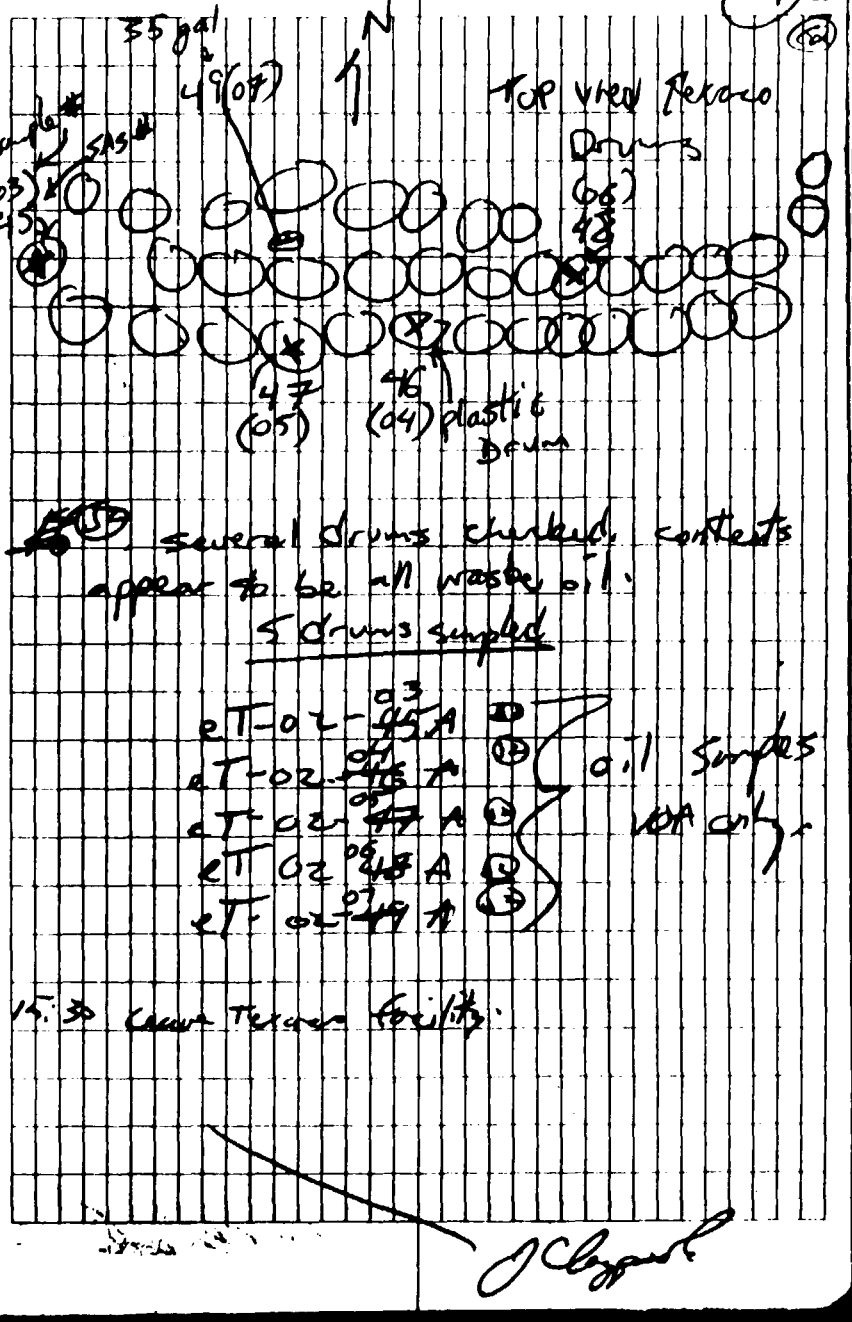
eT-02-01A Taken from oil water separator

sample location oil/water separator

eT-02-02A - from middle bay collection pit

J Clapsaddle

(57) of (62)



TUT 001 0146

(58) OF (60)

6/8/89 JMC

16:30 JC/Clapsaddle Go to Consolidated (Gasket)
Greg Rhymer

Collect 1 sample of oily water from drain leading to Ramsay property.
eC-02-01A (Bag # 50)
Sample is mostly water w/ oily sludge mixed with it.

17:00 Leave site

JM Clapsaddle

6/8/89 JMC (59) OF (60)

17:30
J. Clapsaddle + G. Rhymer take samples at Turbine Bldg. facility.

eE-02-01A (Bag # 51) oil sample collected from 6500 holding tank (UST) located below floor of Turbine service area

eE-02-02A (Bag # 52) } collected
eE-02-03A (Bag # 53) duplicate of one from first stage of oil/water separator which is now being used as a temporary holding tank.

Note - eE-02-01A was collected with an 8 oz clear jar on a polypropylene line and transferred to VOA vials. Only about 3" of oil existed in the holding tank. It has been emptied since the last PM(C) sampling round.

eE-02-02A/03A were collected by submerging the VOA vials in the oil.

G. Rhymer obtained permission from A. Ramsay to dispose waste solvents (used for decon) in 55 gal. drums used for same.

J. Clapsaddle

TUT 001 0147

(60 OF 62)

JM 6/9/89

0945 J. Clapsaddle & Scott Graber arrive at Supercan Laundromat to collect a water sample from a well on the premises.

0930 Gregg Plymer (DPNR) was supposed to meet with CDM FPC at the Supercat facility at 0900. He has not shown up yet.

110 gallons will be purged from the well with 2-55 gallon drums. CDM FPC will collect a duplicate sample at this location.

0935 Trip Blank was prepared while setting up 2-55 gallon drums to purge the Supercat well prior to sampling. The issue of disposal for the purge water is discussed with DPNR. DPNR will handle the issue.

* Kenneth Ellis Property Mgr. [redacted] [776-3626] is providing well hookup as well as access to all sampling conducted on the Supercat Laundromat area on 6/7/89.

Scott Graber

6/7/89 JMC

(61 OF 62)

0940 Drums are in place. K. Ellis turns pump on to begin purging. There is a leak in the PVC pipe where it comes out of the Supercat Laundromat wall.

K. Ellis solders a piece of PVC pipe at the location of the leak.

10:00 Turn pump on the begin purging again, but it is found that the pipe is still leaking. The leak appears to be located up in the block wall, as a hole would have to be broken in the wall to repair the leak.

Scott Graber decides that it is not necessary to do this. No Supercat well sample will be collected during this phase of the investigation.

Note that the minimal amount of water that was purged from the well produced a definite petroleum odor.

J Clapsaddle

TUT 001 0148

(62) OF (62)

6/9/89 jmc

10:20 J. Clampitt and staff Graber pack bottles into car and prepare to leave site.

Gregg Rymer arrives on-site after all issues are resolved.

10:25 COMPAC leave site.

jmc Clampitt

(63)

TUT 001 0149

REFERENCE NO. 8

CDM FEDERAL PROGRAMS CORPORATION

April 27, 1990

Ms. Caroline Kwan
U.S.Environmental Protection Agency
26 Federal Plaza
New York, New York 10278

Project: EPA Contract No: 68-W9-0002

Work Assignment: C02048 - Tutu Well Field

Document No: TES 5 - C02048 - EP - BQHF

Subject: Preliminary (unvalidated) CLP Sample Analysis Data Summary of Soils and Waters from the Tutu Texaco Soil Pile, Tutu Esso Tank Excavation Pit and Soil Pile, and Second Round 104(e) Letter Response Sampling, Tutu Wellfield and Supercat Areas, St. Thomas, U.S. Virgin Islands

Dear Ms. Kwan,

The purpose of this letter is to provide you with the preliminary CLP analysis results from the sampling activities of the week of June 5 - 10, 1989, in the Tutu and Supercat Areas, St. Thomas, Virgin Islands. While this data has been through our in-house validation process, FPC is awaiting validation by MMB before officially releasing the data. When we receive that validation we will submit separate formal data summaries to you for the Tutu Well Field and Supercat Laundromat areas.

The samples analyzed consist of:

Case 12058 - soils and aqueous samples - volatile organics (VOAS), extractables (semi-VOAs - base/neutral/acids, pesticides, and pcbs)
Case 4512b - soils and aqueous samples - total petroleum hydrocarbons (TPH)
Case 4658b - soils and aqueous samples - EP toxicity

Summary tables of these analyses are included as attachments to this report.

Splits of PRP samples were accepted by FPC during the following oversight activities:

Texaco soil pile sampling (following soil pile ventilation)
Esso tank excavation (from pit following tank removal activities)
Esso soil pile sampling (excavated soil prior to ventilation).

40 Rector Street, 10th Floor New York, NY 10006 212 393-9634

TUT 001 0151

FPC samples from 104(e) Letter Response sites were collected from:

Texaco Tutu Station
Esso Tutu Car Care Station
O'Henry Dry Cleaners
Department of Education Building (formerly LAGA)
Ramsay Motor Company
Supercat Site (locations not differentiated in this report)

The 104(e) Letter Response site sampling represents a second investigation. These, and additional sites, were originally sampled in the summer of 1988. Copies of the Sample Analysis Data Summaries submitted for 1988 sampling and 1989 analysis of oils from 104(e) letter response sites are included as attachments with this report for easy reference.

A master table of locations split samples accepted by FPC during field oversight activities is included with the data tables. It lists the PRP field number, FPC field numbers, CLP sample numbers and analyses performed.

The data tables list only analytes found above detection limits. We have included data qualified as estimated (J), tentatively identified (NJ), estimated and found in blanks (BJ). Analytes qualified as below detection limits (U) or estimated below detection limits (UJ) were not included. Values that were rejected during the validation process due to problems with laboratory instrument calibration are listed as rejected (R) with no value. Analyses from field blanks and trip blanks are presented with the data from each site to indicate which analytes may have been present due to sampling or laboratory contamination.

Brief summaries of the analytical results from each site are presented below.

Texaco Soil Pile - Splits from the ventilated soils awaiting disposal at the Texaco site are relatively clean. VOAs were collected from the top, middle and bottom of the pile at each location. All other analyses were performed on homogenized (top/middle/bottom) samples. The main VOA found was methylene chloride, which was also found in a lab blank. Sample SP2-022 from the middle of Texaco's location SP-3 contained chlorinated hydrocarbons and xylenes. Tentatively identified hydrocarbons were also found in semivolatile analyses from this location. No pesticides or PCBs were detected. TPH at the three locations split with FPC ranges from <10 ug/g (ppm) to 91 ug/g. The only metals detected by EP Toxicity analysis were cadmium and lead. Cadmium ranged from .35 to 2.8 ug/l; lead ranged from 1.8 to 31 ug/l.

Esso Excavation Pit - FPC accepted splits from 7 of the 13 locations sampled by Esso. Of the VOAs detected, xylene and ethylbenzene were the most common, being present in all but one sample. Benzene was detected in four samples, toluene in two. The highest concentrations - 311,000 ug/kg (ppb) - of benzene, toluene, ethylbenzene, and xylene (BTEX) were found in sample TE-X-03. Various benzenes were tentatively identified in most samples. No chlorinated hydrocarbons were identified except 8 ug/kg (ppb)

chlorobenzene in sample TE-X-05. Semivolatiles detected included naphthaline, methylnapthalenes, fluorene, phenathrene, bis(2-ethylhexyl)phthalate, and benzene isomers, most of which were found in five of the samples. No pesticides or PCBs were detected. TPH in the pit soils ranged from <10 to 69 ug/g (ppm) in all but location TE-X-03, which contained 2550 ug/g. Barium, cadmium and lead were detected in almost all the samples.

Esso Soil Pile - FPC accepted splits from 3 of 7 locations. VOAs were collected from the top, middle and bottom of the pile at each location. All other analyses were performed on homogenized (top/middle/bottom) samples. Contaminants found were similar to those found in the excavation pit. High values for xylenes and ethylbenzene were found in all but one sample. Toluene was detected in two samples. Tentatively identified compounds in all samples include abundant hydrocarbons and benzenes. Semivolatiles detected in all samples include naphthalene, methylnaphthalenes, fluorene, phenathrene, bis(2-ethylhexyl)phthlate, and benzene isomers. No pesticides or PCBs were detected. TPH ranged from 48 to 139 ug/g (ppm). Barium, cadmium, and lead were detected in all samples and arsenic was detected in one.

O'Henry Dry Cleaners - Three samples were collected at the site. Chlorinated hydrocarbons were the prinipal VOAs found. Sample e02-02 contained the highest values (20 ug/kg [ppb] 1,2-dichloroethene [DCE], 75 ug/kg trichloroethene [TCE] and 180,000 ug/kg tetrachloroethene [PCE]). Semivolatiles detected include phenol, heptadecane and bis(2-ethylhexyl)phthalate. No pesticides or PCBs were found. TPH ranged from 38 ug/g (ppm) to 302 ug/g. Cadmium was the only metal detected; it was present in amounts less than 1 ug/l.

Department of Education (LAGA) - Five (4 soil and 1 water) samples were collected. Toluene, ethylbenzene and xylenes were detected in sample eL-02-01S. Xylenes were also detected in eL-02-02S. Heptanes were tentatively identified in the water sample. Most of the semivolatiles found were also in sample eL-02-01S. They include phenol, methylphenols, naphthalene, methylnaphthalenes and other hydrocarbons. The only pesticide detected was Endosulfan I, also in sample eL-02-01S. TPH ranged from 544 to 3470 ug/g (ppm). Cadmium and lead were detected in all samples.

Ramsay Motor Company - One soil sample was collected. Meythylene chloride, xylenes and tentatively identified benzenes were detected in the VOA analysis. Semivolatiles detected included naphthalene, methylnaphthalene, fluorene, fluoranthene, pyrene, and benzofluoranthenes. No pesticides or PCBs were found. TPH was 23,400 ug/g (ppm). Cadmium and lead were detected at 6.1 and 15 ug/l, respectively.

Supercat Area - Eight samples (six soil and 2 water) were collected from the area. The discussion of individual locations at the Supercat site will be more detailed in the official data summary FPC submits after we receive MMB data validation. VOAs found in most samples were acetone and methylene chloride (possibly laboratory contaminants). Benzene, methylpentanone and ethylbenzene were detected in soil sample eSC-02-06S, as were tentatively identified hydrocarbons. Ethylbenzenes and tentatively identified compounds were found in eSC-02-05S; xylene was found in samples eSC-02-01a

and -04S. It should be noted that the trip blank accompanying the aqueous samples yielded high BTEX values. The Supercat samples contained few semivolatiles, except for sample eSC-02-04S, which had di-n-butylphthalate, butyl benzylphthalate, aliphatic hydrocarbons and sulfur. The only pesticides detected were in sample eSC-02-06S, which contained 55 ug/kg (ppb) 4,4'-DDD. TPH in soils ranged from <10 to 24,500 ug/g (ppm) in eSC-02-06S and from <1 to 2 mg/l in waters. Lead, ranging from 1.4 to 978 ug/l was found in all samples. Barium and cadmium were also detected in most samples.

This completes all of the sampling activities and receipt of the corresponding split sample analytical data for the Tutu Well Field site (Supercat Laundromat site included) to date. If you have any comments or questions regarding this data, please contact Sally Odland or me at (212) 393-9634.

Sincerely,

CDM Federal Programs Corporation

Scott B. Graber
TES V Regional Manager

SG/sko

LETTER REPORT
PRELIMINARY (UNVALIDATED CLP SAMPLE ANALYSIS DATA SUMMARY OF SOILS AND WATER FROM THE TUTU TEXACO SOIL PILE, TUTU ESSO TANK EXCAVATION PIT AND SOIL PILE, AND SECOND ROUND 104(E) LETTER RESPONSE SITE SAMPLING TUTU WELL FIELD AND SUPERCAT AREA
ST. THOMAS, U.S. VIRGIN ISLANDS

Prepared for

U.S. ENVIRONMENTAL PROTECTION AGENCY
Office of Waste Programs Enforcement
Washington, D.C. 20460

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Date Prepared	: April 27, 1990

(Master 11)

Tutu Wellfields, St. Thomas, U.S. Virgin Islands
Volatile Organics Analysis of Soils in ug/kg and Water in ug/l.

TEXACO SOIL PILE

PRP Location:	SP-1TOP	SP-1MID	SP-1BOT	SP-2TOP	SP-2MID	SP-2BOT	SP-3TOP	SP-3TOP	SP-3MID	SP-3 BOT	Field Blank
Field Sample Number:	SP2-011	SP2-012	SP2-013	SP2-021	SP2-022	SP2-023	SP2-031	SP2-031D	SP2-032	SP2-033	SP2-FB2
EPA Sample Number:	BX 262	BX 265	BX 266	BX 263	BX 267	BX 268	BX 264	BT 749	BT 747	BT 748	BT 758
Matrix:	soil	soil	soil	soil	soil	soil	soil	soil	soil	soil	water
Chloromethane											
Bromomethane											
Vinyl Chloride											
Chloroethane											
Methylene Chloride	63 BJ	4 J		7 J	31 J		4 J	63 BJ	55 BJ	67 BJ	
Acetone					8 J						
Carbon Disulfide											
1,1-Dichloroethene											
1,1-Dichloroethane											
1,2-Dichloroethene (total)											
Chloroform											
1,2-Dichloroethane											
2-Butanone						R					
1,1,1-Trichloroethane					39						
Carbon Tetrachloride					5 J						
Vinyl Acetate											
Bromodichloromethane											
1,2-Dichloropropane											
cis-1,3-Dichloropropene											
Trichloroethene					3 J						
Dibromochloromethane											
1,1,2-Trichloroethane											
Benzene					3 J	3 J					
trans-1,3-Dichloropropene											
Bromoform											
4-Methyl-2-Pentanone											
2-Hexanone											
Tetrachloroethene					160						
1,1,2,2-Tetrachloroethane											
Toluene											
Chlorobenzene					1 J	2 J					2 J
Ethylbenzene											
Styrene											
Xylene (total)					140 J						
TIC's:											
None Identified											

TUT 001 0156

Tutu Wellfield, St. Thomas, U.S. Virgin Islands
Semivolatile Organics Analysis of Soils (in ug/kg) and Water (in ug/l)

TEXACO SOIL PILE

PRP Location:	SP-3	SP-1	SP-2	SP-3
Field Sample Number:	SP2-03D	SP2-011	SP2-021	SP2-031
CLP (Case No.10258) Number:	BT 749	BX 262	BX 263	BX 264
Matrix:	soil	soil	soil	soil
Phenol				
bis(2-Chloroethyl)ether				
2-Chlorophenol				
1,3-Dichlorobenzene				
1,4-Dichlorobenzene				
Benzyl alcohol				
1,2-Dichlorobenzene				
2-Methylphenol				
bis(2-Chloroisopropyl)ether				
4-Methylphenol				
N-Nitroso-di-n-propylamine				
Hexachloroethane				
Nitrobenzene				
Isophorone				
2-Nitrophenol				
2,4-Dimethylphenol				
Benzoic acid				
bis(2-Chloroethoxy)methane				
2,4-Dichlorophenol				
1,2,4-Trichlorobenzene				
Naphthalene				
4-Chloroaniline				
Hexachlorobutadiene				
4-Chloro-3-methylphenol				
2-Methylnaphthalene				
Hexachlorocyclopentadiene				
2,4,6-Trichlorophenol				
2,4,5-Trichlorophenol				
2-Chloronaphthalene				
2-Nitroaniline				
Dimethylphthalate				
Acenaphthylene				
2,6-Dinitrotoluene				
3-Nitroaniline				
Acenaphthene				
2,4-Dinitrophenol				
4-Nitrophenol				
Dibenzofuran				
2,4-Dinitrotoluene				
Diethylphthalate				
4-Chlorophenyl-phenylether				
Fluorene				
4-Nitroaniline				
4,6-Dinitro-2-methylphenol				
N-Nitrosodiphenylamine (1)				
4-Bromophenyl-phenylether				

TUT 001 0157

Tutu Wellfield, St. Thomas, U.S. Virgin Islands
Semivolatile Organics Analysis of Soils (in ug/kg) and Water (in ug/l)

TEXACO SOIL PILE

PRP Location:	SP-5	SP-1	SP-3	SP-5
Field Sample Number:	SP2-030	SP2-011	SP2-021	SP2-031
CLP (Case No.10258) Number:	BT 749	BX 262	BX 263	BX 264
Matrix:	soil	soil	soil	soil
Hexachlorobenzene				
Pentachlorophenol				
Phenanthrene				
Anthracene				
Di-n-Butylphthalate				
Fluoranthene				
Pyrene				
Butylbenzylphthalate				
3,3'-Dichlorobenzidine				
Benzo(a)anthracene				
Chrysene				
bis(2-Ethylhexyl)phthalate			48 J	
Di-n-octylphthalate				
Benzo(b)fluoranthene				
Benzo(k)fluoranthene				
Benzo(a)pyrene				
Indeno(1,2,3-cd)pyrene				
Dibenz(a,h)anthracene				
Benzo(g,h,i)perylene				
TIC's:				
4-Hydroxy-4-Methyl-2-pentan	R	R	R	R
Aliphatic hydrocarbon		120 J	110 J	
Heptadecane			110 NJ	
Octadecane			110 J	
Nonadecane			110 J	

TUT 001 0158

Tutu Wellfield, St. Thomas, U.S. Virgin Islands
Pesticide/PCB Analysis of Soils (in ug/kg) and Waters (in ug/l)

TEXACO SOIL PILE

PRP Location:	SP-1	SP-2	SP-3	SP-5
Field Sample Number:	SP2-011	SP2-021	SP2-031	SP2-031D
CLP (12058) Number:	BX 262	BX 263	BX 264	BT 769
Matrix:	soil	soil	soil	soil
alpha-BHC				
beta-BHC				
delta-BHC				
gamma-BHC (Lindane)				
Heptachlor				
Aldrin				
Heptachlor epoxide				
Endosulfan I				
Dieldrin				
4,4'-DDE		NO PESTICIDES OR PCBs DETECTED		
Endrin				
Endosulfan II				
4,4'-DDD				
Endosulfan sulfate				
4,4'-DDT				
Methoxychlor				
Endrin ketone				
alpha-Chlordane				
gamma-Chlordane				
Toxaphene				
Arochlor-1016				
Arochlor-1221				
Arochlor-1232				
Arochlor-1242				
Arochlor-1248				
Arochlor-1254				
Arochlor-1260				
TOTAL PEST/PCBs				

65TO TOO TUT 0159

Tutu Wellfield, St. Thomas, U.S. Virgin Islands
Total Petroleum Hydrocarbon (TPH) Analysis
(Soil in ug/g; Water in mg/l)

TEXACO SOIL PILE

PRP Location:	SP-1	SP-2	SP-3	SP-3	Field Blank
Field Sample Number:	SP2-01	SP2-02	SP2-03	SP2-03D	SP2-FB2
CLP (SAS 4512B) Number:	4512B-10,11	4512B-13,14	4512B-16,17	4512B-21,22	4512B-24
Total Petroleum Hydrocarbon	30*	62*	20 J*	(10 J*	(1 mg/l

*Averaged value

TUT 001 0160

Tutu Wellfield, St. Thomas, U.S. Virgin Islands
E.P. Toxicity Analysis of Soil in ug/l

TEXACO SOIL PILE

PRP Location:	SP-1	SP-3	SP-5	SP-5	Field Blank
Field Sample Number:	SP2-01	SP2-02	SP2-03	SP2-03 DUP	SP2-FB2
CLP (SAS 4658B) Number:	4658B-12	4658B-15	4658B-18	4658B-23	4658B-25
Arsenic					
Barium	R	R	R	R	R
Cadmium	2.2 J	2.8 J	0.54 J	0.35 J	
Chromium	R	R	R	R	R
Lead	1.8 J	31.0 J		5.7 J	
Mercury					
Selenium		R	R	R	
Silver					

TUT 001 0161

11 .. 433

Tutu Wellfields . Thomas, U.S. Virgin Islands
104(e) Letter Response Site Sampling

Volatile Organics Analysis of Soils in ug/kg and Water in ug/l.

O'HENRY DRY CLEANERS

Field Sample Number:	e02-01	e02-02	e02-03	e02-FB1
EPA Sample Number:	BX 261	BX 259	BX 258	BX 260
Matrix:	soil	soil	soil	water
Chloromethane				
Bromomethane				
Vinyl Chloride				
Chloroethane				
Methylene Chloride		150 BJ		
Acetone		84 J		
Carbon Disulfide				
1,1-Dichloroethene				
1,1-Dichloroethane				
1,2-Dichloroethene (total)		20 J		
Chloroform		12 J	2 J	
1,2-Dichloroethane				
2-Butanone				
1,1,1-Trichloroethane				
Carbon Tetrachloride				
Vinyl Acetate				
Bromodichloromethane				
1,2-Dichloropropane				
cis-1,3-Dichloropropene				
Trichloroethene		75		
Dibromochloromethane				
1,1,2-Trichloroethane			R	
Benzene				
trans-1,3-Dichloropropene				
Bromoform				
4-Methyl-2-Pentanone				
2-Hexanone				
Tetrachloroethene	170000	180000	58 J	
1,1,2,2-Tetrachloroethane				
Toluene				
Chlorobenzene				
Ethylbenzene				
Styrene				
Xylene (total)				

TIC's:				
Pentane,2-methoxy-2,4,4-tr				150 NJ

TUT 001 0162

Tutu Wellfield, Thomas, U.S. Virgin Islands
106(e) Letter Response Site Sampling

Semivolatile Organics Analysis of Soils (in ug/kg) and Water (in ug/l)

	O'HENRY		
Field Sample Number:	e02-03	e02-02	e02-01
CLP (Case No.10258) Number:	BX 258	BX 259	BX 261
Matrix:	soil	soil	soil
Phenol	39 NJ		
bis(2-Chloroethyl)ether			
2-Chlorophenol			
1,3-Dichlorobenzene			
1,4-Dichlorobenzene			
Benzyl alcohol			
1,2-Dichlorobenzene			
2-Methylphenol			
bis(2-Chloroisopropyl)ether			R
4-Methylphenol			
N-Nitroso-di-n-propylamine			
Hexachloroethane			
Nitrobenzene			
Isophorone			
2-Nitrophenol			
2,4-Dimethylphenol			
Benzoic acid			
bis(2-Chloroethoxy)methane			
2,4-Dichlorophenol			
1,2,4-Trichlorobenzene			
Naphthalene			
4-Chloroaniline			
Hexachlorobutadiene			
4-Chloro-3-methylphenol			
2-Methylnaphthalene			
Hexachlorocyclopentadiene			
2,4,6-Trichlorophenol			
2,4,5-Trichlorophenol			
2-Chloronaphthalene			
2-Nitroaniline			
Dimethylphthalate			
Acenaphthylene			
2,6-Dinitrotoluene			
3-Nitroaniline			
Acenaphthene			
2,4-Dinitrophenol			
4-Nitrophenol			
Dibenzofuran			
2,4-Dinitrotoluene			
Diethylphthalate			
4-Chlorophenyl-phenylether			
Fluorene			
4-Nitroaniline			
4,6-Dinitro-2-methylphenol			
N-Nitrosodiphenylamine (1)			

TUT 001 0163

Tutu Wellfield, St. Thomas, U.S. Virgin Islands
104(e) Letter Response Site Sampling

Semivolatile Organics Analysis of Soils (in ug/kg) and Water (in ug/l)

O'HENRY

Field Sample Number:	e02-03	e02-02	e02-01
CLP (Case No.10258) Number:	BX 258	BX 259	BX 261
Matrix:	soil	soil	soil
4-Bromophenyl-phenylether			
Hexachlorobenzene			
Pentachlorophenol			
Phenanthrene			
Anthracene			
Di-n-Butylphthalate			
Fluoranthene			
Pyrene			
Butylbenzylphthalate			
3,3'-Dichlorobenzidine			
Benzo(a)anthracene			
Chrysene			
bis(2-Ethylhexyl)phthalate	280 J	390 J	510
Di-n-octylphthalate			
Benzo(b)fluoranthene			
Benzo(k)fluoranthene			
Benzo(a)pyrene			
Indeno(1,2,3-cd)pyrene			
Dibenz(a,h)anthracene			
Benzo(g,h,i)perylene			
TIC's:			
Aldol	R	R	R
Heptadecane, 2,6-Dimethyl-		1600 NJ	1600 NJ

TUT 001 0164

Tutu Wellfield, St. Thomas, U.S. Virgin Islands
104(e) Letter Response Site Sampling

Pesticide/PCB Analysis of Soils (in ug/kg) and Waters (in ug/l)

O'HENRY DRY CLEANERS

Field Sample Number:	e02-01	e02-02	e02-03	e02-FB1
CLP (12058) Number:	BX 261	BX 259	BX 258	BX 260
Matrix:	soil	soil	soil	water
alpha-BHC				
beta-BHC				
delta-BHC				
gamma-BHC (Lindane)				
Heptachlor				
Aldrin				
Heptachlor epoxide				
Endosulfan I	NO PESTICIDES OR PCBS DETECTED			
Dieldrin				
4,4'-DDE				
Endrin				
Endosulfan II				
4,4'-DDD				
Endosulfan sulfate				
4,4'-DDT				
Methoxychlor				
Endrin ketone				
alpha-Chlordane				
gamma-Chlordane				
Toxaphene				
Arochlor-1016				
Arochlor-1221				
Arochlor-1232				
Arochlor-1242				
Arochlor-1248				
Arochlor-1254				
Arochlor-1260				
TOTAL PEST/PCBs				

5270 001 TUT

Tutu Wellfield, St. Thomas, U.S. Virgin Islands
Second Round 10+le) Sampling

Total Petroleum Hydrocarbon (TPH) Analysis
(Soils in ug/g; Waters in ug/l)

O'HENRY DRY CLEANERS

Field Sample Number:	e02-01	e02-02	e02-03	e02-FB1
CLP (SAS 4512B) Number:	4512B-1,2	4512B-4,5	4512B-7,8	4512B-19
Total Petroleum Hydrocarbon	302*	865*	38*	(1 ug/l

* Averaged value

TUT 001 0166

Tutu Wellfield, St. Thomas, U.S. Virgin Islands
Second Round 104(e) Sampling

E.P. Toxicity Analysis of Soil in ug/l

O'HENRY DRY CLEANERS

Field Sample Number:	e02-01	e02-02	e02-03	e02-FB1
CLP (SAS 4658B) Number:	4658B-3	4658B-6	4658B-9	4658B-20
Arsenic				
Barium	R	R	R	103
Cadmium	0.48 J	0.38 J	.44 J	
Chromium	R	R	R	R
Lead	R	R		1.3
Mercury				
Selenium				
Silver				

TUT 001 0167

Tutu Wellfields, St. Thomas, U.S. Virgin Islands
104(e) Letter Response Site Sampling

Volatile Organics Analysis of Soils in ug/kg and Water in ug/l.

DEPT. OF EDUCATION (LAGA)

Field Sample Number:	eL-02-01S	eL-02-02S	eL-02-03S	eL-02-04S	eL-02-05S	eL-02-FB1	eL-02-FB2	eL-02-TB1
EPA Sample Number:	BY 759	BY 760	BY 761	BX 991	BX 992	BY 762	BX 990	BX 993
Matrix:	soil	soil	soil	water	soil	water	water	water
Chloromethane								
Bromomethane								
Vinyl Chloride								
Chloroethane								
Methylene Chloride	R		R		R			
Acetone								
Carbon Disulfide								
1,1-Dichloroethene								
1,1-Dichloroethane								
1,2-Dichloroethene (total)								
Chloroform								
1,2-Dichloroethane								
2-Butanone								
1,1,1-Trichloroethane								
Carbon Tetrachloride								
Vinyl Acetate								
Bromodichloromethane								
1,2-Dichloropropane								
cis-1,3-Dichloropropene								
Trichloroethene								
Dibromochloromethane								
1,1,2-Trichloroethane								
Benzene								
trans-1,3-Dichloropropene								
Bromoform								
4-Methyl-2-Pentanone				32 J				
2-Hexanone								
Tetrachloroethene								
1,1,2,2-Tetrachloroethane								
Toluene	200 J							
Chlorobenzene								
Ethylbenzene	420 J							
Styrene								
Xylene (total)	1400 J	1600 J						
TIC's:								
Bicyclo[3.3.1]non-2-en-9-o	28 NJ							
Phenol	R	R						
Pentane,2-methoxy-2,4,4-tr							190 NJ	
Heptane,3,3,5-trimethyl				29 NJ				

TLT 001 0168

Tutu Wellfields, St. Thomas, U.S. Virgin Islands
104(e) Letter Response Site Sampling

Volatile Organics Analysis of Soils in ug/kg and Water in ug/l.

DEPT. OF EDUCATION (LAGA)

Field Sample Number:	eL-02-01S	eL-02-02S	eL-02-03S	eL-02-04S	eL-02-05S	eL-02-FB1	eL-02-FB2	eL-02-TB1
EPA Sample Number:	BY 759	BY 760	BY 761	BX 991	BX 992	BY 762	BX 990	BX 993
Matrix:	soil	soil	soil	water	soil	water	water	water
Heptane,2,3,6-trimethyl				29 NJ				

TUT 0021 0169

Tutu Wellfield, St. Thomas, U.S. Virgin Islands
104(e) Letter Response Site Sampling

Semivolatile Organics Analysis of Soils (in ug/kg) and Water (in ug/l)

DEPT. OF EDUCATION (LAGA)

Field Sample Number:	eL-02-01S	eL-02-02S	eL-02-03S
CLP (Case No.10258) Number:	BY 759	BY 760	BY 761
Matrix:	soil	soil	soil
Phenol	900000		
bis(2-Chloroethyl)ether			
2-Chlorophenol			
1,3-Dichlorobenzene			
1,4-Dichlorobenzene			
Benzyl alcohol			
1,2-Dichlorobenzene			
2-Methylphenol	320000		
bis(2-Chloroisopropyl)ether			
4-Methylphenol	1300000 J		
N-Nitroso-di-n-propylamine			
Hexachloroethane			
Nitrobenzene			
Isophorone			
2-Nitrophenol			
2,4-Dimethylphenol	42000 J		
Benzoic acid			
bis(2-Chloroethoxy)methane			
2,4-Dichlorophenol			
1,2,4-Trichlorobenzene			
Naphthalene	7700 J	6100	
4-Chloroaniline			
Hexachlorobutadiene			
4-Chloro-3-methylphenol			
2-Methylnaphthalene		750 J	
Hexachlorocyclopentadiene			
2,4,6-Trichlorophenol			
2,4,5-Trichlorophenol			
2-Chloronaphthalene			
2-Nitroaniline			
Dimethylphthalate			
Acenaphthylene			
2,6-Dinitrotoluene			
3-Nitroaniline			
Acenaphthene			
2,4-Dinitrophenol			
4-Nitrophenol	R		
Dibenzofuran			
2,4-Dinitrotoluene	R		
Diethylphthalate			
4-Chlorophenyl-phenylether			
Fluorene			
4-Nitroaniline			
4,6-Dinitro-2-methylphenol			
N-Nitrosodiphenylamine (1)			

TUT 001 0170

Tutu Wellfield, St. Thomas, U.S. Virgin Islands
104(e) Letter Response Site Sampling

Pesticide/PCB Analysis of Soils (in ug/kg) and Waters (in ug/l)

DEPT OF EDUCATION (LAGA)

Field Sample Number:	eL-02-01S	eL-02-02S	eL-02-03S	eL-02-FB1
CLP (12058) Number:	BY 759	BY 760	BY 761	BY 762
Matrix:	soil	soil	soil	water
alpha-BHC				
beta-BHC				
delta-BHC				
gamma-BHC (Lindane)				
Heptachlor				
Aldrin				
Heptachlor epoxide				
Endosulfan I	92			
Dieldrin				
4,4'-DDE				
Endrin				
Endosulfan II				
4,4'-DDD				
Endosulfan sulfate				
4,4'-DDT				
Methoxychlor				
Endrin ketone				
alpha-Chlordane				
gamma-Chlordane				
Toxaphene				
Arochlor-1016				
Arochlor-1221				
Arochlor-1232				
Arochlor-1242				
Arochlor-1248				
Arochlor-1254				
Arochlor-1260				
TOTAL PEST/PCBs				

T/TO TOO 0174

Tutu Wellfield, St. Thomas, U.S. Virgin Islands
Second Round 104(e) Sampling

Total Petroleum Hydrocarbon (TPH) Analysis
(Soils in ug/g; Waters in mg/l)

DEPT OF EDUCATION (LAGA)

Field Sample Number:	eL-02-01s	eL-02-02s	eL-02-03s	eL-02-FB1
CLP (SAS 45128) Number:	45128-26	45128-27	45128-28	45128-29
Total Petroleum Hydrocarbon	3470	1730	544	(1 mg/l

TUT 0041 0172

Tutu Wellfield, St. Thomas, U.S. Virgin Islands
Second Round 104(e) Sampling

E.P. Toxicity Analysis of Soil in ug/l

DEPT OF EDUCATION (LAGA)

Field Sample Number:	eL-02-01s	eL-02-02s	eL-02-03s	eL-02-FB1
CLP (SAS 4658B) Number:	4658B-26	4658B-27	4658B-28	4658B-29
Arsenic				
Barium	R	R	R	R
Cadmium	2.4 J	0.12 J	2.6 J	
Chromium	R		R	R
Lead	13.0 J	3.3 J	8.5 J	
Mercury				
Selenium				
Silver				

TUT 001 0175

Tutu Wellfield, St. Thomas, U.S. Virgin Islands
104(e) Letter Response Site Sampling

Semivolatile Organics Analysis of Soils (in ug/kg) and Water (in ug/l)

DEPT. OF EDUCATION (LAGA)

Field Sample Number:	eL-02-01S	eL-02-02S	eL-02-03S
CLP (Case No.10258) Number:	BY 759	BY 760	BY 761
Matrix:	soil	soil	soil
4-Bromophenyl-phenylether			
Hexachlorobenzene			
Pentachlorophenol	R		
Phenanthrene			
Anthracene			
Di-n-Butylphthalate			
Fluoranthene			
Pyrene			
Butylbenzylphthalate			120 J
3,3'-Dichlorobenzidine			
Benzo(a)anthracene			
Chrysene			
bis(2-Ethylhexyl)phthalate			
Di-n-octylphthalate			
Benzo(b)fluoranthene			
Benzo(k)fluoranthene			
Benzo(a)pyrene			
Indeno(1,2,3-cd)pyrene			
Dibenz(a,h)anthracene			
Benzo(g,h,i)perylene			
TIC's:			
Nonane	440000 NJ		
C9H18 isomer	150000 J		
Aliphatic hydrocarbon	200000 J	20000 J	
Decane (8CI9CI)	710000 NJ	39000 NJ	
C4-benzene isomer	120000 J	55000 J	
C10H20 isomer	160000 J		
Napthalene, decahydro, tra	77000 NJ		
Undecane (8CI9CI)	180000 NJ	55000 NJ	
Ethylphenol isomer	170000 J		
9-Octadecenoic acid (Z)-	650000 NJ		
4-Hydroxy-4-methyl-2-pentan		R	R
C3-benzene isomer		36000 J	
1H-Indene, 2,3-dihydro-		22000 NJ	
C19H32 isomer		17000 J	
C10H12 isomer			
C5-benzene isomer			
1-Methylnapthalene			
C2-Napthalene isomer			

TUT 001 0174

Tutu Wellfields, St. Thomas, U.S. Virgin Islands
104(e) Letter Response Site Sampling

Volatile Organics Analysis of Soils in ug/kg and W

	RAMSAY MOTOR CO.
Field Sample Number:	eR-02-01S
EPA Sample Number:	BX 986
Matrix:	soil
Chloromethane	
Bromomethane	
Vinyl Chloride	
Chloroethane	
Methylene Chloride	200 J
Acetone	
Carbon Disulfide	
1,1-Dichloroethene	
1,1-Dichloroethane	
1,2-Dichloroethene (total)	
Chloroform	
1,2-Dichloroethane	
2-Butanone	
1,1,1-Trichloroethane	
Carbon Tetrachloride	
Vinyl Acetate	
Bromodichloromethane	
1,2-Dichloropropane	
cis-1,3-Dichloropropene	
Trichloroethene	
Dibromochloromethane	
1,1,2-Trichloroethane	
Benzene	
trans-1,3-Dichloropropene	
Bromoform	
4-Methyl-2-Pentanone	
2-Hexanone	
Tetrachloroethene	
1,1,2,2-Tetrachloroethane	
Toluene	
Chlorobenzene	
Ethylbenzene	
Styrene	
Xylene (total)	490 J

TIC's:	
C3H8-Benzene isomer	11000 BJ
1,2-Diethyl benzene	17000 NJ
C4H10-Benzene isomer	6000 J

TUT 001 0175

Tutu Wellfield, St. Thomas, U.S. Virgin Islands
104(e) Letter Response Site Sampling

Semivolatile Organics Analysis of Soils (in ug/kg) an

	RAMSAY MOTOR CO.
Field Sample Number:	eR-02-015
CLP (Case No.10258) Number:	BX 984
Matrix:	soil
Phenol	
bis(2-Chloroethyl)ether	
2-Chlorophenol	
1,3-Dichlorobenzene	
1,4-Dichlorobenzene	
Benzyl alcohol	
1,2-Dichlorobenzene	
2-Methylphenol	
bis(2-Chloroisopropyl)ether	
4-Methylphenol	
N-Nitroso-di-n-propylamine	
Hexachloroethane	
Nitrobenzene	
Isophorone	
2-Nitrophenol	
2,4-Dimethylphenol	
Benzoic acid	
bis(2-Chloroethoxy)methane	
2,4-Dichlorophenol	
1,2,4-Trichlorobenzene	
Naphthalene	4400
4-Chloroaniline	
Hexachlorobutadiene	
4-Chloro-3-methylphenol	
2-Methylnaphthalene	6100
Hexachlorocyclopentadiene	
2,4,6-Trichlorophenol	
2,4,5-Trichlorophenol	
2-Chloronaphthalene	
2-Nitroaniline	
Dimethylphthalate	
Acenaphthylene	
2,6-Dinitrotoluene	
3-Nitroaniline	
Acenaphthene	190 J
2,4-Dinitrophenol	
4-Nitrophenol	
Dibenzofuran	
2,4-Dinitrotoluene	
Diethylphthalate	
4-Chlorophenyl-phenylether	
Fluorene	420 J
4-Nitroaniline	
4,6-Dinitro-2-methylphenol	
N-Nitrosodiphenylamine (1)	

TUT 001 0176

Tutu Wellfield, St. Thomas, U.S. Virgin Islands
104(e) Letter Response Site Sampling

Semivolatile Organics Analysis of Soils (in ug/kg) an

	RAMSAY MOTOR CO.
Field Sample Number:	eR-02-01S
CLP (Case No.10258) Number:	BX 984
Matrix:	soil
4-Bromophenyl-phenylether	
Hexachlorobenzene	
Pentachlorophenol	
Phenanthrene	
Anthracene	
Di-n-Butylphthalate	
Fluoranthene	740 J
Pyrene	2000
Butylbenzylphthalate	
3,3'-Dichlorobenzidine	
Benzo(a)anthracene	
Chrysene	
bis(2-Ethylhexyl)phthalate	5400
Di-n-octylphthalate	
Benzo(b)fluoranthene	870 J
Benzo(k)fluoranthene	
Benzo(a)pyrene	770 J
Indeno(1,2,3-cd)pyrene	
Dibenz(a,h)anthracene	
Benzo(g,h,i)perylene	430 J
TIC's:	
Nonane	
C9H18 isomer	
Aliphatic hydrocarbon	2800 J
Decane (8CI9CI)	
C4-benzene isomer	4700 J
C10H20 isomer	
Napthalene, decahydro, tra	
Undecane (8CI9CI)	
Ethylphenol isomer	
9-Octadecenoic acid (Z)-	
4-Hydroxy-4-methyl-2-pentan	R
C3-benzene isomer	4000 J
1H-Indene, 2,3-dihydro-	
C19H32 isomer	
C10H12 isomer	4000 J
C5-benzene isomer	3500 J
1-Methylnapthalene	4600 NJ
C2-Napthalene isomer	3800 J

Tutu Wellfield, St. Thomas, U.S. Virgin Islands
104(e) Letter Response Site Sampling

Pesticide/PCB Analysis of Soils (in ug/kg) and Waters (in ug/l)

	RAMSAY MOTOR CO.
Field Sample Number:	eR-02-01S
CLP (12058) Number:	BX 986
Matrix:	soil
alpha-BHC	
beta-BHC	
delta-BHC	
gamma-BHC (Lindane)	
Heptachlor	
Aldrin	
Heptachlor epoxide	
Endosulfan I	NO PESTICIDES OR PCBs DECTECTED
Dieldrin	
4,4'-DDE	
Endrin	
Endosulfan II	
4,4'-DDD	
Endosulfan sulfate	
4,4'-DDT	
Methoxychlor	
Endrin ketone	
alpha-Chlordane	
gamma-Chlordane	
Toxaphene	
Arochlor-1016	
Arochlor-1221	
Arochlor-1232	
Arochlor-1242	
Arochlor-1248	
Arochlor-1254	
Arochlor-1260	
TOTAL PEST/PCBs	

TUT 001 0178

Tutu Wellfield, St. Thomas, U.S. Virgin Islands
Second Round 104(e) Sampling

Total Petroleum Hydrocarbon (TPH) Analysis
(Soils in ug/g; Waters in mg/l)

	RAMSAY MOTOR CO.
Field Sample Number:	eR-02-02s
CLP (SAS 4512B) Number:	4512B-40
Total Petroleum Hydrocarbon	23600

TUT 001 0179

Tutu Wellfield, St. Thomas, U.S. Virgin Islands
Second Round 104(e) Sampling

E.P. Toxicity Analysis of Soil in ug/l

RAMSAY MOTOR CO.

Field Sample Number:	eR-02-02s
CLP (SAS 4658B) Number:	4658B-40
Arsenic	
Barium	R
Cadmium	6.1
Chromium	R
Lead	15.0 J
Mercury	
Selenium	
Silver	

TUT 001 0180

Tutu Wellfields, St. Thomas, U.S. Virgin Islands
104(e) Letter Response Site Sampling

Volatile Organics Analysis of Soils in ug/kg and Water in ug/l.

SUPERCAT SITE

Field Sample Number:	eSC-02-01a	eSC-02-02a	eSC-02-04S	eSC-02-05S	eSC-02-06S	eSC-02-07S	eSC-02-09S	eSC-02-10S	eSC-02-03FB	eSC-02-08FB	eSC-02-TB	eSC-02-TB1
EPA Sample Number:	BX 994	BX 995	BX 997	BX 998	BX 976	BX 977	BX 978	BX 983	BX 996	BX 979	BY 764	BX 981
Matrix:	water	water	soil	soil	soil	soil	soil	soil	water	water	water	water
Chloromethane												
Bromomethane												
Vinyl Chloride												
Chloroethane												
Methylene Chloride			13 J	27				3 J				4 J
Acetone					67 J	10 J	43 J					2 J
Carbon Disulfide					7 J							
1,1-Dichloroethene												
1,1-Dichloroethane												
1,2-Dichloroethene (total)												
Chloroform												
1,2-Dichloroethane												
2-Butanone					33 J							
1,1,1-Trichloroethane												
Carbon Tetrachloride												
Vinyl Acetate												
Bromodichloromethane												
1,2-Dichloropropane												
cis-1,3-Dichloropropene												
Trichloroethene												
Dibromochloromethane												
1,1,2-Trichloroethane												
Benzene					13 J						(4400)	
trans-1,3-Dichloropropene												
Bromoform												
4-Methyl-2-Pentanone					20 J							
2-Hexanone												
Tetrachloroethene												
1,1,2,2-Tetrachloroethane												
Toluene											(3700)	
Chlorobenzene												
Ethylbenzene			3 J	85 J	110 J						1700	
Styrene												
Xylene (total)	110		15 J								4200	

TIC's:												
1-Propene,2-methyl-											5300 NJ	
Nonane											300 NJ	
Octane,2,5-Dimethyl-											500 NJ	

TUT 001 0181

Tutu Wellfields, St. Thomas, U.S. Virgin Islands
104(e) Letter Response Site Sampling

Volatile Organics Analysis of Soils in ug/kg and Water in ug/l.

SUPERCAT SITE

Field Sample Number:	eSC-02-01a	eSC-02-02a	eSC-02-04S	eSC-02-05S	eSC-02-06S	eSC-02-07S	eSC-02-09S	eSC-02-10S	eSC-02-03FB	eSC-02-08FB	eSC-02-TB	eSC-02-TB1
EPA Sample Number:	BX 994	BX 995	BX 997	BX 998	BX 976	BX 977	BX 978	BX 983	BX 996	BX 979	BY 764	BX 981
Matrix:	water	water	soil	soil	soil	soil	soil	soil	water	water	water	water
2-Butanone,3-methoxy-3-met												180 NJ
Benzene, (1-methylethyl)-											550 NJ	
Benzene, propyl-											1400 NJ	
Substituted benzene	630 J										6000 J	
Pentane,2-methoxy-2,4,4-tr									200 NJ	150 NJ		
Butane,2-methyl- (8CI9CI)					30 NJ							
Cyclohexane (DOT) (8CI9CI)					40 NJ							
C6H10 isomer					5.7 J							
Hexane (DOT) (8CI9CI)					14 NJ							
2-Ethyl-1-methyl-3-propyl-					11 J							
Hexane,3-methyl- (8CI9CI)					25 J							
Cyclohexane,1,1,3-trimethy				83 NJ	110 NJ							
Decane, 2,4-dimethyl				39 NJ								
C8H14 isomer				23 NJ								

TUT 001 0182

Tutu Wellfield, St. Thomas, U.S. Virgin Islands
104(e) Letter Response Site Sampling

Semivolatile Organics Analysis of Soils (in ug/kg) and Water (in ug/l)

SUPERCAT SITE

Field Sample Number:	eSC-02-6S	eSC-02-7s	eSC-02-9S	eSC-02-10S	eSC-02-4S	eSC-02-5S
CLP (Case No.10258) Number:	BX 976	BX 977	BX 978	BX 983	BX 997	BX 998
Matrix:	soil	soil	soil	soil	soil	soil
Phenol						
bis(2-Chloroethyl)ether						
2-Chlorophenol						
1,3-Dichlorobenzene						
1,4-Dichlorobenzene						
Benzyl alcohol						
1,2-Dichlorobenzene						
2-Methylphenol						
bis(2-Chloroisopropyl)ether						
4-Methylphenol						
N-Nitroso-di-n-propylamine						
Hexachloroethane						
Nitrobenzene						
Isophorone						
2-Nitrophenol						
2,4-Dimethylphenol						
Benzoic acid						
bis(2-Chloroethoxy)methane						
2,4-Dichlorophenol						
1,2,4-Trichlorobenzene						
Naphthalene						
4-Chloroaniline						
Hexachlorobutadiene						
4-Chloro-3-methylphenol						
2-Methylnaphthalene						
Hexachlorocyclopentadiene						
2,4,6-Trichlorophenol						
2,4,5-Trichlorophenol						
2-Chloronaphthalene						
2-Nitroaniline						
Dimethylphthalate						
Acenaphthylene						
2,6-Dinitrotoluene						
3-Nitroaniline						
Acenaphthene						
2,4-Dinitrophenol						
4-Nitrophenol						
Dibenzofuran						
2,4-Dinitrotoluene						
Diethylphthalate						
4-Chlorophenyl-phenylether						
Fluorene						
4-Nitroaniline						
4,6-Dinitro-2-methylphenol						
N-Nitrosodiphenylamine (1)						

TUT 001 0183

Tutu Wellfield, St. Thomas, U.S. Virgin Islands
104(e) Letter Response Site Sampling

Semivolatile Organics Analysis of Soils (in ug/kg) and Water (in ug/l)

SUPERCAT SITE

Field Sample Number:	eSC-02-6S	eSC-02-7s	eSC-02-9S	eSC-02-10S	eSC-02-4S	eSC-02-5S
CLP (Case No.10258) Number:	BX 976	BX 977	BX 978	BX 983	BX 997	BX 998
Matrix:	soil	soil	soil	soil	soil	soil
4-Bromophenyl-phenylether						
Hexachlorobenzene						
Pentachlorophenol						
Phenanthrene						
Anthracene						
Di-n-Butylphthalate					2100 J	
Fluoranthene						
Pyrene						
Butylbenzylphthalate					2000 J	
3,3'-Dichlorobenzidine						
Benzo(a)anthracene						
Chrysene						
bis(2-Ethylhexyl)phthalate					10000	
Di-n-octylphthalate						
Benzo(b)fluoranthene						
Benzo(k)fluoranthene						
Benzo(a)pyrene						
Indeno(1,2,3-cd)pyrene						
Dibenz(a,h)anthracene						
Benzo(g,h,i)perylene						
TIC's:						
4-Hydroxy-4-methyl-2-pentan	R	R	R	R	R	R
Aliphatic hydrocarbon	2300 J		160 BJ		4900 J	
Sulfer, mol (S8)					4100 NJ	

TUT 001 0184

Tutu Wellfield, St. Thomas, U.S. Virgin Islands
104(e) Letter Response Site Sampling

Pesticide/PCB Analysis of Soils (in ug/kg) and Waters (in ug/l)

SUPERCAT SITE

Field Sample Number:	eSC-02-01a	eSC-02-02a	eSC-02-04S	eSC-02-05S	eSC-02-06S	eSC-02-07S	eSC-02-09S	eSC-02-10S	eSC-02-03FB	eSC-02-08FB
CLP (12058) Number:	BX 994	BX 995	BX 997	BX 998	BX 976	BX 977	BX 978	BX 983	BX 996	BX 979
Matrix:	water	water	soil	soil	soil	soil	soil	soil	water	water
alpha-BHC										
beta-BHC										
delta-BHC										
gamma-BHC (Lindane)										
Heptachlor										
Aldrin										
Heptachlor epoxide										
Endosulfan I										
Dieldrin										
4,4'-DDE										
Endrin										
Endosulfan II										
4,4'-DDD					55					
Endosulfan sulfate										
4,4'-DDT										
Methoxychlor										
Endrin ketone										
alpha-Chlordane										
gamma-Chlordane										
Toxaphene										
Arochlor-1016										
Arochlor-1221										
Arochlor-1232										
Arochlor-1242										
Arochlor-1248										
Arochlor-1254										
Arochlor-1260										
TOTAL PEST/PCBs										

TUT 001 0185

Tutu Wellfield, St. Thomas, U.S. Virgin Islands
Second Round 104(e) Sampling

Total Petroleum Hydrocarbon (TPH) Analysis
(Soils in ug/g; Waters in mg/l)

SUPERCAT SITE

Field Sample Number:	eSC-02-01a	eSC-02-02a	eSC-02-04s	eSC-02-05s	eSC-02-06s	eSC-02-07s	eSC-02-09s	eSC-02-03FB	eSC-02-08FB
CLP (SAS 4512B) Number:	4512B-30	4512B-31	4512B-33	4512B-34	4512B-35	4512B-36	4512B-38	4512B-32	4512B-37
Total Petroleum Hydrocarbon	2 mg/l	(1 mg/l	1370	6540	26500	(10	3830	(1 mg/l	(1 mg/l

TUT 001 0186

Tutu Wellfield, St. Thomas, U.S. Virgin Islands
Second Round 104(e) Sampling

E.P. Toxicity Analysis of Soil in ug/l

TEXACO CARIBBEAN, SUPERCAT

Field Sample Number:	eTSC-02-01s
CLP (SAS 66588) Number:	66588-39
Arsenic	
Barium	R
Cadmium	0.65
Chromium	R
Lead	
Mercury	
Selenium	
Silver	

TUT 001 0187

Tutu Wellfield, St. Thomas, U.S. Virgin Islands
Second Round 104(e) Sampling

E.P. Toxicity Analysis of Soil in ug/l

SUPERCAT SITE

Field Sample Number:	eSC-02-02a	eSC-02-04s	eSC-02-05s	eSC-02-06s	eSC-02-07s	eSC-02-09s	eSC-02-03FB	eSC-02-08FB
CLP (SAS 46588) Number:	46588-31	46588-33	46588-34	46588-35	46588-36	46588-38	46588-32	46588-37
Arsenic		3.0 J						
Barium	R	855 J	1560 J	1290	R	R	89.2	
Cadmium		36.0 J	3.6 J	12.0	0.26	1.1 J		
Chromium	R	R		R			R	R
Lead	2.3	978 J	59.0 J	40.0 J	2.8 J	1.4 J		
Mercury								
Selenium								
Silver								

TUT 001 0188

Tutu Wellfield, St. Thomas, U.S. Virgin Islands
Second Round 10+(e) Sampling

Total Petroleum Hydrocarbon (TPH) Analysis
(Soils in ug/g; Waters in mg/l)

	TEXACO CARIBBEAN
Field Sample Number:	eTSC-02-01s
CLP (SAS 4512B) Number:	4512B-39
Total Petroleum Hydrocarbon	(10

TUT 001 0189

Tutu Wellfields, St. Thomas, U.S. Virgin Islands
Volatile Organics Analysis of Soils in ug/kg and Water in ug/l.

ESSO SOIL PILE

PRP Location: / Field Sample Number:	SP-1TOP ESP-01T	SP-1MID ESP-01M	SP-1BOT ESP-01B	SP-2TOP ESP-02T	SP-2MID ESP-02M	SP-2BOT ESP-02B	SP-3TOP ESP-03T	SP3MID ESP-03M	SP-3BOT ESP-03B	Field Blank ESP-FB3
EPA Sample Number:	BY 702	BY703	BY 704	BY 705	BY 707	BY 709	BY 711	BY 712	BY 713	BY 701
Matrix:	soil	soil	soil	soil	soil	soil	soil	soil	soil	water
Chloromethane										
Bromomethane										
Vinyl Chloride										
Chloroethane										
Methylene Chloride		280 J	660 J							
Acetone										8 J
Carbon Disulfide										
1,1-Dichloroethene										
1,1-Dichloroethane										
1,2-Dichloroethene (total)										
Chloroform	7 J									
1,2-Dichloroethane										
2-Butanone				R	R	R	R	R	R	
1,1,1-Trichloroethane										
Carbon Tetrachloride										
Vinyl Acetate										
Bromodichloromethane										
1,2-Dichloropropane										
cis-1,3-Dichloropropene										
Trichloroethene										
Dibromochloromethane										
1,1,2-Trichloroethane										
Benzene										
trans-1,3-Dichloropropene										
Bromoform										
4-Methyl-2-Pentanone										
2-Hexanone										
Tetrachloroethene										
1,1,2,2-Tetrachloroethane										
Toluene			780		550 J					
Chlorobenzene										
Ethylbenzene		3300	2500	240 J	750 J	360 J				
Styrene										
Xylene (total)	270	5100	8500	3600	13000	15000 J	2100 J	4800	1300	
TIC's:										
Heptane,3,5-dimethyl-	210 NJ									
Heptane,3-methyl-	230 NJ		2700 NJ		4600 NJ		2100 NJ	2600 NJ	1500 NJ	
Octane,2-methyl	500 NJ		4700 NJ						3200 NJ	
Nonane	380 NJ	2100 NJ	3200 NJ	2500 NJ	4700 NJ	8300 NJ	2100 NJ	3400 NJ	2400 NJ	
Octane,2,3-Dimethyl-	590 NJ	3700 NJ	5200 NJ	3800 NJ	6000 NJ		3600 NJ	5000 NJ	3700 NJ	

TUT 001 0170

Tutu Wellfields, St. Thomas, U.S. Virgin Islands
Volatile Organics Analysis of Soils in ug/kg and Water in ug/l.

ESSO SOIL PILE

PRP Location:	SP-1TOP	SP-1MID	SP-1BOT	SP-2TOP	SP-2MID	SP-2BOT	SP-3TOP	SP3MID	SP-3BOT	Field Blank
Field Sample Number:	ESP-01T	ESP-01M	ESP-01B	ESP-02T	ESP-02M	ESP-02B	ESP-03T	ESP-03M	ESP-03B	ESP-FB3
EPA Sample Number:	BY 702	BY703	BY 704	BY 705	BY 707	BY 709	BY 711	BY 712	BY 713	BY 701
Matrix:	soil	soil	soil	soil	soil	soil	soil	soil	soil	water
Octane,3-methyl	490 NJ									
Nonane,3-methyl-	240 NJ									
Heptane,2,4-dimethyl-		3200 NJ				9800 NJ		4600 NJ		
Ethylmethylbenzene isomer		48000 J			62000 J	40000 J	13000 J	33000 J	7600 J	
7-Methyl*tridecane		1300 J								
Heptane			2000 NJ							
Benzene,1-ethyl-2-methyl			53000 NJ							
Decane		1800 J		2000 NJ	2500 NJ	4500 NJ		2200 NJ	1800 NJ	
Benzene,1,2,4-trimethyl-	1200 NJ	24000 NJ	24000 NJ		32000 NJ	68000 NJ				
2,3-heptadien-5-yne,2,4-di	1200 NJ									
Benzene,(1-methylethyl)-			2300 NJ			4500 NJ				
Benzene,propyl-			8200 NJ	1600 NJ	4100 NJ	5200 NJ				
Substituted benzene				36000 J						
Alkane				1300 J						
Hexane,2,5-dimethyl			2900 NJ		4700 NJ				1600 NJ	
Benzene 1,2,3-trimethyl-									10000 NJ	
Trimethyl benzene isomer							6400 J	34000 J		
Methyl octane isomer					5900 J		3300 NJ			
Pentane,2,2,4-trimethyl-							3000 NJ			

TUT 001 0191

Tutu Wellfield, St. Thomas, U.S. Virgin Islands
Semivolatile Organics Analysis of Soils (in ug/kg) and Water (in ug/l)

ESSO SOIL PILE

PRP Location:	SP-1	SP-2	SP-3
Field Sample Number:	ESP-01	ESP-02	ESP-03
CLP (Case No.10258) Number:	BY 704	BY 710	BY 711
Matrix:	soil	soil	soil
Phenol			
bis(2-Chloroethyl)ether			
2-Chlorophenol			
1,3-Dichlorobenzene			
1,4-Dichlorobenzene			
Benzyl alcohol			
1,2-Dichlorobenzene			
2-Methylphenol			
bis(2-Chloroisopropyl)ether			
4-Methylphenol			
N-Nitroso-di-n-propylamine			
Hexachloroethane			
Nitrobenzene			
Isophorone			
2-Nitrophenol			
2,4-Dimethylphenol			
Benzoic acid			
bis(2-Chloroethoxy)methane			
2,4-Dichlorophenol			
1,2,4-Trichlorobenzene			
Naphthalene	1400	3100	2000
4-Chloroaniline			
Hexachlorobutadiene			
4-Chloro-3-methylphenol			
2-Methylnaphthalene	1700	2500	2000
Hexachlorocyclopentadiene			
2,4,6-Trichlorophenol			
2,4,5-Trichlorophenol			
2-Chloronaphthalene			
2-Nitroaniline			
Dimethylphthalate			
Acenaphthylene			
2,6-Dinitrotoluene			
3-Nitroaniline			
Acenaphthene			
2,4-Dinitrophenol			
4-Nitrophenol			
Dibenzofuran			
2,4-Dinitrotoluene			
Diethylphthalate		89 J	380 J
4-Chlorophenyl-phenylether			
Fluorene	150 J	150 J	150 J
4-Nitroaniline			
4,6-Dinitro-2-methylphenol			
N-Nitrosodiphenylamine (1)			
4-Bromophenyl-phenylether			

TUT 001 0192

Tutu Wellfield, St. Thomas, U.S. Virgin Islands
Semivolatile Organics Analysis of Soils (in ug/kg) and Water (in ug/l)

ESSO SOIL PILE

PRP Location:	SP-1	SP-2	SP-3
Field Sample Number:	ESP-01	ESP-02	ESP-03
CLP (Case No.10258) Number:	BY 706	BY 710	BY 711
Matrix:	soil	soil	soil
Hexachlorobenzene			
Pentachlorophenol			
Phenanthrene	140 J	170 J	120 J
Anthracene			
Di-n-Butylphthalate			
Fluoranthene			
Pyrene			
Butylbenzylphthalate			
3,3'-Dichlorobenzidine			
Benzo(a)anthracene			
Chrysene			
bis(2-Ethylhexyl)phthalate	240 J	95 J	200 J
Di-n-octylphthalate			
Benzo(b)fluoranthene			
Benzo(k)fluoranthene			
Benzo(a)pyrene			
Indeno(1,2,3-cd)pyrene			
Dibenz(a,h)anthracene			
Benzo(g,h,i)perylene			
TIC's:			
4-hydroxy-4-methyl-2-pentan	R	R	R
C3-benzene isomer	5000 J	1600 J	9000 J
C4-benzene isomer	3000 J	5200 J	5300 J
C10H12 isomer	1100 J	6200 J	2900 J
C5-benzene isomer	1600 J	2400 J	1400 J
1-Methylnapthalene	1100 NJ	1700 NJ	1400 NJ
C2-Napthalene isomer	790 J		
C10H22 isomer			1200 J
C9H10 isomer			1700 J
C2-benzene isomerthyl-(9CI)		1600 J	
Aliphatic hydrocarbon		1100 J	
Decane (8CI9CI)		1100 NJ	
1H-Indene, 2,3-dihydro-		2100 NJ	

TLT 0193

Tutu Wellfield, St. Thomas, U.S. Virgin Islands
Pesticide/PCB Analysis of Soils (in ug/kg) and Waters (in ug/l)

ESSO SOIL PILE

PRP Location:	SP-1	SP-2	SP-3	Field Blank
Field Sample Number:	ESP-01	ESP-02	ESP-03	ESP-FB3
CLP (12058) Number:	BY 706	BY 710	BY 711	BY 701
Matrix:	soil	soil	soil	water
alpha-BHC				
beta-BHC				
delta-BHC				
gamma-BHC (Lindane)				
Heptachlor				
Aldrin				
Heptachlor epoxide				
Endosulfan I				
Dieldrin				
4,4'-DDE		NO PESTICIDES OR PCBs DETECTED		
Endrin				
Endosulfan II				
4,4'-DDD				
Endosulfan sulfate				
4,4'-DDT				
Methoxychlor				
Endrin ketone				
alpha-Chlordane				
gamma-Chlordane				
Toxaphene				
Arochlor-1016				
Arochlor-1221				
Arochlor-1232				
Arochlor-1242				
Arochlor-1248				
Arochlor-1254				
Arochlor-1260				
TOTAL PEST/PCBs				

TUT 001 0174

Tutu Wellfield, St. Thomas, U.S. Virgin Islands
Total Petroleum Hydrocarbon (TPH) Analysis
(Soil in ug/g; Water in mg/l)

ESSO SOIL PILE

PRP Location:	SP-1	SP-2	SP-3	Field Blank
Field Sample Number:	ESP-01	ESP-02	ESP-03	ESP-FB3
CLP (SAS 45128) Number:	45128-73	45128-74	45128-75	45128-72
Total Petroleum Hydrocarbon	48	139	65	(1 mg/l

TUT 001 0195

Tutu Wellfield, St. Thomas, U.S. Virgin Islands
E.P. Toxicity Analysis of Soil in ug/l

ESSO SOIL PILE

PRP Location:	SP-1	SP-2	SP-3	Field Blank
Field Sample Number:	ESP-01	ESP-02	ESP-03	ESP-FB3
CLP (SAS 46588) Number:	46588-73	46588-74	46588-75	46588-72
Arsenic				
Barium	3420	2110	2260	R
Cadmium	5.2	3.6 J	3.9 J	
Chromium	R	R	R	R
Lead	33.0 J	16.0 J	19.0 J	
Mercury				
Selenium				
Silver				

TUT 001 0196

Tutu Wellfields, St. Thomas, U.S. Virgin Islands
Volatile Organics Analysis of Soils in ug/kg and Water in ug/l.

ESSO TANK EXCAVATION

PRP Location: / Field Sample Number:	TP-1 TE-X-02	TP-3 TE-X-03	TP-5 TE-X-01	TP-7 TE-X-05	TP-9 TE-X-06	TP-11 TE-X-04	TP-11 TE-X-040	TP-12 TE-X-07	Field Blank TE-FB1	Field Blank TE-FB2	Trip Blank TE-TB1	Trip Blank TE-TB2
EPA Sample Number:	BY 771	BY 770	BY 765	BY 773	BY 769	BY 772	BY 774	BY 775	BY 763	BY 768	BY 766	BY 767
Matrix:	soil	soil	soil	soil	soil	soil	soil	soil	water	water	water	water
2-Butene						65 NJ						
Benzene, (1-methylethyl)-				1800 NJ		28 NJ						
Benzene, propyl-		150000 NJ	26000 NJ		180 NJ	53 NJ		22 NJ				
Benzene, 1-propenyl						45 NJ						
Diethylbenzene isomer	8700 NJ	260000 NJ				40 NJ						
Benzene,2-ethyl-1,4-dimeth						81 NJ		61 NJ				
Benzene,1,2,3,5-tetramethy				1700 NJ		23 NJ		28 NJ				
Benzene,1,4-diethyl-			26000 NJ					22 NJ				
Heptane,2,4-dimethyl-			12000 NJ									
Benzene,1-ethyl-2-methyl		260000 NJ	20000 NJ		190 NJ							
1,4-Cyclohexadiene,3-ethny			32000 NJ									
Hexane,2-methyl					100 NJ							
Heptane,3,5-dimethyl-					33 NJ							
2,3-Heptadien-5-yne,2,4-di		1000000 NJ										
Benzene,(1,1-dimethylethyl		310000 NJ										
Ithyldimethylbenzene isome		230000 J										
Methane,trichlorofluoro-									24 NJ			
Propane,2-methoxy-2-methyl											270 J	270 J
Benzene,1,2,3-trimethyl-								6.9 NJ				
Benzene,1,2,4-trimethyl-								6.2 NJ				
1H-indene,2,3-dihydro-5-me								9.9 NJ				
Benzene,1-methyl-3-propyl-								7.4 NJ				
Substituted benzene	18000 NJ			1300 J								
Benzene,1,2,4-trimethyl-				1500 NJ								
Benzene,1-ethyl-3,5-dimeth				1300 NJ								
Benzene,(2-methylpropyl)-				1800 NJ								
Methane,trichlorofluoro										11 NJ		
Benzene,1-ethynyl-2-methyl			13000 NJ									

TUT 001 0197

Tutu Wellfield, St. Thomas, U.S. Virgin Islands
Semivolatile Organics Analysis of Soils (in ug/kg) and Water (in ug/l)

ESSO TANK EXCAVATION

PRP Location:	TP-5	Field Blank	TP-9	TP-3	TP-1	TP-11	TP-7	TP-11	TP-12
Field Sample Number:	TE-X-01	TE-FB2	TE-X-06	TE-X-03	TE-X-02	TE-X-04	TE-X-05	TE-X-04D	TE-X-07
CLP (Case No.10258) Number:	BY 765	BY 768	BY 769	BY 770	BY 771	BY 772	BY 773	BY 774	BY 775
Matrix:	soil	water	soil	soil	soil	soil	soil	soil	soil
Phenol									
bis(2-Chloroethyl)ether									
2-Chlorophenol									
1,3-Dichlorobenzene									
1,4-Dichlorobenzene									
Benzyl alcohol									
1,2-Dichlorobenzene									
2-Methylphenol									
bis(2-Chloroisopropyl)ether									
4-Methylphenol									
N-Nitroso-di-n-propylamine									
Hexachloroethane									
Nitrobenzene									
Isophorone									
2-Nitrophenol									
2,4-Dimethylphenol									
Benzoic acid									
bis(2-Chloroethoxy)methane									
2,4-Dichlorophenol									
1,2,4-Trichlorobenzene									
Naphthalene	5700 J		1800	37000 J	1100		600		
4-Chloroaniline									
Hexachlorobutadiene									
4-Chloro-3-methylphenol									
2-Methylnaphthalene	5000		1600	27000 J	1100		940		
Hexachlorocyclopentadiene									
2,4,6-Trichlorophenol									
2,4,5-Trichlorophenol									
2-Chloronaphthalene									
2-Nitroaniline									
Dimethylphthalate									
Acenaphthylene									
2,6-Dinitrotoluene									
3-Nitroaniline									
Acenaphthene									
2,4-Dinitrophenol									
4-Nitrophenol									
Dibenzofuran									
2,4-Dinitrotoluene									
Diethylphthalate									
4-Chlorophenyl-phenylether									
Fluorene	330 J		130 J	1100 J	59 J		300		
4-Nitroaniline									
4,6-Dinitro-2-methylphenol									
N-Nitrosodiphenylamine (1)									
4-Bromophenyl-phenylether									

TUT 001 0198

Tutu Wellfield, St. Thomas, U.S. Virgin Islands
Semivolatile Organics Analysis of Soils (in ug/kg) and Water (in ug/l)

ESSO TANK EXCAVATION

PRP Location:	TP-5	Field Blank	TP-9	TP-3	TP-1	TP-11	TP-7	TP-11	TP-12
Field Sample Number:	TE-X-01	TE-FB2	TE-X-06	TE-X-03	TE-X-02	TE-X-04	TE-X-05	TE-X-04D	TE-X-07
CLP (Case No.10258) Number:	BY 765	BY 768	BY 769	BY 770	BY 771	BY 772	BY 773	BY 774	BY 775
Matrix:	soil	water	soil	soil	soil	soil	soil	soil	soil
Hexachlorobenzene									
Pentachlorophenol									
Phenanthrene	300 J			1100 J			170		
Anthracene									
Di-n-Butylphthalate									
Fluoranthene									
Pyrene				150 J					
Butylbenzylphthalate									
3,3'-Dichlorobenzidine									
Benzo(a)anthracene									
Chrysene									
bis(2-Ethylhexyl)phthalate	50 J	3 J		260 J		45 J	36 J		59 J
Di-n-octylphthalate									
Benzo(b)fluoranthene									
Benzo(k)fluoranthene									
Benzo(a)pyrene									
Indeno(1,2,3-cd)pyrene									
Dibenz(a,h)anthracene									
Benzo(g,h,i)perylene									
TIC's:									
4-Hydroxy-4-methyl-2-pentan	R		R		R	R	R	R	R
C2-benzene isomer	3400 J			21000 J					
Aliphatic hydrocarbon	1800 J			8300 J					
C3-benzene isomer	5700 J		1900 J	8500 J	1200 J		540 J		
1 H-Indene, 2,3-dihydro	4200 NJ			13000 NJ	730 NJ				
C4-benzene isomer	9100 J		3100 J	14000 J	2300 J		2100 J		
C10H12 isomer	2200 J		1700 J	12000 J	540 J		610 J		
C5-benzene isomer	1700 J		1400 J	9900 J	660 J		570 J		
1-Methylnapthalene	2200 NJ		1400 NJ		660 J		570 J		
Indene			1200NJ						
C10H14 isomer			1600J						
Biphenyl							1300 J		
C2-napthalene isomer							540 J		

(1) = cannot be separated from Diphenylamine

6570 T00 1111

Tutu Wellfield, St. Thomas, U.S. Virgin Islands
Pesticide/PCB Analysis of Soils (in ug/kg) and Waters (in ug/l)

ESSO TANK EXCAVATION

PRP Location:	TP-1	TP-3	TP-5	TP-7	TP-9	TP-11	TP-11	TP-12	T-E-1	Field Blank	Field Blank
Field Sample Number:	TE-X 02	TE-X 03	TE-X 01	TE-X 05	TE-X 06	TE-X 04	TE-X 040	TE-X 07	TE-A-01	TE-FB1	TE-FB2
(LP (12058) Number.	BY 771	BY 770	BY 765	BY 773	BY 769	BY 772	BY 774	BY 775	BY 761	BY 763	BY 768
Matrix:	soil	soil	soil	soil	soil	soil	soil	soil	water	water	water
alpha-BHC											
beta-BHC											
delta-BHC											
gamma-BHC (Lindane)											
Heptachlor											
Aldrin											
Heptachlor epoxide											
Endosulfan I											
Dieldrin											
4,4'-DDE				NO PESTICIDES OR PCBs DETECTED							
Endrin											
Endosulfan II											
4,4'-DDD											
Endosulfan sulfate											
4,4'-DDT											
Methoxychlor											
Endrin ketone											
alpha-Chlordane											
gamma-Chlordane											
Toxaphene											
Arochlor-1016											
Arochlor-1221											
Arochlor-1232											
Arochlor-1242											
Arochlor-1248											
Arochlor-1254											
Arochlor-1260											
TOTAL PEST/PCBs											

TUT 001 0200

Tutu Wellfield, St. Thomas, Tutu Wellfield, St. Thomas, U.S. Virgin Islands
Total Petroleum Hydrocarbon Total Petroleum Hydrocarbon (TPH) Analysis
(Soil in ug/g; Water in mg/ (Soil in ug/g; Water in mg/l)

ESSO TANK EXCAVATION

PRP Location:	PRP Location:	T-E-1	TP-5	TP-1	TP-3	TP-11	TP-7	TP-9	TP-12	TP-11	Field Blank	Field Blank
Field Sample Number:	Field Sample Number:	TE-A-01	TE-X-01	TE-X-02	TE-X-03	TE-X-04	TE-X-05	TE-X-06	TE-X-07	TE-X-04D	TE-FB1	TE-FB2
CLP (SAS 4512B) Number:	CLP (SAS 4512B) Number:	4512B-60	4512B-61	4512B-62	4512B-63	4512B-66	4512B-68	4512B-69	4512B-70	4512B-71	4512B-65	4512B-67
Total Petroleum Hydrocarbon	Total Petroleum Hydrocarbon	66 mg/l	69	66	2550	11	63	39	(10	(10	(1 mg/l	(1 mg/l

TUT 001 0201

Tutu Wellfield, St. Thomas, U.S. Virgin Islands
E.P. Toxicity Analysis of Soil in ug/l

ppb

ESSO TANK EXCAVATION

PRP Location:	T-E-1	TP-5	TP-1	TP-3	TP-11	TP-7	TP-9	TP-12	TP-11	Field Blank	Field Blank
Field Sample Number:	TE-A-01	TE-X-01	TE-X-02	TE-X-03	TE-X-04	TE-X-05	TE-X-06	TE-X-07	TE-X-04 DUP	TE-FB1	TE-FB2
CLP (SAS 4658B) Number:	4658B-60	4658B-61	4658B-62	4658B-63	4658B-64	4658B-68	4658B-69	4658B-70	4658B-71	4658B-65	4658B-67
Arsenic	R										
Barium	1800	2950 J	2690 J	3090 J	2560 J	R	2590 J	R	1950 J	R	R
Cadmium		6.5 J	1.8 J	3.9 J	2.2 J	0.60 J	1.0 J	0.36 J	3.2 J		
Chromium	R	R	R	R					1.0 J	R	R
Lead	46.0 J	20.0 J	4.6 J	15.0 J	4.0 J	8.8 J	6.9 J		3.5 J		
Mercury											
Selenium		R									
Silver											

TUT 001 0202

TUTU WELLFIELD

SAMPLE SUMMARY

MASTER LIST OF FPC SPLITS OF PRP SAMPLES
APRIL 27, 1990 REPORT

CASE #	DATES	MATRIX	CLP #S	ANALYSES
12058	6/5-10/89	SOIL, AQ	BT, BX, BY	VOA, EXT
4512B	6/5-10/89	SOIL, AQ	4512B	TPH
4658B	6/5-10/89	SOIL, AQ	4658B	EP TOX

(PRP) LOCATION	FPC FIELD #	CLP #	DATE	MATRIX	ANALYSES
TEXACO STATION					
SOIL PILE					
SP-1, top	SP2-011	BX 262	6/6/89	SOIL	VOA
SP-1, mid	SP2-012	BX 265	"	"	VOA
SP-1, bot	SP2-013	BX 266	"	"	VOA
SP-1, comp	SP2-011	BX 262	"	"	EXTRACTABLES
"	SP2-01	4512B-10	"	"	TPH
"	"	4512B-11	"	"	TPH
"	"	4658B-12	"	"	EP TOX
SP-3, top	SP2-021	BX 263	6/6/89	SOIL	VOA
SP-3, mid	SP2-022	BX 267	"	"	VOA
SP-3, bot	SP2-023	BX 268	"	"	VOA
SP-3, comp	SP2-021	BX 263	"	"	EXTRACTABLES
"	SP2-02	4512B-13	"	"	TPH
"	"	4512B-14	"	"	TPH
"	"	4658B-15	"	"	EP TOX
SP-5, top	SP2-031	BX 264	6/6/89	SOIL	VOA
SP-5, mid	SP2-032	BT 747	"	"	VOA
SP-5, bot	SP2-033	BT 748	"	"	VOA
SP-5, comp	SP2-031	BX 264	"	"	EXTRACTABLES
"	SP2-03	4512B-16	"	"	TPH
"	"	4512B-17	"	"	TPH
"	"	4658-18	"	"	EP TOX
Dup SP-5, top	SP2-031D	BT 749	6/6/89	SOIL	VOA
Dup SP-5, comp	SP2-031D	BT 749	"	"	EXTRACTABLES
"	SP2-03D	4512B-21	"	"	TPH
"	"	4512B-22	"	"	TPH
"	"	4658B-23	"	"	EP TOX
Field Blank	SP2-FB2	BT 758	6/6/89	AQ	VOA
		BT 758	"	"	EXTRACTABLES
		4512B-24	"	"	TPH
"		4658B-25	"	"	EP TOX

TUT 001 0203

TUTU WELLFIELD
SAMPLE SUMMARY

MASTER LIST OF FPC SPLITS OF PRP SA
APRIL 27, 1990 REPORT

CASE #	DATES	MATRIX	CLP #S
12058	6/5-10/89	SOIL, AQ	BT, BX, BY
4512B	6/5-10/89	SOIL, AQ	4512B
46588	6/5-10/89	SOIL, AQ	46588

(PRP) LOCATION	FPC FIELD #	CLP #	DATE	MATRIX
ESSO STATION				
TANK EXCAV PIT				
TP-1	TE-X-02	BY 771	6/9/89	SOIL
"	"	4512B-62		
"	"	46588-62		
TP-3	TE-X-03	BY 770	6/9/89	SOIL
"	"	4512B-63		
"	"	46588-63		
TP-5	TE-X-01	BY 765	6/8/89	SOIL
"	"	4512B-61		
"	"	46588-61		
TP-7	TE-X-05	BY 773	6/9/89	SOIL
"	"	4512B-68		
"	"	46588-68		
TP-9	TE-X-06	BY 769	6/9/89	SOIL
"	"	4512B-69		
"	"	46588-69		
TP-11	TE-X-04	BY 772	6/9/89	SOIL
"	"	4512B-64		
"	"	46588-64		
TP-12	TE-X-07	BY 775	6/9/89	SOIL
"	"	4512B-70		
"	"	46588-70		
Dup, TP-11	TE-X-04D	BY 774	6/9/89	SOIL
"	"	4512B-71		
"	"	46588-71		
Field Blank	TE-FB1	BY 763	6/8/89	AQ
"	"	4512B-65	"	
"	"	46588-65		
"	TE-FB2	BY 768	6/9/89	AQ
"	"	4512B-67		
"	"	46588-67		
ESSO SOIL PILE				
SP-1, top	ESP-01T	BY 702	6/10/89	SOIL
SP-1, mid	ESP-01M	BY 703	"	"
SP-1, bod	ESP-01B	BY 704	"	"
SP-1, comp	ESP-01	BY 704	"	"
"	"	4512B-73	"	"

TUT 001 0204

TUTU WELLFIELD
SAMPLE SUMMARY

MASTER LIST OF FPC SPLITS OF PRP SA
APRIL 27, 1990 REPORT

CASE #	DATES	MATRIX	CLP #S
12058	6/5-10/89	SOIL, AQ	BT, BX, BY
45128	6/5-10/89	SOIL, AQ	45128
46588	6/5-10/89	SOIL, AQ	46588

(PRP) LOCATION	FPC FIELD #	CLP #	DATE	MATRIX
"	"	46588-73	"	"
SP-2, top	ESP-02T	BY 705	6/10/89	SOIL
SP-2, mid	ESP-02M	BY 707	"	"
SP-2, bot	ESP-02B	BY 709	"	"
SP-2, comp	ESP-02	BY 710	"	"
"	"	45128-74	"	"
"	"	46588-74	"	"
SP-3, top	ESP-03T	BY 711	6/10/89	SOIL
SP-3, mid	ESP-03M	BY 712	"	"
SP-3, bot	ESP-03B	BY 713	"	"
SP-3, comp	ESP-03	BY 711	"	"
"	"	45128-75	"	"
"	"	46588-75	"	"
Field Blank	ESP-FB3	BY 701	6/10/89	AQ
"	"	45128-72	"	"
"	"	46588-72	"	"

TUT 001 0205

TK OF 432

TUT 001 0206

TUTC WELLFIELD
SAMPLE SUMMARY

MASTER LIST OF SAMPLES FROM 104(E) LETTER RESPONSE SITES
APRIL 27, 1990 REPORT

CASE #	DATES	MATRIX	CLP #S	ANALYSES
12058	6/5-10/89	SOIL, AQ	BT, BX, BY	VOA, EXT
45128	6/5-10/89	SOIL, AQ	45128	TPH
46588	6/5-10/89	SOIL, AQ	46588	EP TOX

LOCATION	FFC FIELD #	CLP #	DATE	MATRIX	ANALYSES
O HENRY DRY CLEANERS					
Under a pile of	e0-02-01	BX 261	6/5/89	SOIL	VOA, EXTRACTABLES
debris, 6-15"	"	45128-182	"	"	TPH
	"	46588-3	"	"	EP TOX
Under the same pile	e0-02-02	BX 259	6/5/89	SOIL	VOA, EXTRACTABLES
of debris, 15-24"	"	45128-445	"	"	TPH
	"	46588-6	"	"	EP TOX
8 south of first	e0-02-03	BX 258	6/5/89	SOIL	VOA, EXTRACTABLES
borehole location	"	45128-766	"	"	TPH
above	"	46588-9	"	"	EP TOX
Field blank	e0-02-FB1	BX 260	6/5/89	AQ	VOA, EXTRACTABLES
	"	45128-19	"	"	TPH
	"	46588-20	"	"	EP TOX
DEPT OF EDUCATION (LADA)					
Drum area	eL-02-01S	BY 759	6/6/89	SOIL	VOA, EXTRACTABLES
3 to 12 inches deep	"	45128-26	"	"	TPH
	"	46588-26	"	"	EP TOX
Drum area	eL-02-02S	BY 760	6/6/89	SOIL	VOA, EXTRACTABLES
	"	45128-27	"	"	TPH
	"	46588-27	"	"	EP TOX
Drum area	eL-02-03S	BY 761	6/6/89	SOIL	VOA
	"	BY 761	"	"	EXTRACTABLES
	"	45128-28	"	"	TPH
	"	46588-28	"	"	EP TOX
Product in open drum	eL-02-04L	BX 991	6/6/89	AQ	VOA — eL-02
	eL-02-05S	BX 992	6/6/89	SOIL	VOA
Field blank	eL-02-FB1	BY 762	6/6/89	AQ	VOA, EXTRACTABLES
	"	45128-29	"	"	TPH
	"	46588-29	"	"	EP TOX
Field blank	eL-02-FB2	BX 990	6/6/89	AQ	VOA
Trip blank	eL-02-TB1	BX 993	6/6/89	AQ	VOA
KAMSAK MOTOR CO.					
Next to basset fence	eK-02-01S	BY 984	6/8/89	SOIL	VOA, EXTRACTABLES
stained soil, 2-12"	"	45128-40	"	"	TPH
	"	46588-40	"	"	EP TOX
SUPERIOR SITE					
From non-potable	eSE-02-01A	BX 994	6/7/89	AQ	VOA, EXTRACTABLES
cistern	"	45128-30	"	"	TPH
	"	46588-30	"	"	EP TOX
From potable cister	eSE-02-02A	BX 995	6/7/89	AQ	VOA, EXTRACTABLES

5 OF 6.

TUTU WELLFIELD
SAMPLE SUMMARY

MASTER LIST OF SAMPLES FROM 104(E) LETTER RESPONSE SITES
APRIL 27, 1990 REPORT

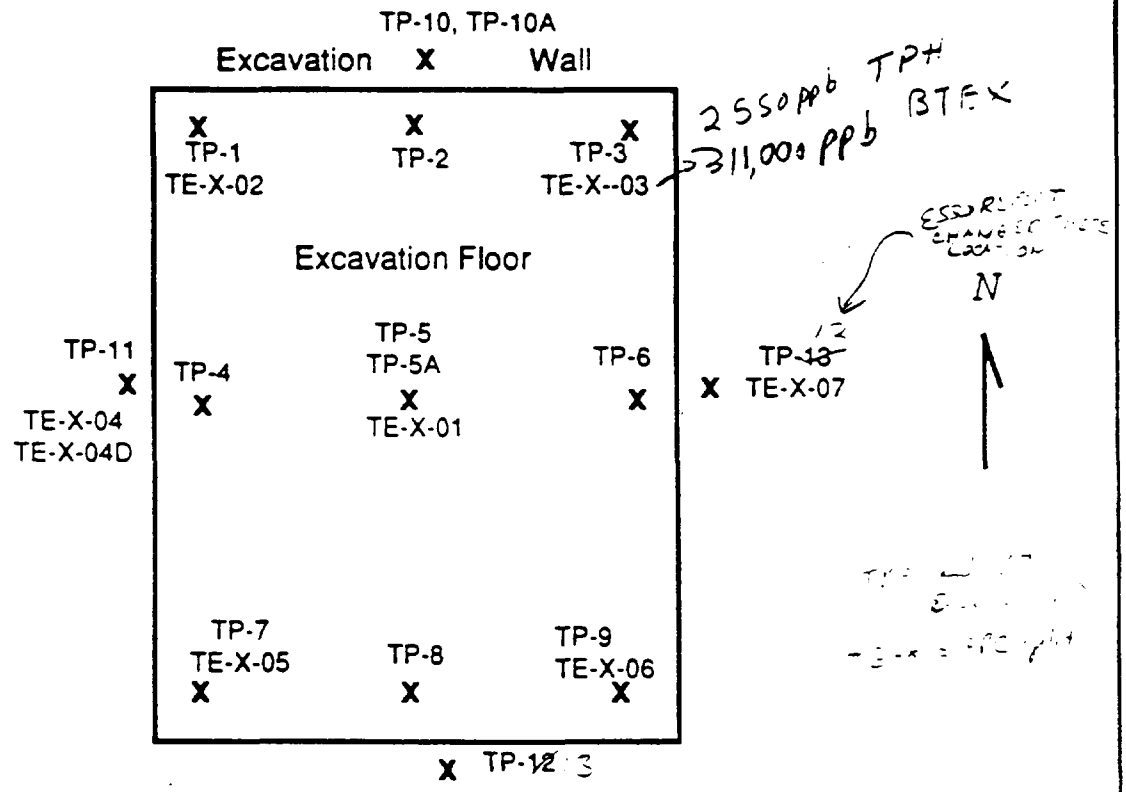
CASE #	DATES	MATRIX	CLP BS	ANALYSES
12056	6/5-10/89	SOIL, AQ	BT, BX, BY	VOA, EXT
45126	6/5-10/89	SOIL, AQ	45126	TPH
46588	6/5-10/89	SOIL, AQ	46588	EP TOX

LOCATION	FPC FIELD #	CLP #	DATE	MATRIX	ANALYSES
	"	45126-31	"	"	TPH
	"	46588-31	"	"	EP TOX
Drain originating	eSC-02-04s	BX 997	6/7/89	SOIL	VOA, EXTRACTABLES
behind the facility	"	45126-33	"	"	TPH
	"	46588-33	"	"	EP TOX
Fence, west side of	eSC-02-05s	BX 998	6/7/89	SOIL	VOA, EXTRACTABLES
facility,3-12" below	"	45126-34	"	"	TPH
sand/gravel interfac	"	46588-34	"	"	EP TOX
Along same fence,	eSC-02-06s	BX 976	6/7/89	SOIL	VOA, EXTRACTABLES
3-9" below sand/	"	45126-35	"	"	TPH
gravel interface	"	46588-35	"	"	EP TOX
Inside fenced area,	eSC-02-07s	BX 977	6/7/89	SOIL	VOA, EXTRACTABLES
3-12" below sand/	"	45126-36	"	"	TPH
gravel interface	"	46588-36	"	"	EP TOX
Inside fenced area	eSC-02-09s	BX 978	6/7/89	SOIL	VOA, EXTRACTABLES
	"	45126-38	"	"	TPH
	"	46588-38	"	"	EP TOX
Adjacent Texaco sign	eSC-02-10s	BX 983	6/7/89	SOIL	VOA, EXTRACTABLES
3-8" below concrete/	"	45126-39	"	"	TPH
soil interface	"	46588-39	"	"	EP TOX
Field Blank	eSC-02-03FB	BX 996	6/7/89	AQ	VOA, EXTRACTABLES
	"	45126-32	"	"	TPH
	"	46588-32	"	"	EP TOX
Field Blank	eSC-02-08FB	BX 979	6/7/89	AQ	VOA, EXTRACTABLES
	"	45126-37	"	"	TPH
	"	46588-37	"	"	EP TOX
Trip Blank	eSC-02-TB	BX 981	6/7/89	AQ	VOA

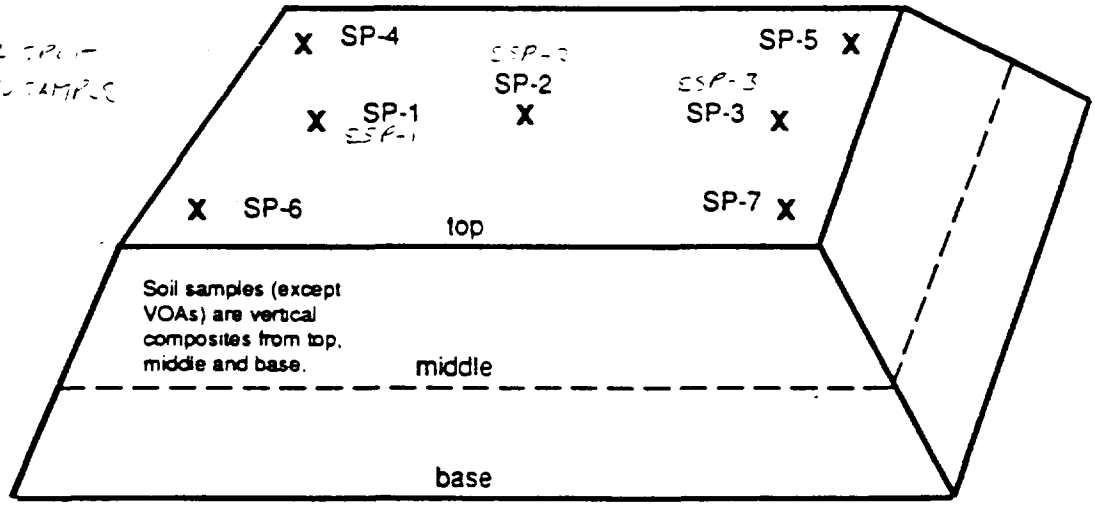
TUT 001 0207

ATTACHMENT 1

Approximate Location of Soil Samples Collected
Esso Tank Excavation
Tutu Wellfield, St. Thomas, U.S. Virgin Islands
June 8-10, 1990



EXCAVATION PIT

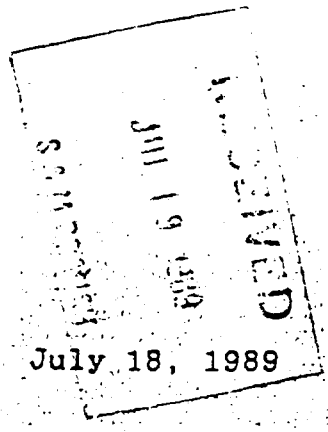


SOIL PILE

CDM Federal Programs Corporation

CEIMIC
CORPORATION

1 VOA only 16 Soil
15 VOA
SV
Pest



July 18, 1989

USEPA Contract Lab Program
Sample Management Office
209 Madison Street, Suite 200
Alexandria, VA 22314

Dear Program Manager:

Enclosed please find a data package and one floppy diskette for each of the two SDGs (BT747 and BX978) for the analysis of thirty two soil samples received at CEIMIC from Region II under Case #12058 and performed under contract #68D90028.

Please call if you have any questions regarding the data.

Sincerely,

Kin S. Chiu
Program Manager

cc USEPA EMSL-LV
USEPA Region II

BX978
VOA

100 Dean Knauss Drive, Narragansett, R.I. 02882 • (401) 782-8900 • FAX (401) 782-8905

-0-f 493

TUT 001 0209

CASE NARRATIVE

The enclosed data package is in response to EPA Case #12058 and performed under Contract # 68D90028. These corresponded to 32 VOA, 29 SV and 28 Pest analyses (including the duplicate matrix spikes) originating from USEPA Region II and received at CEIMIC on June 13, 1989 via Federal Express. There are 2 SDGs in this case: BT747 and BX978.

The data package included the analysis of samples for SDG BT747:

EPA ID	ANALYSIS
BT747 --- SDG	VOA
BT748	VOA
BT749	VOA, SV, Pest
BX262	VOA, SV, Pest
BX263	VOA, SV, Pest
BX264	VOA, SV, Pest
BX265	VOA
BX266	VOA
BX266MS	VOA
BX266MSD	VOA
BX267	VOA
BX268	VOA
BX976	VOA, SV, Pest
BX977	VOA, SV, Pest
BX992	VOA
BY759	VOA, SV, Pest
BY759RE	VOA
BY759MS	SV, Pest
BY759MSD	SV, Pest
BY760	VOA, SV, Pest
BY761 --- Last sample	VOA, SV, Pest

The submitted data covers the analysis of the Volatile (VOA), Semivolatile (SV) and Pesticides/PCB (Pest) fractions and their associated blanks and QA/QC. CEIMIC would like to highlight the following points pertaining to the analyses performed for this case:

(1) INSTRUMENTATION AND COLUMN IDENTIFICATION

The following instruments are used for the analyses:

GC/MS ANALYSIS

a. VOA

MS2 : HP 5970B GC/MS using 6' x 2 mm ID SP-1000 packed column

MS3 : HP 5970B GC/MS using 6' x 2 mm ID SP-1000 packed column

b. SV

MS1 : HP 5970B GC/MS using 30 m x 0.25 mm ID DB-5 fused silica capillary column

GC ANALYSIS

GC1 : HP 5890 with ECD

GC3 : HP 5890 with ECD

a. Primary column: SP2100

6' x 2 mm ID glass column packed with 3% SP-2100 on 100/120 Supelcoport (Supelco)

b. Confirmation column: 22502401 (2250/2401)

6' x 4 mm ID glass column packed with 1.5% SP-2250/1.95 % SP-2401 on 100/120 Supelcoport (Supelco)

(2) SAMPLE INFORMATION

Duplicate matrix spikes were performed on BX266 for the VOA fraction, and on BY761 for the SVOA and Pest fractions.

A. Pest Fraction

Surrogate recovery and retention time of several sample extracts were out of the limits. This is probably due to matrix interferences as method blanks which were analyzed with the sequence were all within limits.

B. VOA Fraction

Sample BY759 was reanalyzed to demonstrate matrix effects.

The VOA reconstructed ion chromatograms are labeled as :

IS-1	Bromochloromethane	IS
IS-2	1,4-Difluorobenzene	IS
IS-3	Chlorobenzene-d5	IS
S-1	1,2-Dichloroethane-d4	SS
S-2	Toluene-d8	SS
S-3	p-Bromofluorobenzene	SS

C. SVOA Fraction:

The SV reconstructed ion chromatograms are labeled as :

S-1	2-Fluorophenol	SS
S-2	Phenol-d5	SS
IS-1	1,4-Dichlorobenzene-d4	IS
S-3	Nitrobenzene-d5	SS
IS-2	Naphthalene-d8	IS
S-4	2-Fluorobiphenyl	SS
IS-3	Acenaphthene-d10	IS
S-5	Tribromophenol	SS
IS-4	Phenanthrene-d10	IS
S-6	Terphenyl-d14	SS
IS-5	Chrysene-d12	IS
IS-6	Perylene-d12	IS

IS = Internal standard
SS = Surrogate standard

DEVIATIONS FROM THE SOW

None

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hardcopy data package and in the computer-readable data submitted on floppy diskette has been authorized by the Laboratory Manager or his designee, as verified by the following signature.

Kin S. Chiu
Program Manager

CASE NARRATIVE

The enclosed data package is in response to EPA Case #12058 and performed under Contract # 68D90028. These corresponded to 32 VOA, 29 SV and 28 Pest analyses (including the duplicate matrix spikes) originating from USEPA Region II and received at CEIMIC on June 13, 1989 via Federal Express. There are 2 SDGs in this case: BT747 and BX978.

The data package included the analysis of samples for SDG BT747:

EPA ID	ANALYSIS
BT747 --- SDG	VOA
BT748	VOA
BT749	VOA, SV, Pest
BX262	VOA, SV, Pest
BX263	VOA, SV, Pest
BX264	VOA, SV, Pest
BX265	VOA
BX266	VOA
BX266MS	VOA
BX266MSD	VOA
BX267	VOA
BX268	VOA
BX976	VOA, SV, Pest
BX977	VOA, SV, Pest
BX992	VOA
BY759	VOA, SV, Pest
BY759RE	VOA
BY759MS	SV, Pest
BY759MSD	SV, Pest
BY760	VOA, SV, Pest
BY761 --- Last sample	VOA, SV, Pest

The submitted data covers the analysis of the Volatile (VOA), Semivolatile (SV) and Pesticides/PCB (Pest) fractions and their associated blanks and QA/QC. CEIMIC would like to highlight the following points pertaining to the analyses performed for this case:

(1) INSTRUMENTATION AND COLUMN IDENTIFICATION

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a. VOA

MS2 : HP 5970B GC/MS using 6' x 2 mm ID SP-1000 packed column

MS3 : HP 5970B GC/MS using 6' x 2 mm ID SP-1000 packed column

b. SV

MS1 : HP 5970B GC/MS using 30 m x 0.25 mm ID DB-5 fused silica capillary column

GC ANALYSIS

GC1 : HP 5890 with ECD

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a. Primary column: SP2100

6' x 2 mm ID glass column packed with 3% SP-2100 on 100/120 Supelcoport (Supelco)

b. Confirmation column: 22502401 (2250/2401)

6' x 4 mm ID glass column packed with 1.5% SP-2250/1.95 % SP-2401 on 100/120 Supelcoport (Supelco)

(2) SAMPLE INFORMATION

Duplicate matrix spikes were performed on BX266 for the VOA fraction, and on BY761 for the SVOA and Pest fractions.

A. Pest Fraction

Surrogate recovery and retention time of several sample extracts were out of the limits. This is probably due to matrix interferences as method blanks which were analyzed with the sequence were all within limits.

B. VOA Fraction

Sample BY759 was reanalyzed to demonstrate matrix effects.

The VOA reconstructed ion chromatograms are labeled as :

IS-1	Bromochloromethane	IS
IS-2	1,4-Difluorobenzene	IS
IS-3	Chlorobenzene-d5	IS
S-1	1,2-Dichloroethane-d4	SS
S-2	Toluene-d8	SS
S-3	p-Bromofluorobenzene	SS

C. SVOA Fraction:

The SV reconstructed ion chromatograms are labeled as :

S-1	2-Fluorophenol	SS
S-2	Phenol-d5	SS
IS-1	1,4-Dichlorobenzene-d4	IS
S-3	Nitrobenzene-d5	SS
IS-2	Naphthalene-d8	IS
S-4	2-Fluorobiphenyl	SS
IS-3	Acenaphthene-d10	IS
S-5	Tribromophenol	SS
IS-4	Phenanthrene-d10	IS
S-6	Terphenyl-d14	SS
IS-5	Chrysene-d12	IS
IS-6	Perylene-d12	IS

IS = Internal standard
SS = Surrogate standard

DEVIATIONS FROM THE SOW

None

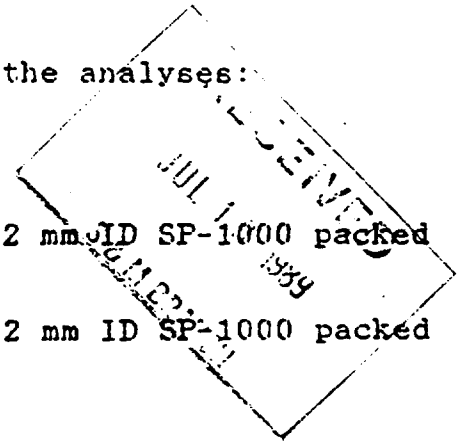
TDT 001 0216

Resubmittal

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hardcopy data package and in the computer-readable data submitted on floppy diskette has been authorized by the Laboratory Manager or his designee, as verified by the following signature.

Kin S. Chiu 7/18/89
Program Manager

(1) INSTRUMENTATION AND COLUMN IDENTIFICATION



The following instruments are used for the analyses:

GC/MS ANALYSIS

a. VOA

MS2 : HP 5970B GC/MS using 6' x 2 mm ID SP-1000 packed column

MS3 : HP 5970B GC/MS using 6' x 2 mm ID SP-1000 packed column

b. SV

MS1 : HP 5970B GC/MS using 30 m x 0.25 mm ID DB-5 fused silica capillary column

GC ANALYSIS

GC1 : HP 5890 with ECD

GC3 : HP 5890 with ECD

a. Primary column: SP2100

6' x 2 mm ID glass column packed with 3% SP-2100 on 100/120 Supelcoport (Supelco)

b. Confirmaion column: 22502401 (2250/2401)

6' x 4 mm ID glass column packed with 1.5% SP-2250/1.95 % SP-2401 on 100/120 Supelcoport (Supelco)

(2) SAMPLE INFORMATION

Duplicate matrix spikes were performed on BX984 for the VOA fraction, and on BY775 for the SVOA and Pest fractions.

A. Pest Fraction

The surrogate recovery and retention time were out of the limits for several of the sample extracts. This is probably due to matrix interferences as the method blanks which were analyzed with the sequence were all within limits.

B. VOA Fraction

The VOA reconstructed ion chromatograms are labeled as :

IS-1	Bromochloromethane	IS
IS-2	1,4-Difluorobenzene	IS
IS-3	Chlorobenzene-d5	IS
S-1	1,2-Dichloroethane-d4	SS
S-2	Toluene-d8	SS
S-3	p-Bromofluorobenzene	SS

C. SVOA Fraction:

The SV reconstructed ion chromatograms are labeled as :

S-1	2-Fluorophenol	SS
S-2	Phenol-d5	SS
IS-1	1,4-Dichlorobenzene-d4	IS
S-3	Nitrobenzene-d5	SS
IS-2	Naphthalene-d8	IS
S-4	2-Fluorobiphenyl	SS
IS-3	Acenaphthene-d10	IS
S-5	Tribromophenol	SS
IS-4	Phenanthrene-d10	IS
S-6	Terphenyl-d14	SS
IS-5	Chrysene-d12	IS
IS-6	Perylene-d12	IS

IS = Internal standard
SS = Surrogate standard

DEVIATIONS FROM THE SOW

None

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hardcopy data package and in the computer-readable data submitted on floppy diskette has been authorized by the Laboratory Manager or his designee, as verified by the following signature.

Kin S. Chiu
Program Manager

CEIMIC
CORPORATION

SECOND
REVISED
SDG Cover Sheet

Laboratory Name: Ceimic Corporation

Contract Number: # 68D90028

Sample Analysis Price: $ 737

Case Number: # 12058

SDG Number	Date of Receipt
BT747 - first sample received	6/8/89
BT748	6/8/89
BT749	6/8/89
BX262	6/8/89
BX263	6/8/89
BX264	6/8/89
BX265	6/8/89
BX266	6/8/89
BX266 MS	6/8/89
BX266 MSD	6/8/89
BX267	6/8/89
BX268	6/8/89
BX976	6/10/89
BX977	6/10/89
BX992	6/8/89
BY759	6/8/89
BY759 MS	6/8/89
BY759 MSD	6/8/89
BY760	6/8/89
BY761 - last sample received	6/8/89

TLT 001 02221

100 Dean Knauss Drive, Narragansett, R.I. 02882 • (401) 782-8900 • FAX (401) 782-8905

CEIMIC
CORPORATION

SECOND
REVISED
SDG Cover Sheet

Laboratory Name: Ceimic Corporation

Contract Number: # 68D90028

Sample Analysis Price: $ 737

Case Number: # 12058

SDG Number	Date of Receipt
BX978 - first sample received	6/10/89
BX983	6/10/89
BX984	6/10/89
BX997	6/10/89
BX998	6/10/89
BY704	6/13/89
BY710	6/13/89
BY711	6/13/89
BY765	6/12/89
BY769	6/12/89
BY770	6/12/89
BY771	6/12/89
BY772	6/12/89
BY773	6/12/89
BY774	6/12/89
BY775	6/12/89
BY775 MS	6/12/89
BY775 MSD - last sample received	6/12/89

160

TUT 001 0222

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SOP NO. HW-6
Revision #6

CLP ORGANICS DATA REVIEW AND PRELIMINARY REVIEW

CONCURRED BY: _____ Date: 4/6/89
Louis Bevilacqua
Monitoring Management Branch

APPROVED BY: _____ Date: 4/14/89
Gerard F. McKenna, Chief
Monitoring Management Branch

PACKAGE COMPLETENESS AND DELIVERABLES

CASE NUMBER: [illegible]

LAB: [illegible]

SITE: [illegible]

	YES	NO	N/A
1.0 Data Completeness and Deliverables			
1.1 Have any missing deliverables been received and added to the data package.	[✓]	___	___
ACTION: Call lab for explanation / resubmittal of any missing deliverables. If lab cannot provide them, note the effect on review of the package under the "Contract Problems/Non-compliance" section of reviewer narrative.			
1.2 Was SMO CCS checklist included with package?	[✓]	___	___
2.0 Cover Letter/Case Narrative			
2.1 Is the Narrative or Cover Letter present?	[✓]	___	___
2.2 Are Case Number and/or SAS number contained in the Narrative or Cover Letter?	[✓]	___	___
3.0 Data Validation Checklist			
The following checklist is divided into three parts. Part A is filled out if the data package contains any VOA analyses, Part B for any BNA analyses and Part C for Pesticide/PCBs.			
Does this package contain:			
VOA data?	✓	___	
BNA data?	✓	___	
Pesticide/PCB data?	✓	___	
ACTION: Complete corresponding parts of checklist.			

	YES	NO	N/A

PART A: VOA ANALYSES

1.0 Traffic Reports and Laboratory Narrative

1.1 Are the Traffic Report Forms present for all samples? [✓] ___ ___

ACTION: If no, contact lab for replacement of missing or illegible copies.

1.2 Do the Traffic Reports or Lab Narrative indicate any problems with sample receipt, condition of samples, analytical problems or special notations affecting the quality of the data? ___ [✓] ___

ACTION: Use professional judgement to evaluate the effect on the quality of the data.

ACTION: If any sample analyzed as a soil contains more than 50% water, all data should be rejected.

ACTION: If both VOA vials for a sample have air bubbles, flag all positive results "J" and all non-detects "R".

2.0 Holding Times

2.1 Have any VOA holding times, determined from date of collection to date of analysis, been exceeded? [✓] [___] ___

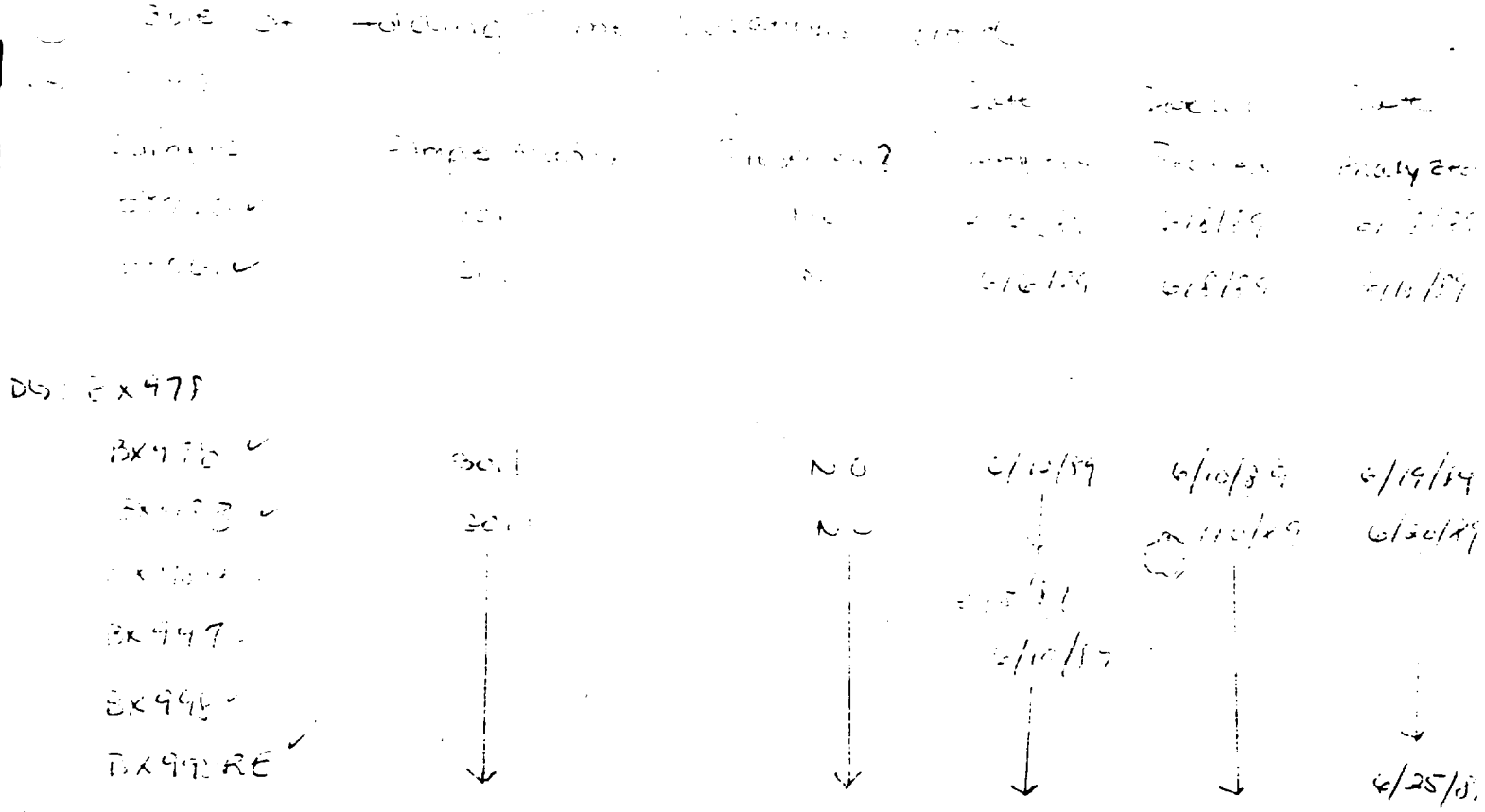
If unpreserved, aqueous aromatic volatiles must be analyzed within 7 days of collection and non-aromatic volatiles must be analyzed within 14 days. If preserved with hydrochloric acid and stored at 4°C, then both aromatic and non-aromatic volatiles must be analyzed within 14 days. If uncertain about preservation, contact the sampler to determine whether the samples were preserved.

A ten-day holding time for soil samples is recommended.

Table of Holding Time Violations

Sample	Sample Matrix	Preserved ?	(See Traffic Report) Date Sampled	Date Lab Received	Date Analyzed
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	NO	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	NO	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

ACTION: If holding times are exceeded, flag all positive results as estimated ("J") and sample quantitation limits as estimated ("UJ"), and document in the narrative that holding times were exceeded.



	YES	NO	N/A

If analyses were done more than 14 days beyond holding time, either on the first analysis or upon reanalysis, the reviewer must use professional judgement to determine the reliability of the data and the effects of additional storage on the sample results. The reviewer may determine that non-detect data are unusable ("R").

3.0 Surrogate Recovery (Form II)

3.1 Are the VOA Surrogate Recovery Summaries (Form II) present for each of the following matrices:

a. Low Water	[___]	___	✓
b. Med Water	[___]	___	✓
c. Low Soil	[___]	___	___
d. Med Soil	[___]	___	✓

3.2 Are all the VOA samples listed on the appropriate Surrogate Recovery Summaries for each of the following matrices:

a. Low Water	[___]	___	✓
b. Med Water	[___]	___	✓
c. Low Soil	[✓]	___	___
d. Med Soil	[___]	___	✓

ACTION: Call lab for explanation / resubmittals. If missing deliverables are unavailable, document effect on data under "Conclusions" section of reviewer narrative.

3.3 Were outliers marked correctly with an asterisk?	[✓]	___	___

ACTION: Circle all outliers in red.

3.4 Was one or more VOA surrogate recovery outside of contract specifications for any sample or method blank?	✓	[___]	___
If yes, were samples reanalyzed?	[✓]	___	___
Were method blanks reanalyzed?	[___]	✓	___

ACTION: If surrogate recoveries are > 10% but all do not meet SOW specifications:

1. Flag all positive results as estimated ("J").
2. Flag all non-detects as estimated detection limits ("UJ").

	YES	NO	N/A
If any surrogate has a recovery of <10% : 1. Flag all positive results as estimated ("J"). 2. Flag all non-detects as unusable ("R"). Professional judgement should be used to qualify data that have method blank surrogate recoveries out of specification in both original and re-analyses. Check the internal standard areas.			
3.5 Are there any transcription/calculation errors between raw data and Form II?	___	[✓]	___
ACTION: If large errors exist, call lab for explanation / resubmittal, make any necessary corrections and note errors under "Conclusions".			
Matrix Spikes (Form III)			
4.1 Is the Matrix Spike Duplicate/Recovery Form (Form III) present?	[✓]	---	---
4.2 Were matrix spikes analyzed at the required frequency for each of the following matrices:			
a. Low Water	[___]	___	✓
b. Med Water	[___]	___	✓
c. Low Soil	[✓]	___	
d. Med Soil	[___]	___	✓
ACTION: If any matrix spike data are missing, take the action specified in 3.2 above.			

4.3 How many VOA spike recoveries are outside QC limits?

Water	Soils
BX747 N/A out of 10	0 out of 10
BX775 N/A	2 recov of 10

4.4 How many RPD's for matrix spike and matrix spike duplicate recoveries are outside QC limits?

Water	Soils
BX747 N/A out of 5	0 out of 5
BX775 N/A	5 recov OK

ACTION: If MS and MSD both have less than 10% recovery for an analyte, negative results for that analyte should be rejected, and positive results should be flagged "J". The above applies only to the sample used for the MS/MSD analysis. Use professional judgement in applying this criterion to other samples in the package

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	YES	NO	N/A
5.0 Blanks (Form IV)			
5.1 Is the Method Blank Summary (Form IV) present?	[ ]		
5.2 Frequency of Analysis: for the analysis of VOA TCL compounds, has a reagent/method blank been analyzed for each set of samples or every 20 samples of similar matrix (low water, med water, low soil, medium soil), whichever is more frequent?	[✓]		
5.3 Has a VOA instrument blank been analyzed at least once every twelve hours for each GC/MS system used?	[✓]		
ACTION: If any method blank data are missing, call lab for explanation / resubmittal. If not available, reject all associated positive data ("R").			
5.4 Chromatography: review the blank raw data - chromatograms (RICs), quant reports or data system printouts and spectra.			
Is the chromatographic performance (baseline stability) for each instrument acceptable for VOAs?	[✓]		
ACTION: Use professional judgement to determine the effect on the data.			
6.0 Contamination			
NOTE: "Water blanks" and "distilled water blanks" are validated like any other sample and are NOT used to qualify data. Do not confuse them with the other QC blanks discussed below.			
6.1 Do any method/instrument/reagent blanks have positive results (TCL and/or TIC) for VOAs? When applied as described below, the contaminant concentration in these blanks are multiplied by the sample Dilution Factor.	✓	[ ]	
6.2 Do any field/trip/rinse blanks have positive VOA results (TCL and/or TIC)?		[ ]	✓
ACTION: Prepare a list of the samples associated with each of the contaminated blanks. (Attach a separate sheet.)			
NOTE: Only field/rinse blanks taken the same day as the samples are used to qualify data. Trip blanks are used to qualify only those samples with which they were shipped. Blanks may not be qualified because of contamination in another blank. Blanks may be qualified for surrogate, spectral, tuning or calibration QC problems.			

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ORGANICS
BLANK CONTAMINATIONS

CASE:
SITE:

LAB:
FRACTION:

ANALYTES	METHOD BLANK CONTAMINATIONS				~~RINSE BLANK CONT.~~		TRIP BLANK CONT.	
	ID: 3	ID:	ID:	ID:	NO:	NO:	NO:	NO:
TCL	AMOUNT	AMOUNT	AMOUNT	AMOUNT	AMOUNT	AMOUNT	AMOUNT	AMOUNT
Methylene chloride	24							
Acetone								
Carbon disulfide								
2-Butanone								
1,1,1-Trichloroethane								
Carbon tetrachloride								
Vinyl acetate								
Bromodichloromethane								
1,2-Dichloropropane								
cis-1,3-Dichloropropene								
Trichloroethene								
Dibromochloromethane								
1,1,2-Trichloroethane								
Benzene								
trans-1,3-Dichloropropene								
Bromoform								
4-Methyl-2-pentanone								
2-Hexanone								
Tetrachloroethene								
1,1,2,2-Tetrachloroethane								
Toluene								
Chlorobenzene		3						
Ethylbenzene								
Styrene								
Xylenes (total)								
TIC								
Unknown	5							
Unknown	40							
Unknown Hydrocarbon	25							
AFFECTED SAMPLES	BK092	BK093	BK094	BT-117	BK268			
	BK158			BT-118	BK269			
	BK159			BT-119				
	BK160			BK268				

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ORGANICS
BLANK CONTAMINATIONS

CASE: [illegible]
SITE: [illegible]

LAB: [illegible]
FRACTION: [illegible]

ANALYTES	METHOD BLANK CONTAMINATIONS				RINSE BLANK CONT.		TRIP BLANK CONT.	
	ID [illegible]	ID [illegible]	ID	ID	NO:	NO:	NO:	NO:
TCL	AMOUNT	AMOUNT	AMOUNT	AMOUNT	AMOUNT	AMOUNT	AMOUNT	AMOUNT
[illegible]	4							
[illegible]	2	2						
[illegible]	1	1						
[illegible]	2							
[illegible]	2							
[illegible]	1							
[illegible]		1						
[illegible]		2						
[illegible]		2						
[illegible]		2						
TIC								
[illegible]		2						
AFFECTED SAMPLES	BK902	BK903						
	BK904							
	BK907							
	BK908							
	BK909MS							

YES NO N/A

ACTION: Follow the directions in the table below to qualify TCL results due to contamination. Use the largest value from all the associated blanks.

	Sample conc > CRQL but < 10x blank	Sample conc < CRQL & is < 10x blank value	Sample conc > CRQL value & >10x blank value
Methylene chloride Acetone Toluene 2-butanone	Flag sample result with a 'U'; cross out 'B' flag	Reject sample result and report CRQL; cross out 'B' flag	No qualification is needed

	Sample conc > CRQL but < 5x blank	Sample conc < CRQL & is < 5x blank value	Sample conc > CRQL value & > 5 blank value
Other Contaminants	Flag sample result with a 'U'; cross out 'B' flag	Reject sample result and report CRQL; cross out 'B' flag	No qualification is needed

ACTION: For TIC compounds, if the concentration in the sample is less than five times the concentration in the most contaminated associated blank, flag the sample data "R" (unusable).

6.3 Are there field/rinse/equipment blanks associated with every sample? [___] ✓ ___

ACTION: For low level samples, note in data assessment that there is no associated field/rinse/equipment blank. Exception: samples taken from a drinking water tap do not have associated field blanks.

7.0 GC/MS Tuning and Mass Calibration (Form V)

7.1 Are the GC/MS Tuning and Mass Calibration Forms (Form V) present for Bromofluorobenzene (BFB)? [___] ___ ___

7.2 Are the enhanced bar graph spectrum and mass/charge (m/z) listing for the BFB provided for each twelve hour shift? [___] ___ ___

7.3 Has a tuning performance compound been analyzed for every twelve hours of sample analysis per instrument? [✓] ___ ___

ACTION: If any tuning data are missing, take action specified in 3.2 above.

ACTION: List date, time, instrument ID, and sample analyses for which no associated GC/MS tuning data are available.

	YES	NO	N/A

DATE	TIME	INSTRUMENT	SAMPLE NUMBERS

ACTION: If lab cannot provide missing data, reject ("R") all data generated outside an acceptable twelve hour calibration interval.

7.4 Have the ion abundance criteria been met for each instrument used? [✓] ___ ___

ACTION: List all data which do not meet ion abundance criteria (attach a separate sheet).

ACTION: If tuning calibration is in error, flag all associated sample data as unusable ("R"). However, if expanded ion criteria are met (See 1988 Functional Guidelines), the data reviewer may accept data with appropriate qualifiers.

7.5 Are there any transcription / calculation errors between mass lists and Form Vs? (Check at least two values but if errors are found, check more.) ___ [✓] ___

7.6 Have the appropriate number of significant figures (two) been reported? (Check at least two values, but if errors are found check more values.) ___ [✓] ___

ACTION: If large errors exist, call lab for explanation / resubmittal, make necessary corrections and note errors under "Conclusions".

7.7 Are the spectra of the mass calibration compound acceptable? [✓] ___ ___

ACTION: Use professional judgement to determine whether associated data should be accepted, qualified, or rejected.

8.0 Target Compound List (TCL) Analytes

8.1 Are the Organic Analysis Data Sheets (Form I VOA) present with required header information on each page, for each of the following:

a. Samples and/or fractions as appropriate [✓] ___ ___

b. Matrix spikes and matrix spike duplicates [✓] ___ ___

c. Blanks [✓] ___ ___

	YES	NO	N/A
8.2 Are the VOA Reconstructed Ion Chromatograms, the mass spectra for the identified compounds, and the data system printouts (Quant Reports) included in the sample package for each of the following?			
a. Samples and/or fractions as appropriate	[ ]	✓*	
b. Matrix spikes and matrix spike duplicates (Mass spectra not required)	[✓]		
c. Blanks	[✓]		
ACTION: If any data are missing, take action specified in 3.2 above.			
8.3 Are the response factors shown in the Quant Report?	[ ]	✓	
8.4 Is chromatographic performance acceptable with respect to:			
Baseline stability	[✓]		
Resolution	[✓]		
Peak shape	[✓]		
Full-scale graph (attenuation)	[✓]		
Other:_____	[ ]		✓
ACTION: Use professional judgement to determine the acceptability of the data.			
8.5 Are the lab-generated standard mass spectra of the identified VOA compounds present for each sample?	[ ]	✓*	
ACTION: If any mass spectra are missing, take action specified in 3.2 above. If Lab does not generate their own standard spectra, make note in "Contract Problems/Non-compliance".			
8.6 Is the RRT of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?	[✓]		
8.7 Are all ions present in the standard mass spectrum at a relative intensity greater than 10% also present in the sample mass spectrum?	[✓]		
8.8 Do sample and standard relative ion intensities agree within 20%?	[✓]		
ACTION: Use professional judgement to determine acceptability of data. If it is determined that incorrect identifications were made, all such data should be rejected, flagged "N" (presumptive evidence of the presence of the compound) or changed to not detected (at the calculated detection limit).			

* See Data Assessment

	YES	NO	N/A
0 Tentatively Identified Compounds (TIC)			
9.1 Are all Tentatively Identified Compound Forms (Form I, Part B) present; and do listed TICs include scan number or retention time, estimated concentration and "J" qualifier?	[✓]	___	___
9.2 Are the mass spectra for the tentatively identified compounds and associated "best match" spectra included in the sample package for each of the following:			
a. Samples and/or fractions as appropriate	[✓]	___	___
b. Blanks	[✓]	___	___
ACTION: If any TIC data are missing, take action specified in 3.2 above.			
ACTION: Add "J" qualifier if missing and "N" qualifier to all identified TIC compounds on Form I, Part B.			
9.3 Are any TCL compounds (from any fraction) listed as TIC compounds (example: 1,2-dimethylbenzene is xylene--a VOA TCL--and should not be reported as a TIC)?	✓	[___]	___
ACTION: Flag with "R" any TCL compound listed as a TIC.			
9.4 Are all ions present in the reference mass spectrum with a relative intensity greater than 10% also present in the sample mass spectrum?	[✓]	___	___
9.5 Do TIC and "best match" standard relative ion intensities agree within 20%?	[✓]	___	___
ACTION: Use professional judgement to determine acceptability of TIC identifications. If it is determined that an incorrect identification was made, change identification to "unknown" or to some less specific identification (example: "C3 substituted benzene") as appropriate.			
10.0 Compound Quantitation and Reported Detection Limits			
10.1 Are there any transcription / calculation errors in Form I results? Check at least two positive values. Verify that the correct internal standard, quantitation ion, and RRF were used to calculate Form I result. Were any errors found?	✓	[___]	___
10.2 Are the CRQLs adjusted to reflect sample dilutions and, for soils, sample moisture?	___	[✓]	___

Minor differences due to software formatting

	YES	NO	N/A

ACTION: If errors are large, call lab for explanation / resubmittal, make any necessary corrections and note errors under "Conclusions".

ACTION: When a sample is analyzed at more than one dilution, the lowest CRQLs are used (unless a QC exceedance dictates the use of the higher CRQL data from the diluted sample analysis). Replace concentrations that exceed the calibration range in the original analysis by crossing out the "E" value on the original Form I and substituting it with data from the analysis of diluted sample. Specify which Form I is to be used, then draw a red "X" across the entire page of all Form I's that should not be used, including any in the summary package.

11.0 Standards Data (GC/MS)

11.1 Are the Reconstructed Ion Chromatograms, and data system printouts (Quant. Reports) present for initial and continuing calibration? [✓] ___ ___

ACTION: If any calibration standard data are missing, take action specified in 3.2 above.

12.0 GC/MS Initial Calibration (Form VI)

12.1 Are the Initial Calibration Forms (Form VI) present and complete for the volatile fraction? [✓] ___ ___

ACTION: If any calibration standard forms are missing, take action specified in 3.2 above.

12.2 Are response factors stable for volatiles over the concentration range of the calibration (RSD <30%)? [___] ✓ ___

ACTION: Circle all outliers in red.

ACTION: When RSD >30%, non-detects may be qualified using professional judgement. Flag all positive results "J". When RSD >90%, flag all non-detects as unusable ("R"). (Region II policy.)

12.3 Do any compounds have a RRF < 0.05? ___ [✓] ___

ACTION: Circle all outliers in red.

ACTION: If any volatile compound has an average RRF < 0.05, flag positive results for that compound as estimated ("J"), and flag non-detects for that compound as unusable ("R").

	YES	NO	N/A
12.4 Are there any transcription / calculation errors in the reporting of average response factors (RRF) or %RSD? (Check at least two values but if errors are found, check more.)	___	[✓]	___

ACTION: Circle errors in red.

ACTION: If errors are large, call lab for explanation / resubmittal, make any necessary corrections and note errors under "Conclusions".

13.0 GC/MS Continuing Calibration (Form VII)

13.1 Are the Continuing Calibration Forms (Form VII) present and complete for the volatile fraction?	[___]	___	___
13.2 Has a continuing calibration standard been analyzed for every twelve hours of sample analysis per instrument?	[___]	___	___

ACTION: List below all sample analyses that were not within twelve hours of the previous continuing calibration analysis.

_____

_____

_____

ACTION: If any forms are missing or no continuing calibration standard has been analyzed within twelve hours of every sample analysis, call lab for explanation / resubmittal. If continuing calibration data are not available, flag all associated sample data as unusable ("R").

13.3 Do any continuing calibration standard compounds have a RRF < 0.05?	✓	[___]	___

ACTION: Circle all outliers in red.

ACTION: If any volatile compound has a RRF < 0.05, flag positive results for that compound as estimated ("J"), and flag non-detects for that compound as unusable ("R").

13.4 Do any compounds have a % difference between initial and continuing calibration RRF > 25%?	✓	[___]	___

ACTION: Circle all outliers in red and qualify associated sample data as outlined in the table below:

YES NO N/A

% DIFFERENCE

25-50	50-90	>90
'J' positive results, no action for non detects	'J' positive results, 'UJ' non detects	'J' positive results, "R" non detects

13.5 Are there any transcription / calculation errors in the reporting of average response factors (RRF) or difference (%D) between initial and continuing RRFs? (Check at least two values but if errors are found, check more.) ___ [✓] ___

ACTION: Circle errors in red.

ACTION: If errors are large, call lab for explanation / resubmittal, make any necessary corrections and note errors under "Conclusions".

14.0 Internal Standards (Form VIII)

14.1 Are the internal standard areas (Form VIII) of every sample and blank within the upper and lower limits for each continuing calibration? [___] ✓ ___

ACTION: List all the outliers below.

Sample #	Internal Std	Area	Lower Limit	Upper Limit
BK995	[illegible]	16100	16-95[illegible]	[illegible]
BK995RE	[illegible]	16300	[illegible]9150	72600
[illegible]	[illegible]	9710	[illegible]	[illegible]

(Attach additional sheets if necessary.)

ACTION: If the internal standard area count is outside the upper or lower limit, flag with "J" all positive results and non-detects (U values) quantitated with this internal standard. If extremely low area counts are reported, or if performance exhibits a major abrupt drop off, flag all associated non-detects as unusable ("R").

14.2 Are the retention times of the internal standards within 30 seconds of the associated calibration standard? [✓] ___ ___

ACTION: Professional judgement should be used to qualify data if the retention times differ by more than 30 seconds.

	YES	NO	N/A
15.0 Field Duplicates			
15.1 Were any field duplicates submitted for VOA analysis?	[✓]	___	___

ACTION: Compare the reported results for field duplicates and calculate the relative percent difference.

ACTION: Any gross variation between field duplicate results must be addressed in the reviewer narrative. However, if large differences exist, identification of field duplicates should be confirmed by contacting the sampler.

	YES	NO	N/A

PART B: BNA ANALYSES

1.0 Traffic Reports and Laboratory Narrative

1.1 Are the Traffic Report Forms present for all samples? [✓] ___ ___

ACTION: If no, contact lab for replacement of missing or illegible copies.

1.2 Do the Traffic Reports or Lab Narrative indicate any problems with sample receipt, condition of samples, analytical problems or special notations affecting the quality of the data? ___ [✓] ___

ACTION: Use professional judgement to evaluate the effect on the quality of the data.

ACTION: If any sample analyzed as a soil contains more than 50% water, all data should be rejected.

2.0 Holding Times

2.1 Have any BNA holding times, determined from date of collection to date of extraction, been exceeded? ___ [✓] ___

Samples for BNA analysis, both soils and waters, must be extracted within seven days of the date of collection. Extracts must be analyzed within 40 days of the date of extraction.

Table of Holding Time Violations

			(See Traffic Report)		
Sample	Sample Matrix	Date Sampled	Date Lab Received	Date Extracted	Date Analyzed

ACTION: If holding times are exceeded, flag all positive results as estimated ("J") and sample quantitation limits as estimated ("UJ"), and document in the narrative that holding times were exceeded.

91 [illegible]

	YES	NO	N/A

If analyses were done more than 14 days beyond holding time, either on the first analysis or upon reanalysis, the reviewer must use professional judgement to determine the reliability of the data and the effects of additional storage on the sample results. The reviewer may determine that non-detect data are unusable ("R").

3.0 Surrogate Recovery (Form II)

3.1 Are the BNA Surrogate Recovery Summaries (Form II) present for each of the following matrices:

a. Low Water	[ ]	___	✓
b. Med Water	[ ]	___	✓
c. Low Soil	[✓]	___	___
d. Med Soil	[ ]	___	✓

3.2 Are all the BNA samples listed on the appropriate Surrogate Recovery Summaries for each of the following matrices:

a. Low Water	[ ]	___	✓
b. Med Water	[ ]	___	✓
c. Low Soil	[✓]	___	___
d. Med Soil	[ ]	___	✓

ACTION: Call lab for explanation / resubmittals. If missing deliverables are unavailable, document effect on data under "Conclusions" section of reviewer narrative.

3.3 Were outliers marked correctly with an asterisk?	[ ]	___	✓

ACTION: Circle all outliers in red.

3.4 Were two or more base-neutral OR acid surrogate recoveries out of specification for any sample or method blank?	___	[✓]	___
If yes, were samples reanalyzed?	[ ]	___	✓
Were method blanks reanalyzed?	[ ]	___	✓

ACTION: If all BNA surrogate recoveries are > 10% but two within the base-neutral or acid fraction do not meet SOW specifications, for the affected fraction only (i.e. base-neutral OR acid compounds):

1. Flag all positive results as estimated ("J").
2. Flag all non-detects as estimated detection limits ("UJ").

	YES	NO	N/A
If any base-neutral or acid surrogate has a recovery of <10% : 1. Flag all positive results for that fraction (i.e. all acid or base-neutral compounds) "J". 2. Flag all non-detects for that fraction "R". Professional judgement should be used to qualify data that have method blank surrogate recoveries out of specification in both original and re-analyses. Check the internal standard areas.			
3.5 Are there any transcription/calculation errors between raw data and Form II?	___	[✓]	___

ACTION: If large errors exist, call lab for explanation / resubmittal, make any necessary corrections and note errors under "Conclusions".

Matrix Spikes (Form III)

4.1 Is the Matrix Spike Duplicate/Recovery Form (Form III) present?	[✓]	___	.....
4.2 Were matrix spikes analyzed at the required frequency for each of the following matrices:			
a. Low Water	[___]	___	✓
b. Med Water	[___]	___	✓
c. Low Soil	[✓]	___	___
d. Med Soil	[___]	___	✓

ACTION: If any matrix spike data are missing, take the action specified in 3.2 above.

4.3 How many BNA spike recoveries are outside QC limits?

Water	Soils
SDG BT747 N/A out of 22 BX978 N/A	14 out of 22 0

4.4 How many RPD's for matrix spike and matrix spike duplicate recoveries are outside QC limits?

Water	Soils
SDG BT747 N/A out of 11 BX978 N/A	3 out of 11 0

ACTION: If MS and MSD both have less than 10% recovery for an analyte, negative results for that analyte should be rejected, and positive results should be flagged "J". The above applies only to the sample used for MS/MSD analysis. Use professional judgement in applying this criterion to other samples

	YES	NO	N/A
5.0 Blanks (Form IV)			
5.1 Is the Method Blank Summary (Form IV) present?	[V]		
5.2 Frequency of Analysis: for the analysis of BNA TCL compounds, has a reagent/method blank been analyzed for each set of samples or every 20 samples of similar matrix (low water, med water, low soil, medium soil), whichever is more frequent?	[V]		
5.3 Chromatography: review the blank raw data - chromatograms (RICs), quant reports or data system printouts and spectra.			
Is the chromatographic performance (baseline stability) ~~VOAs~~ BNA instrument acceptable for ~~VOAs~~ BNA?	[✓]		
NOTE: Use professional judgement to determine the effect on the data			
6.0 Contamination			
NOTE: "Water blanks" and "distilled water blanks" are validated like any other sample and are not used to qualify data. Do not confuse them with the other QC blanks discussed below.			
6.1 Do any method/instrument/reagent blanks have positive results (TCL and/or TIC) for BNAs? When applied as described below, the contaminant concentration in these blanks are multiplied by the sample Dilution Factor.	✓	[ ]	
6.2 Do any field/rinse blanks have positive BNA results (TCL and/or TIC)?		[ ]	✓
ACTION: Prepare a list of the samples associated with each of the contaminated blanks. (Attach a separate sheet.)			
NOTE: Only field/rinse blanks taken the same day as the samples are used to qualify data. Blanks may not be qualified because of contamination in another blank. Blanks may be qualified for surrogate, spectral, tuning or calibration QC problems.			

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ORGANICS
BLANK CONTAMINATIONS

CASE: [illegible] LAB: [illegible]
SITE: [illegible] FRACTION: [illegible]

ANALYTES	METHOD BLANK CONTAMINATIONS				RINSE BLANK CONT.		TRIP BLANK CONT.	
	ID [illegible]	ID [illegible]	ID	ID	NO:	NO:	NO:	NO:
TCL	AMOUNT	AMOUNT	AMOUNT	AMOUNT	AMOUNT	AMOUNT	AMOUNT	AMOUNT
TIC								
[illegible]	[illegible]	[illegible]						
[illegible]	[illegible]							
[illegible]		[illegible]						
AFFECTED SAMPLES	[illegible]	BY764 [illegible]						
	[illegible]	BY765 BY773						
	[illegible]	BY769 BY770						
	[illegible]	BY771 BY772						
	[illegible]	BY773 BY774						
		BY775 BY775MS BY775MSD						

95 F 433

ORGANICS
BLANK CONTAMINATIONS

CASE: [illegible] LAB: CEIMIC
SITE: [illegible] FRACTION: [illegible]

ANALYTES	METHOD BLANK CONTAMINATIONS				RINSE BLANK CONT.		TRIP BLANK CONT.	
	ID [illegible]	ID	ID	ID	NO:	NO:	NO:	NO:
TCL	AMOUNT	AMOUNT	AMOUNT	AMOUNT	AMOUNT	AMOUNT	AMOUNT	AMOUNT
TIC								
[illegible]								
[illegible]	[illegible]							
AFFECTED SAMPLES	BT 764 BX 262 BX 263 BX 264 BX 976 BX 977 BT 757 BT 760 BT 761							

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YES NO N/A

ACTION: Follow the directions in the table below to qualify TCL results due to contamination. Use the largest value from all the associated blanks.

	Sample conc > CRQL but < 10x blank	Sample conc < CRQL & is < 10x blank value	Sample conc > CRQL value & >10x blank value
Common Phthalate Esters	Flag sample result with a 'U'; cross out 'B' flag	Reject sample result and report CRQL; cross out 'B' flag	No qualification is needed

	Sample conc > CRQL but < 5x blank	Sample conc < CRQL & is < 5x blank value	Sample conc > CRQL value & > 5 blank value
Other Contaminants	Flag sample result with a 'U'; cross out 'B' flag	Reject sample result and report CRQL; cross out 'B' flag	No qualification is needed

ACTION: For TIC compounds, if the concentration in the sample is less than five times the concentration in the most contaminated associated blank, flag the sample data "R" (unusable).

6.3 Are there field/rinse/equipment blanks associated with every sample? [___] ✓ ___

ACTION: For low level samples, note in data assessment that there is no associated field/rinse/equipment blank. Exception: samples taken from a drinking water tap do not have associated field blanks.

7.0 GC/MS Tuning and Mass Calibration (Form V)

7.1 Are the GC/MS Tuning and Mass Calibration Forms (Form V) present for Decafluorotriphenylphosphine (DFTPP)? [✓] ___ ___

7.2 Are the enhanced bar graph spectrum and mass/charge (m/z) listing for the DFTPP provided for each twelve hour shift? [___] ✓ ___

7.3 Has a tuning performance compound been analyzed for every twelve hours of sample analysis per instrument? [✓] ___ ___

ACTION: If any tuning data are missing, take action specified in 3.2 above.

ACTION: List date, time, instrument ID, and sample analyses for which no associated GC/MS tuning data are available.

			YES	NO	N/A

DATE	TIME	INSTRUMENT	SAMPLE NUMBERS

ACTION: If lab cannot provide missing data, reject ("R") all data generated outside an acceptable twelve hour calibration interval.

7.4 Have the ion abundance criteria been met for each instrument used? [✓] ___ ___

ACTION: List all data which do not meet ion abundance criteria (attach a separate sheet).

ACTION: If tuning calibration is in error, flag all associated sample data as unusable ("R"). However, if expanded ion criteria are met (See 1988 Functional Guidelines), the data reviewer may accept data with appropriate qualifiers.

7.5 Are there any transcription / calculation errors between mass lists and Form Vs? (Check at least two values but if errors are found, check more.) ___ [✓] ___

7.6 Have the appropriate number of significant figures (two) been reported? (Check at least two values, but if errors are found check more values.) ___ [___] ___

ACTION: If large errors exist, call lab for explanation / resubmittal, make necessary corrections and note errors under "Conclusions".

7.7 Are the spectra of the mass calibration compound acceptable? [✓] ___ ___

ACTION: Use professional judgement to determine whether associated data should be accepted, qualified, or rejected.

8.0 Target Compound List (TCL) Analytes

8.1 Are the Organic Analysis Data Sheets (Form I BNA) present with required header information on each page, for each of the following:

a. Samples and/or fractions as appropriate [✓] ___ ___

b. Matrix spikes and matrix spike duplicates [✓] ___ ___

c. Blanks [✓] ___ ___

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	YES	NO	N/A
8.2 Are the BNA Reconstructed Ion Chromatograms, the mass spectra for the identified compounds, and the data system printouts (Quant Reports) included in the sample package for each of the following?			
a. Samples and/or fractions as appropriate	[✓]	___	___
b. Matrix spikes and matrix spike duplicates (Mass spectra not required)	[✓]	___	___
c. Blanks	[✓]	___	___
ACTION: If any data are missing, take action specified in 3.2 above.			
8.3 Are the response factors shown in the Quant Report?	[___]	___	___
8.4 Is chromatographic performance acceptable with respect to:			
Baseline stability	[✓]	___	___
Resolution	[✓]	___	___
Peak shape	[✓]	___	___
Full-scale graph (attenuation)	[✓]	___	___
Other:_____	[___]	___	✓
ACTION: Use professional judgement to determine the acceptability of the data.			
8.5 Are the lab-generated standard mass spectra of the identified BNA compounds present for each sample?	[✓]	___	___
ACTION: If any mass spectra are missing, take action specified in 3.2 above. If Lab does not generate their own standard spectra, make note in "Contract Problems/Non-compliance".			
8.6 Is the RRT of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?	[✓]	___	___
8.7 Are all ions present in the standard mass spectrum at a relative intensity greater than 10% also present in the sample mass spectrum?	[✓]	___	___
8.8 Do sample and standard relative ion intensities agree within 20%?	[✓]	___	___
ACTION: Use professional judgement to determine acceptability of data. If it is determined that incorrect identifications were made, all such data should be rejected, flagged "N" (presumptive evidence of the presence of the compound) or changed to not detected (at the calculated detection limit).			

	YES	NO	N/A
9.0 Tentatively Identified Compounds (TIC)			
9.1 Are all Tentatively Identified Compound Forms (Form I, Part B) present; and do listed TICs include scan number or retention time, estimated concentration and "J" qualifier?	[/]	___	___
9.2 Are the mass spectra for the tentatively identified compounds and associated "best match" spectra included in the sample package for each of the following:			
a. Samples and/or fractions as appropriate	[/]	___	___
b. Blanks	[/]	___	___
ACTION: If any TIC data are missing, take action specified in 3.2 above.			
ACTION: Add "J" qualifier if missing and "N" qualifier to all identified TIC compounds on Form I, Part B.			
9.3 Are any TCL compounds (from any fraction) listed as TIC compounds (example: 1,2-dimethylbenzene is xylene--a VOA TCL--and should not be reported as a TIC)?	___	[/]	___
ACTION: Flag with "R" any TCL compound listed as a TIC.			
9.4 Are all ions present in the reference mass spectrum with a relative intensity greater than 10% also present in the sample mass spectrum?	[___]	___	___
9.5 Do TIC and "best match" standard relative ion intensities agree within 20%?	[___]	___	___
ACTION: Use professional judgement to determine acceptability of TIC identifications. If it is determined that an incorrect identification was made, change identification to "unknown" or to some less specific identification (example: "C3 substituted benzene") as appropriate.			
10.0 Compound Quantitation and Reported Detection Limits			
10.1 Are there any transcription / calculation errors in Form I results? Check at least two positive values. Verify that the correct internal standard, quantitation ion, and RRF were used to calculate Form I result. Were any errors found?	/	[___]	___
10.2 Are the CRQLs adjusted to reflect sample dilutions and, for soils, sample moisture?	/	[___]	___

Minor errors due to software formatting

	YES	NO	N/A

ACTION: If errors are large, call lab for explanation / resubmittal, make any necessary corrections and note errors under "Conclusions".

ACTION: When a sample is analyzed at more than one dilution, the lowest CRQLs are used (unless a QC exceedance dictates the use of the higher CRQL data from the diluted sample analysis). Replace concentrations that exceed the calibration range in the original analysis by crossing out the "E" value on the original Form I and substituting it with data from the analysis of diluted sample. Specify which Form I is to be used, then draw a red "X" across the entire page of all Form I's that should not be used, including any in the summary package.

11.0 Standards Data (GC/MS)

11.1 Are the Reconstructed Ion Chromatograms, and data system printouts (Quant. Reports) present for initial and continuing calibration? [✓] ___ ___

ACTION: If any calibration standard data are missing, take action specified in 3.2 above.

12.0 GC/MS Initial Calibration (Form VI)

12.1 Are the Initial Calibration Forms (Form VI) present and complete for the BNA fraction? [✓] ___ ___

ACTION: If any calibration standard forms are missing, take action specified in 3.2 above.

12.2 Are response factors stable for BNAs over the concentration range of the calibration (RSD <30%)? [✓] ___ ___

ACTION: Circle all outliers in red.

ACTION: When RSD >30%, non-detects may be qualified using professional judgement. Flag all positive results "J". When RSD >90%, flag all non-detects as unusable ("R"). (Region II policy.)

12.3 Do any compounds have a RRF < 0.05? ___ [✓] ___

ACTION: Circle all outliers in red.

ACTION: If any BNA compound has an average RRF < 0.05, flag positive results for that compound as estimated ("J"), and flag non-detects for that compound as unusable ("R").

	YES	NO	N/A
12.4 Are there any transcription / calculation errors in the reporting of average response factors (RRF) or %RSD? (Check at least two values but if errors are found, check more.)	___	[✓]	___

ACTION: Circle errors in red.

ACTION: If errors are large, call lab for explanation / resubmittal, make any necessary corrections and note errors under "Conclusions".

13.0 GC/MS Continuing Calibration (Form VII)

13.1 Are the Continuing Calibration Forms (Form VII) present and complete for the BNA fraction?	[✓]	___	___
13.2 Has a continuing calibration standard been analyzed for every twelve hours of sample analysis per instrument?	[✓]	___	___

ACTION: List below all sample analyses that were not within twelve hours of the previous continuing calibration analysis.

_____

_____

_____

ACTION: If any forms are missing or no continuing calibration standard has been analyzed within twelve hours of every sample analysis, call lab for explanation / resubmittal. If continuing calibration data are not available, flag all associated sample data as unusable ("R").

13.3 Do any continuing calibration standard compounds have a RRF < 0.05?	___	[✓]	___

ACTION: Circle all outliers in red.

ACTION: If any BNA compound has a RRF < 0.05, flag positive results for that compound as estimated ("J"), and flag non-detects for that compound as unusable ("R").

13.4 Do any compounds have a % difference between initial and continuing calibration RRF > 25%?	✓	[___]	___

ACTION: Circle all outliers in red and qualify associated sample data as outlined in the table below:

YES NO N/A

% DIFFERENCE

25-50	50-90	>90
'J' positive results, no action for non detects	'J' positive results, 'UJ' non detects	'J' positive results, "R" non detects

13.5 Are there any transcription / calculation errors in the reporting of average response factors (RRF) or difference (%D) between initial and continuing RRFs? (Check at least two values but if errors are found, check more.) ___ [✓] ___

ACTION: Circle errors in red.

ACTION: If errors are large, call lab for explanation / resubmittal, make any necessary corrections and note errors under "Conclusions".

Internal Standards (Form VIII)

Are the internal standard areas (Form VIII) of every sample and blank within the upper and lower limits for each continuing calibration? [___] ✓ ___

ACTION: List all the outliers below.

Sample #	Internal Std	Area	Lower Limit	Upper Limit
BK97P	Perylene-d12	70500	785 00	314000

(Attach additional sheets if necessary.)

ACTION: If the internal standard area count is outside the upper or lower limit, flag with "J" all positive results and non-detects (U values) quantitated with this internal standard. If extremely low area counts are reported, or if performance exhibits a major abrupt drop off, flag all associated non-detects as unusable ("R").

14.2 Are the retention times of the internal standards within 30 seconds of the associated calibration standard? [✓] ___ ___

ACTION: Professional judgement should be used to qualify data if the retention times differ by more than 30 seconds.

	YES	NO	N/A
15.0 Field Duplicates			
15.1 Were any field duplicates submitted for BNA analysis?	[✓]	___	___

ACTION: Compare the reported results for field duplicates and calculate the relative percent difference.

ACTION: Any gross variation between field duplicate results must be addressed in the reviewer narrative. However, if large differences exist, identification of field duplicates should be confirmed by contacting the sampler.

	YES	NO	N/A
PART C: PESTICIDE/PCB ANALYSES			
1.0 Traffic Reports and Laboratory Narrative			
1.1 Are the Traffic Report Forms present for all samples?	[✓]	___	___
ACTION: If no, contact lab for replacement of missing or illegible copies.			
1.2 Do the Traffic Reports or Lab Narrative indicate any problems with sample receipt, condition of samples, analytical problems or special notations affecting the quality of the data?	___	[✓]	___
ACTION: Use professional judgement to evaluate the effect on the quality of the data.			
ACTION: If any sample analyzed as a soil contains more than 50% water, all data should be rejected.			
2.0 Holding Times			
2.1 Have any PEST/PCB holding times, determined from date of collection to date of extraction, been exceeded?	___	[✓]	___
Samples for PEST/PCB analysis, both soils and waters, must be extracted within seven days of the date of collection. Extracts must be analyzed within 40 days of the date of extraction.			
3.0 Surrogate Recovery (Form II)			
3.1 Are the PEST/PCB Surrogate Recovery Summaries (Form II) present for each of the following matrices:			
a. Low Water	[___]	___	✓
b. Med Water	[___]	___	✓
c. Low Soil	[✓]	___	___
d. Med Soil	[___]	___	✓
3.2 Are all the PEST/PCB samples listed on the appropriate Surrogate Recovery Summaries for each of the following matrices:			
a. Low Water	[___]	___	✓
b. Med Water	[___]	___	✓
c. Low Soil	[✓]	___	___
d. Med Soil	[___]	___	✓

	YES	NO	N/A

ACTION: Call lab for explanation / resubmittals. If missing deliverables are unavailable, document effect on data under "Conclusions" section of reviewer narrative.

3.3 Were outliers marked correctly with an asterisk? [✓] ___ ___

ACTION: Circle all outliers in red.

3.4 Was surrogate (DBC) recovery outside of the contract specification for any sample or blank? ✓ [___] ___

ACTION: No qualification is done if surrogates are diluted beyond detection. If recovery is below contract limit (but above zero), flag all results for that sample "J". If recovery is zero, flag positive results "J" and non-detects "R". If recovery for the blank is zero, flag non-detects for all associated samples "R". If recovery is above contract limit, flag all positive results for that sample "J", unless in the reviewers professional judgement the high recovery is due to co-eluting interference (check the associated blank - if recovery is high there also, flag the sample data).

3.5 Are there any transcription/calculation errors between raw data and Form II? ___ [✓] ___

ACTION: If large errors exist, call lab for explanation / resubmittal, make any necessary corrections and note errors under "Conclusions".

4.0 Matrix Spikes (Form III)

4.1 Is the Matrix Spike Duplicate/Recovery Form (Form III) present? [✓] ___ ___

4.2 Were matrix spikes analyzed at the required frequency for each of the following matrices:

a. Low Water [___] ___ ✓

b. Med Water [___] ___ ✓

c. Low Soil [✓] ___ ___

d. Med Soil [___] ___ ✓

ACTION: If any matrix spike data are missing, take the action specified in 3.2 above.

4.3 How many PEST/PCB spike recoveries are outside QC limits?

	Water	Soils
	N/A out of 12	12 out of 12

SDG No. 2978 N/A
ST-47 N/A

	YES	NO	N/A

4.4 How many RPD's for matrix spike and matrix spike duplicate recoveries are outside QC limits?

Water	Soils
[illegible] out of 6	[illegible] out of 6

ACTION: If MS and MSD both have less than zero recovery for an analyte, negative results for that analyte should be rejected, and positive results should be flagged "J". The above applies only to the sample used for MS/MSD analysis. Use professional judgement in applying this criterion to other samples.

5.0 Blanks (Form IV)

5.1 Is the Method Blank Summary (Form IV) present? [ ] ___ ___

5.2 Frequency of Analysis: for the analysis of Pesticide TCL compounds, has a reagent/method blank been analyzed for each set of samples or every 20 samples of similar matrix (low water, med water, low soil, medium soil), whichever is more frequent? [✓] ___ ___

5.3 Chromatography: review the blank raw data - chromatograms, quant reports or data system printouts.

Is the chromatographic performance (baseline stability) for each instrument acceptable for PEST/PCBs? [ ] ___ ___

ACTION: Use professional judgement to determine the effect on the data.

6.0 Contamination

NOTE: "Water blanks" and "distilled water blanks" are validated like any other sample and are not used to qualify data. Do not confuse them with the other QC blanks discussed below.

6.1 Do any method/instrument/reagent blanks have positive results for PEST/PCBs? When applied as described below, the contaminant concentration in these blanks are multiplied by the sample Dilution Factor. ___ [✓] ___

6.2 Do any field/rinse blanks have positive PEST/PCB results? ___ [ ] ✓

ACTION: Prepare a list of the samples associated with each of the contaminated blanks. (Attach a separate sheet.)

YES NO N/A

NOTE: Only field/rinse blanks taken the same day as the samples are used to qualify data. Blanks may not be qualified because of contamination in another blank. Blanks may be qualified for surrogate, spectral, tuning or calibration QC problems.

ACTION: Follow the directions in the table below to qualify TCL results due to contamination. Use the largest value from all the associated blanks.

Sample conc > CRQL but < 5x blank	Sample conc < CRQL & is < 5x blank value	Sample conc > CRQL & > 5x blank value
Flag sample result with a "U"; cross out "B" flag	Reject sample result and report CRQL; cross out "B" flag	No qualification is needed

Are there field/rinse/equipment blanks associated with every sample? [___] ✓ ___ ___

ACTION: For low level samples, note in data assessment that there is no associated field/rinse/equipment blank. Exception: samples taken from a drinking water tap do not have associated field blanks.

7.0 Calibration and GC Performance

7.1 Are the following Gas Chromatograms and Data System Printouts for both Primary and Confirmation (confirmation standards not required if there are no positive results above CRQL) column present:

a. Evaluation Standard Mix A [✓] ___ ___

b. Evaluation Standard Mix B [✓] ___ ___

c. Evaluation Standard Mix C [✓] ___ ___

d. Individual Standard Mix A [✓] ___ ___

e. Individual Standard Mix B [✓] ___ ___

f. Multi-component Pesticides Toxaphene & Chlordane [✓] ___ ___

g. Aroclors 1016/1260 (1660) [✓] ___ ___

h. Aroclors 1221, 1232, 1242, 1248, and 1254 [✓] ___ ___

ACTION: If no, take action specified in 3.2 above

	YES	NO	N/A
7.2 Is Form VIII Pest-1 present and complete for each GC column (primary and confirmation) and each 72 hour sequence of analyses?	[✓]	___	___

ACTION: If no, take action specified in 3.2 above.

7.3 Are there any transcription/calculation errors between raw data and Form VIII?	___	[___]	___

ACTION: If large errors exist, call lab for explanation / resubmittal, make any necessary corrections and note errors under "Conclusions".

7.4 Has the total breakdown on quantitation or confirmation column exceeded 20% for DDT?	___	[___]	___
- for Endrin?	___	[___]	___
or if Endrin aldehyde and 4,4'-DDD co-elute and there is a peak at their retention time, has the combined DDT and Endrin breakdown exceeded 20%?	___	[___]	___

ACTION:

a. If DDT breakdown is greater than 20% on quantitation column beginning with the samples following the last in control standard:

1. Flag all positive DDT results "J".
2. If DDT was not detected but DDD and/or DDE are positive, flag the DDT non-detect "R".
3. Flag positive DDD and DDE results "JN".
4. If DDT breakdown is > 20% on confirmation column and DDT is identified on quantitation column but not on confirmation column, use professional judgement to determine whether DDT should be reported on Form I (if reported, flag result "N").

b. If Endrin breakdown is > 20% on quantitation column, beginning with the samples following the last in control standard:

1. Flag all positive Endrin results "J".
2. If Endrin was not detected, but Endrin Aldehyde and/or Endrin Ketone are positive, flag the Endrin non-detect "R".
3. Flag Endrin Ketone positive results "JN".
4. If Endrin breakdown is > 20% on confirmation column and Endrin is identified on quantitation column but not on confirmation column, use professional judgement to determine whether Endrin should be reported on Form I (if reported, flag result "N").

c. If the combined breakdown is used (it can only be used if the conditions in 7.4 above are met) and is > 20% on quantitation column beginning with the last in control standard, take the actions specified in 7.4 a and b above. If the combined breakdown is >20% on confirmation column and Endrin or DDT is identified on quantitation column but not on confirmation column, use professional judgement to determine whether Endrin or DDT should be reported on Form I (if reported, flag result "N").

	YES	NO	N/A
7.5 Is the linearity check RSD of all four calibration factors <10% for the quantitation column?	[✓]	___	___
ACTION: If no, flag positive hits for all pesticide and PCB analytes "J" for all associated samples. Do not flag toxaphene or DDT if they are quantified from a 3-point calibration curve.			
7.6 Is the % difference between the EVAL A and each analysis (quantitation and confirmation) DBC retention time within QC limits (2% for packed column, 0.3% for capillary [I.D. < 0.32 mm], 1% for megabore [0.32 < I.D. < 2 mm]) ?	[___]	✓*	___
ACTION: DBC retention time cannot be evaluated if DBC is not detected. If it is present and has a retention time out of QC limits, then use professional judgement to determine the reliability of the analysis and flag results "R", if appropriate.			
Was the proper analytical sequence followed for each 72 hour period of analyses (page PEST D-36 in 8/87 SOW).	[✓]	___	___
ACTION: If no, use professional judgement to determine the severity of the effect on the data and accept or reject it accordingly. Generally, the effect is negligible unless the sequence was grossly altered or the calibration was also out of limits.			

8.0 Pesticide/PCB Standards Summary

8.1 Is Form IX present and complete for each GC column and 72 hr sequence of analyses?	[___]	✓*	___
ACTION: If no, take action specified in 3.2 above.		*See assessment	
8.2 Are there any transcription/calculation errors between raw data and Form IX?	___	[✓]	___
ACTION: If large errors exist, call lab for explanation / resubmittal, make any necessary corrections and note errors under "Conclusions".			
8.3 Is DDT' retention time for packed columns > 12 min (except OV-1 and OV-101 columns)?	[✓]	___	___
ACTION: If no, check that there is adequate resolution between individual components. If not, flag results for compounds that interfere with each other (co-elute) "R".			
.4 Do all standard retention times fall within the windows established for the first IND A and IND B analyses?	[✓]	___	___

	YES	NO	N/A
ACTION: Beginning with the samples following the last <u>in control</u> standard, check to see if the chromatograms contain peaks within an expanded window surrounding the expected retention times. If no peaks are found and, DBC is visible non-detects are valid. If peaks are present and cannot be identified through "pattern recognition" or a consistent shift in standard retention times, flag all affected compound results "R".			
8.5 Are the continuing calibration standard calibration factors within 15% (for quantitation column) or 20% (for confirmation column) of the initial (at beginning of 72 hr sequence) calibration factors?	[✓]	___	___
ACTION: If no, flag all associated positive results "J". Use professional judgement to determine whether or not to flag non-detects.			
9.0 Pesticide/PCB Identification			
9.1 Is Form X complete for every sample in which a pesticide or PCB was detected?	[✓]	___	___
ACTION: If no, take action specified in 3.2 above.			
9.2 Are there any transcription errors between raw data and Form X?	___	[✓]	___
ACTION: If large errors exist, call lab for explanation / resubmittal, make any necessary corrections and note errors under "Conclusions".			
9.3 Are retention times of sample compounds within the calculated retention time windows for both quantitation and confirmation analyses?	[✓]	___	___
Was GC/MS confirmation provided when required (when compound concentration is > 10 ug/ml in final extract)?	[___]	___	✓
ACTION: Reject ("R") all positive results (meeting quantitation column criteria, but missing confirmation by a second column or GC/MS (if appropriate). Also, reject ("R") all positive results not meeting retention time window criteria unless associated standard compounds are similarly biased (i.e. base on RRT to DBC).			
9.4 Check chromatograms for false negatives, especially for the multiple peak components toxaphene and PCB's. Were there any false negatives?	___	[✓]	___
ACTION: If appropriate PCB standards were not analyzed, or if the lab performed no confirmation analysis, flag the appropriate data with an "R".			

	YES	NO	N/A
10.0 Compound Quantitation and Reported Detection Limits			
10.1 Are there any transcription / calculation errors in Form I results? Check at least two positive values. Were any errors found?	___	[✓]	___
10.2 Are the CRQLs adjusted to reflect sample dilutions and, for soils, sample moisture?	✓	[___]	___

NOTE: Simple peak pesticide results can be checked for rough agreement between quantitative results obtained on the two GC columns. The reviewer should use professional judgement to decide whether a much larger concentration obtained on one column versus the other indicates the presence of an interfering compound. If an interfering compound is indicated, the lower of the two values should be reported and qualified as presumptively present at an estimated quantity ("JN"). This necessitates a determination of an estimated concentration on the confirmation column. The narrative should indicate that the presence of interferences has obscured the attempt at a second column confirmation.

ACTION: If errors are large, call lab for explanation / resubmittal, make any necessary corrections and note errors under "Conclusions".

ACTION: When a sample is analyzed at more than one dilution, the lowest CRQLs are used (unless a QC exceedance dictates the use of the higher CRQL data from the diluted sample analysis). Replace concentrations that exceed the calibration range in the original analysis by crossing out the "E" value on the original Form I and substituting it with data from the analysis of diluted sample. Specify which Form I is to be used, then draw a red "X" across the entire page of all Form I's that should not be used, including any in the summary package.

11.0 Chromatogram Quality			
11.1 Were baselines stable?	[✓]	___	___
11.2 Were any electropositive displacement (negative peaks) or unusual peaks seen?	___	[✓]	___
11.3 Were early eluting peaks (for early eluting analytes) resolved to baseline?	[✓]	___	___

ACTION: For 11.1 and 11.2, comment only. For 11.3, reject ("R") those analytes that are not sufficiently resolved.

	YES	NO	N/A
12.0 Field Duplicates			
12.1 Were any field duplicates submitted for PEST/PCB analysis?	[✓]	___	___

ACTION: Compare the reported results for field duplicates and calculate the relative percent difference.

ACTION: Any gross variation between field duplicate results must be addressed in the reviewer narrative. However, if large differences exist, identification of field duplicates should be confirmed by contacting the sampler.

STANDARD OPERATING PROCEDURE

Page: 28 of -
Date: APR 15 1995
Number: SM-3
Revision: 2

Title: Attachment 2 - CLP Data Assessment Checklist: Short Form (GC/MS Analysts)

SURVEILLANCE AND MONITORING BRANCH REVIEW

Project Name/Site: TuTu / Supercat

Case Number: 12058.

Type Investigation (Circle One): Remedial Site Other: CDM / Rem. Oversight

Contract No.: 68-D9-0028.

Laboratory: Ceimic

Sample Identification Numbers:

Aqueous: None.

Soil/Sediment: 32 — BT-749; Bx-267-268; 264, 263, 265-266, 126; Bx-992; 997-998; 976-977; 983; 978; BT-748, 747; By-704; 710-711. By-760-761; 759, 765; 984; 770-774, 769, 775

Superfund Account No.:

Comments: Blank. BT-749 - Bx-264. None By-772 - By-774.

TUT 001 0263

CEIMIC CORPORATION

12058 organic

August 4, 1989

USEPA Contract Laboratory Program
209 Madison Street, Suite 200
Alexandria, VA 22314
ATTN: Muhannad Kanaan

Dear Muhannad:

Enclosed is the resubmitted diskette and documentation for EPA case 12058, SDG BT747 and BX978. Please replace the resubmitted page for that arriving with the original datapack. This diskette contains the fractions VOA, BNA and Pests. Sample BY770 will not be reanalyzed.

Thank you for your time in this matter. If you have any questions, please do not hesitate to call.

Kindest Regards,

Veronica Moretti

Veronica Moretti
Document Control

Encl.

cc: USEPA EMSL-LV
USEPA Region II

100 Dean Knauss Drive, Narragansett, R.I. 02882 • (401) 782-8900 • FAX (401) 782-8905

SAMPLE DATA PACKAGE

Case 12058

SDG BT747

SAMPLE DATA PACKAGE

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(3) Reconstructed Total Ion Chromatograms (RIC) for each sample or extract	
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d. TCL Spectra with Lab Generated Standards	
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(3) Matrix Spike Data	
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SAMPLE DATA PACKAGE

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      (4) GC/MS Tuning and Mass Calibration (Form 5 SV)
      (5) Internal Standard Area Summary (FORM 7 SV)

   b. Sample Data 467
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      (2) Tentatively Identified Compounds (FORM 1 SV-TIC)
      (3) Reconstructed Total Ion Chromatograms (RIC) for each sample or extract

   c. Standards Data 634
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         a. Bar Graph Spectrum
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         a. Tabulated Results of Nonspiked TCL Compound (FORM 1)
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SAMPLE DATA PACKAGE

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CASE NARRATIVE

2. TRAFFIC REPORTS

USEPA CONTRACT LABORATORY PROGRAM
SAMPLE MANAGEMENT OFFICE
P.O. BOX 818 ALEXANDRIA, VA 22313
703/557-2490 FTS-557-2490

CASE NO: 12058 | SAS NO: (IF APPLICABLE)

ORGANIC TRAFFIC REPORT
(FOR CLP USE ONLY)

TYPE OF ACTIVITY (CIRCLE ONE) ①
SUPERFUND—PA SI ESI RIFS RD RA ER
NPLD O&M OTHER RD
NON-SUPERFUND—_____PROGRAM

SAMPLE DESCRIPTION
(ENTER IN BOX A)
1. SURFACE WATER 4. SOIL
2. GROUND WATER 5. SEDIMENT
3. LEACHATE 6. OIL (SAS)
7. WASTE (SAS)

REGION NO: 2 SAMPLING COMPANY ② CDM-FPC
SAMPLER: (NAME) Susan Cantz

SHIP TO: ③
Ceimic
100 Dean Knauss Dr
South Ferry Indus. Park
Narragansett R.I. 02882
ATTN: Veronica Moretti

SAMPLING DATE: 6/6/89 ④
BEGIN: 0900 END: 1400

DATE SHIPPED: 6/8/89 CARRIER: UPS
AIRBILL NO:

DATE REC'D: 6/8/89 SDG NO: ⑥ BT747
REC'D BY: Veronica Moretti
LABORATORY CONTRACT NO. 68D90028 UNIT PRICE 737

TRANSFER TO: DATE REC'D: ⑦
REC'D BY: CONTRACT NO./PRICE:

CLP SAMPLE NUMBER (FROM LABELS)	A SAMPLE DESCRIPTION (FROM BOX 1) 1 2 3 4 5 6 7	B CONCENTRATION L = LOW/MED H = HIGH (SAS)	C RAS ANALYSIS: VOLATILE	BASE/NEUT /ACID	PESTICIDE /PCB's		D SPECIAL HANDLING	E STATION LOCATION	F SAMPLE CONDITION ON RECEIPT	G HIGH CONC. PHASES (CHECK): SOLID	WATER—MIS LIQUID	NON WATER—MIS LIQUID
BT749	4	L	X					SP2-031D				
BX268	4	L	X					SP2-023				
BX267	4	L	X					SP2-022				
BX264	4	L	X					SP2-031				
BT748	4	L	X					SP2-033				
BT747	4	L	X					SP2-032				
BX263	4	L	X					SP2-021				
BX265	4	L	X					SP2-012				
BX266	4	L	X					SP2-013				
BX262	4	L	X					SP2-011				
BY761	4	L	X	→	→	→	→	EL-02-035	→ written on the			
BT749	4	L		X	X			SP2-03D	Mas full organic			
BX263	4	L		X	X			SP2-02				
BY760	4	L	X					EL-02-025				
BX264	4	L		X	X			SP2-03				
BX262	4	L		X	X			SP2-01				
BY760	4	L		X	X			EL-02-025				
BX992	4	L	X					EL-02-055				
BY759	4	L	X					EL-02-015				
BY759	4	L		X	X			EL-02-015				

EPA Form 2075-7 (8-87)

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TUT 001 0271

USEPA CONTRACT LABORATORY PROGRAM
SAMPLE MANAGEMENT OFFICE
P.O. BOX 818 ALEXANDRIA, VA 22313
703/557-2490 FTS-557-2490

CASE NO: 12058 | SAS NO: (IF APPLICABLE)

ORGANIC TRAFFIC REPORT
(FOR CLP USE ONLY)

TYPE OF ACTIVITY (CIRCLE ONE) ①
SUPERFUND—PA SI ESI RIFS RD RA ER
NPLD O&M OTHER
NON-SUPERFUND—_____ PROGRAM

SAMPLE DESCRIPTION (ENTER IN BOX A)
1. SURFACE WATER 4. SOIL
2. GROUND WATER 5. SEDIMENT
3. LEACHATE 6. OIL (SAS)
7. WASTE (SAS)

REGION NO: SAMPLING COMPANY ②
I CDM FRC
SAMPLER: (NAME) Susan Canton

SHIP TO: ③
Ceimic
100 Dean Knauss Dr.
South Terry Indus Park
Narragansett RI 02882
ATTN: Veronica Moretti

SAMPLING DATE: 6-7-89 ④
BEGIN: _____ END: _____
DATE SHIPPED: 6-8-89 CARRIER: US Mail ⑥
AIRBILL NO: ~~953147028~~ 098-44688

DATE REC'D: 6/10/89 SDG NO: ⑤ See below
REC'D BY: Veronica Moretti
LABORATORY CONTRACT NO. UNIT PRICE
68D90028 737

TRANSFER TO: DATE REC'D: ⑦
REC'D BY: CONTRACT NO./PRICE:

SAMPLE NUMBER (FROM LABELS)	A SAMPLE DESCRIPTION (FROM BOX 1) 1 2 3 4 5 6 7	B CONCENTRATION L = LOW/MED H = HIGH (SAS)	C RAS ANALYSIS: VOLATILE	BASE/NEUT /ACID	PESTICIDE /PCB's	D SPECIAL HANDLING	E STATION LOCATION	F SAMPLE CONDITION ON RECEIPT	G HIGH CONC PHASES (CHECK): SOLID	WATER—MIS LIQUID	NON WATER—MIS LIQUID
BX997	4	L	X	X	X	SDG BT747	ESC-02-05	SDG BX984			
BX998	4	L	X	X	X	" BT747	ESC-02-05 (MW)	" BX984			
BX976	4	L	X	X	X	" BT747	ESC-02-05	" BT747			
BX977	4	L	X	X	X	" BT747	ESC-02-05	" BT747			
BX983	4	L	X	X	X	" (MW)	ESC-02-05	" BT747			
BX978	4	L	X	X	X	"	ESC-02-05	" BT747 (MW)			

SAMPLE	SDG
BX997 →	BX978
BX998	"
BX976	BT747
BX977	"
BX983	BX978
BX978	BX978

BX977 SDG BT747 First Sample

EPA Form 2075-7 (8-87)

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TLF 001 0272

SAMPLE MANAGEMENT OFFICE
P.O. BOX 818 ALEXANDRIA, VA 22313
703/557-2490 FTS-557-2490

CASE NO: 12058 | SAS NO: (IF APPLICABLE)

ORGANIC TRAFFIC REPORT
(FOR CLP USE ONLY)

TYPE OF ACTIVITY (CIRCLE ONE) ①
SUPERFUND—PA SI ES RIFS RD RA ER
NPLD O&M OTHER
NON-SUPERFUND—_____ PROGRAM

SAMPLE DESCRIPTION
(ENTER IN BOX A)
1. SURFACE WATER 4. SOIL
2. GROUND WATER 5. SEDIMENT
3. LEACHATE 6. OIL (SAS)
7. WASTE (SAS)

REGION NO: 2 SAMPLING COMPANY ② CDMFRC
SAMPLER: (NAME) Susan Otten

SHIP TO ③ Ceimic
100 Dean Krauss Dr.
South Terry Indus. Park
Narragansett RI. 02882
ATTN: Veronica Moretti

SAMPLING DATE: 6-8-89 ④
BEGIN: 0830 END: 0910

DATE SHIPPED: 6-8-89 CARRIER: USPS
AIRBILL NO: 09844688Y

DATE REC'D: 6/10/89 SDG NO: ⑤ BX984 BX978
REC'D BY: Veronica Moretti
LABORATORY CONTRACT NO. 68D90028 UNIT PRICE B7

TRANSFER TO: DATE REC'D: ⑦
REC'D BY: CONTRACT NO./PRICE:

CLP SAMPLE NUMBER (FROM LABELS)	Ⓐ SAMPLE DESCRIPTION (FROM BOX 1) 1 2 3 4 5 6 7	Ⓑ CONCENTRATION L = LOW/MED H = HIGH (SAS)	Ⓒ RAS ANALYSIS: VOLATILE	BASE/NEUT /ACID	PESTICIDE /PCB's	Ⓓ SPECIAL HANDLING	Ⓔ STATION LOCATION	Ⓕ SAMPLE CONDITION ON RECEIPT	Ⓖ HIGH CONC. PHASES (CHECK): SOLID	WATER—MIS LIQUID	NON WATER—MIS LIQUID
BX984 *	4	L	X	X	X		CR-02-015	Bottle (jar) is marked BX984. Should read BX988			

EPA Form 2075-7 (8-87)

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WHITE — SMO COPY PINK — CLIENT COPY WHITE — LAB COPY FOR RETURN TO SMO YELLOW — LAB COPY

TUT 001 0273

USEPA CONTRACT LABORATORY PROGRAM
SAMPLE MANAGEMENT OFFICE
P.O. BOX 818 ALEXANDRIA, VA 22313
703/557-2490 FTS-557-2490

CASE NO: 12058 | SAS NO: (IF APPLICABLE)

ORGANIC TRAFFIC REPORT
(FOR CLP USE ONLY)

TYPE OF ACTIVITY (CIRCLE ONE) ①
SUPERFUND—PA SI ESI RIFS RD RA ER
NPLD O&M OTHER _____
NON-SUPERFUND—_____PROGRAM

SAMPLE DESCRIPTION
(ENTER IN BOX A)
1. SURFACE WATER 5. SEDIMENT
2. GROUND WATER 6. OIL (SAS)
3. LEACHATE 7. WASTE (SAS)
4. SOIL

REGION NO: II SAMPLING COMPANY ② CDM FRC

SAMPLER: (NAME) Joe Claypoole

SHIP TO: ③
Ceimic
100 Deankguss Dr.
South Terry Indus. Park
Narragansett, RI 02882
ATTN:

SAMPLING DATE: 6/6/89 ④
BEGIN: _____ END: _____

DATE SHIPPED: 6/8/89 CARRIER: US Mail ⑤
Express Mail
AIRBILL NO: 098446884

DATE REC'D: 6/10/89 SDG NO: ⑥ BT747
REC'D BY: Veronica Mouth
LABORATORY CONTRACT NO. 68D90008 UNIT PRICE 737

TRANSFER TO: DATE REC'D: ⑦
REC'D BY: CONTRACT NO./PRICE:

CLP SAMPLE NUMBER (FROM LABELS)	Ⓐ SAMPLE DESCRIPTION (FROM BOX 1) 1 2 3 4 5 6 7	Ⓑ CONCENTRATION L = LOW/MED H = HIGH (SAS)	Ⓒ RAS ANALYSIS: VOLATILE	BASE/NEUT /ACID	PESTICIDE /PCB's		Ⓓ SPECIAL HANDLING	Ⓔ STATION LOCATION	Ⓕ SAMPLE CONDITION ON RECEIPT	Ⓖ HIGH CONC. PHASES (CHECK): SOLID	WATER—MIS LIQUID	NON WATER—MIS LIQUID
RV 761	4	L	X	X	X		*	ek 02-035				
							↓					
							VOA analysis with					
							on another TR also					

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TUT 001 0274

USEPA CONTRACT LABORATORY PROGRAM
SAMPLE MANAGEMENT OFFICE
P.O. BOX 818 ALEXANDRIA, VA 22313
703/557-2490 FTS-557-2490

CASE NO: 12058 | SAS NO: (IF APPLICABLE)

ORGANIC TRAFFIC REPORT
(FOR CLP USE ONLY)

TYPE OF ACTIVITY (CIRCLE ONE) ①
SUPERFUND—PA SI ESI RIFS RD RA ER
NPLD O&M OTHER
NON-SUPERFUND PROGRAM

SAMPLE DESCRIPTION (ENTER IN BOX A)
1. SURFACE WATER 4. SOIL
2. GROUND WATER 5. SEDIMENT
3. LEACHATE 6. OIL (SAS)
7. WASTE (SAS)

REGION NO: SAMPLING COMPANY ②
1 CDM FRC
SAMPLER: (NAME)

SHIP TO: ③
Ceimic
100 Post Kennedy Dr.
South Kerry Indus Park
Wallingford RI 02892
ATTN: Veronica Marth

SAMPLING DATE: 6-9-89 ④
BEGIN: END:

DATE SHIPPED 6/12 CARRIER Mail ⑤
AIRBILL NO: 805747377

DATE REC'D: 6/12/89 SDG NO: BX978 ⑥
REC'D BY:
LABORATORY CONTRACT NO. UNIT PRICE
68D90028 73

TRANSFER TO: DATE REC'D: ⑦
REC'D BY: CONTRACT NO./PRICE:

CLP SAMPLE NUMBER (FROM LABELS)	SAMPLE DESCRIPTION (FROM BOX 1) Ⓐ 1 2 3 4 5 6 7	CONCENTRATION L = LOW/MED H = HIGH (SAS) Ⓑ	RAS ANALYSIS Ⓒ VOLATILE	BASE/NEUT /ACID	PESTICIDE /PCB'S		SPECIAL HANDLING Ⓓ	STATION LOCATION Ⓔ	SAMPLE CONDITION ON RECEIPT Ⓕ	HIGH CONC PHASES (CHECK) Ⓖ SOLID	WATER—MIS LIQUID	NON WATER—MIS LIQUID
BX771				X	X			TE-X-02				
BX770				X	X			TE-X-03				
BX772				X	X			TE-X-04				
BX774				X	X			TE-X-04D				
BX773				X	X			TE-X-05				
BX769				X	X			TE-X-06				
BX775				X	X			TE-X-07				
						X						

EPA Form 2075-7 (8-87)

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WHITE — SMO COPY PINK — CLIENT COPY WHITE — LAB COPY FOR RETURN TO SMO 150 YELLOW — LAB COPY

TUT 001 0275

USEPA CONTRACT LABORATORY PROGRAM
SAMPLE MANAGEMENT OFFICE
P.O. BOX 818 ALEXANDRIA, VA 22313
703/557-2490 FTS-557-2490

CASE NO: 12058 | SAS NO: (IF APPLICABLE)

ORGANIC TRAFFIC REPORT
(FOR CLP USE ONLY)

TYPE OF ACTIVITY (CIRCLE ONE) ①
SUPERFUND—PA SI ESI RIFS RD RA ER
NPLD D&M OTHER
NON-SUPERFUND— PROGRAM

SAMPLE DESCRIPTION (ENTER IN BOX A)
1. SURFACE WATER 4. SOIL
2. GROUND WATER 5. SEDIMENT
3. LEACHATE 6. OIL (SAS)
7. WASTE (SAS)

REGION NO: II SAMPLING COMPANY ② CDM FRC
SAMPLER: (NAME) Susan Green

SHIP TO: ③ Ceimic
100 Dean Krauss Dr.
South Terry Indus. Park
Narragansett R.I 02882
401-782-8800
ATTN: Veronica Moretti

SAMPLING DATE: 6-8-89 ④
BEGIN: END:
DATE SHIPPED: 6/9/89 CARRIER: ⑤
Express Mail
AIRBILL NO: B057 4737 7

DATE REC'D: SDG NO: BX978 ⑥
REC'D BY: 6/10/89
LABORATORY CONTRACT NO: UNIT PRICE
TRANSFER TO: DATE REC'D: 6/13/89 ⑦
REC'D BY: CONTRACT NO./PRICE:

CLP SAMPLE NUMBER (FROM LABELS)	Ⓐ SAMPLE DESCRIPTION (FROM BOX 1) 1 2 3 4 5 6 7	Ⓑ CONCENTRATION L = LOW/MED H = HIGH (SAS)	Ⓒ RAS ANALYSIS: VOLATILE	BASE/NEUT /ACID	PESTICIDE /PCB's		Ⓓ SPECIAL HANDLING	Ⓔ STATION LOCATION	Ⓕ SAMPLE CONDITION ON RECEIPT	Ⓖ HIGH CONC PHASES (CHECK): SOLID	WATER—MIS LIQUID	NON WATER—MIS LIQUID
BX761	4	L		X	X			TE-X-01				
BX765												
↓												
Collected Water & Soil Samples by Claire Baker												

EPA Form 2075-7 (8-87)

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WHITE — SMO COPY PINK — CLIENT COPY WHITE — LAB COPY FOR RETURN TO SMO YELLOW — LAB COPY

TUT 001 0276

USEPA CONTRACT LABORATORY PROGRAM
SAMPLE MANAGEMENT OFFICE
P.O. BOX 818 ALEXANDRIA, VA 22313
703/557-2490 FTS-557-2490

CASE NO: 12008 | SAS NO: (IF APPLICABLE)

ORGANIC TRAFFIC REPORT
(FOR CLP USE ONLY)

TYPE OF ACTIVITY (CIRCLE ONE) ①
SUPERFUND—PA SI ES BIES RD RA ER
NPLD O&M OTHER
NON-SUPERFUND PROGRAM

SAMPLE DESCRIPTION (ENTER IN BOX A)
1. SURFACE WATER 4. SOIL
2. GROUND WATER 5. SEDIMENT
3. LEACHATE 6. OIL (SAS)
7. WASTE (SAS)

REGION NO: II SAMPLING COMPANY: ② CDM FRC
SAMPLER: (NAME) Susan Orton

SHIP TO: ③ Ceimic
DO Dean Krauss Dr.
South Ferry Indus Park
Narragansett RI. 02882
ATTN: Veronica Morelli

SAMPLING DATE: 6/10/89 ④
BEGIN: 0900 END: 1500

DATE SHIPPED: 6/13/89 CARRIER: Mid ⑤
AIRBILL NO: 8007473457

DATE REC'D: 6/13 SDG NO: ⑥ BX918
REC'D BY:
LABORATORY CONTRACT NO. UNIT PRICE
68D90028

TRANSFER TO: DATE REC'D: ⑦
REC'D BY: CONTRACT NO./PRICE:

CLP SAMPLE NUMBER (FROM LABELS)	Ⓐ SAMPLE DESCRIPTION (FROM BOX 1) 1 2 3 4 5 6	Ⓑ CONCENTRATION L = LOW/MED, H = HIGH (SAS)	Ⓒ RAS ANALYSIS: VOLATILE	BASE/NEUT /ACID	PESTICIDE /PCB's		Ⓓ SPECIAL HANDLING	Ⓔ STATION LOCATION	Ⓕ SAMPLE CONDITION ON RECEIPT	Ⓖ HIGH CONC PHASES (CHECK): SOLID	WATER—MIS LIQUID	NON WATER—MIS LIQUID
BY704	4	L		X	X			ESP-01				
BY710*	4	L		X	X			ESP-02				
BY711	4	L		X	X			ESP-03				

*3 sample was assigned for this one sample. Sam Babcock instructed to keep the two extra vials similar and to discard the third.

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TUT 001 0277

VOLATILES

a. QC Summary

BT747

SOIL VOLATILE SURROGATE RECOVERY

Lab Name: CEIMIC Contract: 68D90085

Lab Code: CEIMIC Case No.: 12050 SAS No.: _____ SDG No.: BT747

Level: (Low/Med) LOW

	EPA SAMPLE NO.	S1 (TOL)#	S2 (BFB)#	S3 (DCE)#	OTHER	TOT OUT
01	BT747	105	96	97		0
02	BT748	104	97	98		0
03	BT749	104	95	96		0
04	BX262	106	90	98		0
05	BX263	106	90	99		0
06	BX264	101	90	95		0
07	BX265	101	89	96		0
08	BX266	104	88	95		0
09	BX267	105	88	94		0
10	BX268	104	85	96		0
11	BX976	115	91	103		0
12	BX977	102	95	88		0
13	BX978	102	95	103		0
14	BY759	113	88	91		0
15	BY760	101	95	100		0
16	BY761	116	81	92		0
17	BX266MS	103	85	95		0
18	BX266MSD	106	89	92		0
19	VBLK01	105	100	100		0
20	VBLK02	104	97	100		0
21	VBLK03	102	97	95		0
22	VBLK04	103	95	95		0
23	VBLK05	98	96	91		0
24	VBLK06	103	100	102		0

	QC LIMITS
S1 (TOL) = Toluene-d8	(81-117)
S2 (BFB) = Bromofluorobenzene	(74-121)
S3 (DCE) = 1,2-Dichloroethane-d4	(70-121)

* Column to be used to flag recovery values

\# Values outside of contract required QC limits

D Surrogates diluted out

VOLATILE HALOGENATED SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

Lab Name: TRIMIC CORP Contract: 68D90029

Lab Code: TRIMIC Case No.: 10158 SAS No.: _____ SDG No.: PT747

Matrix Spike - EPA Sample No.: SX044 Level: (low/med) LOW

COMPOUND	SPIKE ADDED (ug/Kg)	SAMPLE CONCENTRATION (ug/Kg)	MS CONCENTRATION (ug/Kg)	MS % REC #	QC LIMITS REC.
1,1-Dichloroethene	56.2	0	72.0	128	59-172
Trichloroethene	56.2	0	70.1	125	62-137
Benzene	56.2	0	64.7	115	66-142
Toluene	56.2	0	60.2	107	59-139
Chlorobenzene	56.2	0	67.9	121	60-133

COMPOUND	SPIKE ADDED (ug/Kg)	MSD CONCENTRATION (ug/Kg)	MSD % REC #	% RPD #	QC LIMITS RPD	QC LIMITS REC.
1,1-Dichloroethene	56.2	61.7	109	16	22	59-172
Trichloroethene	56.2	60.4	108	15	24	62-137
Benzene	56.2	57.8	103	11	21	66-142
Toluene	56.2	55.1	100	11	21	59-139
Chlorobenzene	56.2	55.8	100	19	21	60-133

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

RPD: 0 out of 5 outside limits
Spike Recovery: 0 out of 10 outside limits

COMMENTS:

VOLATILE METHOD BLANK SUMMARY

Lab Name: SEIMIC CORP Contract: SEDS0009

Lab Code: SEIMIC Case No.: 12050 SAS No.: _____ SDG No.: ET747

Lab File ID: G0748 Lab Sample ID: V0706A15-B1

Date Analyzed: 06/15/89 Time Analyzed: 1442

Matrix: (soil/water) SOIL Level:(low/med) LOW

Instrument ID: MS3

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS AND MSD:

	EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	TIME ANALYZED
1	ET747	890107-01	G0754	2145
2	ET746	890107-02	G0755	2136
3	ET748	890107-03	G0756	2233
4	DX142	890107-04	G0757	2315

COMMENTS:

VOLATILE METHOD BLANK SUMMARY

Lab Name: CEIMIC CORP Contract: ASD20208

Lab Code: CEIMIC Case No.: 12058 SAS No.: _____ SDG No.: BTZ47

Lab File ID: C0361 Lab Sample ID: VTC616-52

Date Analyzed: 06/16/89 Time Analyzed: 1229

Matrix: (soil/water) SOIL Level:(low/med) LOW

Instrument ID: MS3

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS AND MSD:

	EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	TIME ANALYZED
01	BXC67	890107-15	C0362	1405
02	BXC64	890107-16	C0363	1451
03	BXC65	890107-17	C0364	1455
04	BXC66	890107-08	C0365	1715
05	BXC67	890107-09	C0366	1940
06	BXC66MS	890107-08MS	C0366	1808

COMMENTS:

VOLATILE METHOD BLANK SUMMARY

Lab Name: CHMIC CORP Contract: 68D70038

Lab Code: CHMIC Case No.: 10956 SAS No.: _____ SDG No.: BT747

Lab File ID: D0773 Lab Sample ID: V30617-MB

Date Analyzed: 06/17/89 Time Analyzed: 1212

Matrix: (soil/water) SOIL Level: (low/med) LOW

Instrument ID: MS3

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS AND MSD:

	EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	TIME ANALYZED
11	BX0L8	890107-10	D0774	1415
12	BX66MSD	890107-08MSD	D0773	1327

COMMENTS:

4A

VOLATILE METHOD BLANK SUMMARY

Lab Name: CEIMIC CORP Contract: 68D90028

Lab Code: CEINIC Case No.: 13058 SAS No.: _____ SDG No.: BT747

Lab File ID: C0386 Lab Sample ID: 890107-04

Date Analyzed: 06/18/89 Time Analyzed: 1246

Matrix: (soil/water) SOIL Level:(low/med) LOW

Instrument ID: MS3

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS AND MSD:

	EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	TIME ANALYZED
01	BX792	890107-11	C0385	2157
02	BY755	890107-12	C0389	1514
03	BY760	890107-13	C0393	1949
04	BY761	890107-14	C0387	1340

COMMENTS:

160

4A

VOLATILE METHOD BLANK SUMMARY

Lab Name: CRINIC CORP Contract: 68D90008

Lab Code: CRINIC Case No.: 12058 SAS No.: _____ SDG No.: BT747

Lab File ID: C0399 Lab Sample ID: VB0619-B1

Date Analyzed: 06/19/89 Time Analyzed: 1355

Matrix: (soil/water) SOIL Level:(low/med) LOW

Instrument ID: MS3

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS AND MSD:

	EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	TIME ANALYZED
01	BT977	890107-16	C0400	2021

COMMENTS:

161

4A

VOLATILE METHOD BLANK SUMMARY

Lab Name: CEIMIC CORP Contract: 68D90028

Lab Code: CEIMIC Case No.: 12058 SAS No.: _____ SDG No.: BT747

Lab File ID: B1650 Lab Sample ID: V0619-B1

Date Analyzed: 06/19/89 Time Analyzed: 1414

Matrix: (soil/water) SOIL Level:(low/med) LOW

Instrument ID: MS2

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS AND MSD:

	EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	TIME ANALYZED
01	BX976	890107-15	B1651	1555

COMMENTS:

TOTAL REVIEW

CLP DATA ASSESSMENT

Functional Guidelines for Evaluating Organic Analysis

Case No. 12058 SDG No. BT747 & BX978 LABORATORY CEIMIC SITE Tutu

DATA ASSESSMENT:

The current functional guidelines (1988) for evaluating organic data have been applied.

All data are valid and acceptable except those analytes which have been qualified with a "J" (estimated), "U" (non-detects), "R" (unusable), or "JN" (presumptive evidence for the presence of the material at an estimated value). All action is detailed on the attached sheets.

Two facts should be noted by all data users. First, the "R" flag means that the associated value is unusable. In other words, due to significant QC problems the analysis is invalid and provides no information as to whether the compound is present or not. "R" values should not appear on data tables because they cannot be relies upon, even as a last resort. The second fact to keep in mind is that no compound concentration, even if it has passed all QC tests, is guaranteed to be accurate. Strict QC serves to increase confidence in data but any value potentially contains error.

Reviewer's Signature: Rhonda Carter Date 4/15/1990

Verified By: David E Mroball Date 6/11/1990

DATA ASSESSMENT:

1. HOLDING TIME:

The amount of an analyte in a sample can change with time due to chemical instability, degradation, volatilization, etc. If the specified holding time is exceeded, the data may not be valid. Those analytes detected in the samples whose holding time has been exceeded will be qualified as estimated, "J". The non-detects (sample quantitation limits) will be flagged as estimated, "J", or unusable, "R", if the holding times are grossly exceeded.

The following action was taken in the samples and analytes due to excessive holding time.

SDG No.- BT747

VOA- All analytes in samples BX976, 977 were flagged J.
All analytes (except methylene chloride) in samples BX992, BY759, 760 and 761 were flagged J.

SDG No.- BX978

VOA- All analytes in samples BX978, 983, 984, 997 and 998 were flagged J.

Sample BX268 was analyzed one day beyond holding time, but no data qualification is deemed necessary. DEe

DATA ASSESSMENT:

2. BLANK CONTAMINATION:

Quality assurance (QA) blanks, i.e., method, trip, field, rinse and water blanks are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Trip blanks measure cross-contamination of samples during shipment. Field blanks measure cross-contamination of samples during field operations. If the concentration of the analyte is less than 5 times the blank contaminant level (10 times for the common contaminants), the analytes in the samples shown were qualified with "U" for these reasons:

A) Method blank contamination

SDG No.- BT747

VOA- Acetone was flagged U in samples BT747,749, BX262, 992, BY759, 760 and 761. Methylene Chloride was flagged U in sample BX977. One TIC was flagged R in Samples BX761 and BY759, two TICs were flagged R in sample BY760.
BNA- Two TICs were flagged R in samples BT749, BX262, 263, 264, 977 and BY761 and one TIC was flagged R in samples BY760 and BX976.

SDG No.- BX978

VOA- Methylene Chloride was flagged U in sample BX978. Acetone was flagged U in samples BX984, 997 and 998.
BNA- One TIC was flagged R in samples BX983, 984, 997, 998, BY704, 710, BY711, 765, 769, 771, 773 and 775. Two TICs were flagged R in samples BX978, BY772 and 774.

Both SDGs: Note that no field or trip blanks are associated with these samples.

DATA ASSESSMENT:

4. CALIBRATION:

Satisfactory instrument calibration is established to ensure that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of giving acceptable performance at the beginning of an experimental sequence. The continuing calibration checks document that the instrument is giving satisfactory daily performance.

A) RESPONSE FACTOR:

The response factor measures the instrument's response to specific chemical compounds. The response factor for the Target Compound List (TCL) must be $\geq$ 0.05 in both the initial and continuing calibrations. A value < 0.05 indicates a serious detection and quantitation problem (poor sensitivity). Analytes detected in the sample will be qualified as estimated, "J". All non-detects for that compound will be rejected, "R".

SDG No.- BT747

VOA- 2-Butanone was flagged R in sample BX268.

DATA ASSESSMENT:

5. CALIBRATION:

A) PERCENT RELATIVE STANDARD DEVIATION (%RSD) AND PERCENT DIFFERENCE (%D):

Percent RSD is calculated from the initial calibration and is used to indicate the stability of the specific compound response factor over increasing concentration. Percent D compares the response factor of the continuing calibration check to the mean response factor (RRF) from the initial calibration. Percent D is a measure of the instrument's daily performance. Percent RSD must be <30% and %D must be <25%. A value outside of these limits indicates potential detection and quantitation errors. For these reasons, all positive results are flagged as estimated, "J" and non-detects are flagged "UJ" (if %D or RSD >50%). If there is a gross deviation of %RSD and %D, the non-detects may be rejected, "R".

For the PCB/PESTICIDE fraction, %RSD for aldrin, endrin, DDT, and dibutylchlorendate must not exceed 10%. Percent D must be within 15% on the quantitation column and 20% on the confirmation column.

SDG No.- BT747

VOA- cis-1,3-Dichloropropene was flagged J in samples BT747, 748, 749, BY759, 760, 761, BX262,263, 264,265, 266, 268, 267 977and 992. Methylene chloride was flagged J in samples BT747, 748,749, BX262, 263, 264, 265 and 267. Acetone was flagged J in samples BX267 and 976. Methylene choride was flagged R in samples BX992, BY759, 760 and 761.

BNA- Benzyl alcohol was flagged J in sample BX977.

SDG No.- BX978

VOA- cis-1,3-Dichloropropene was outside of QC criteria in samples BX978, 983, 984, 997 and 998 and methylene chloride in BX983, 984, 997 and 998 no action was taken because the samples were previously qualified due to holding time exceedance. Vinyl acetate was also outside the QC criteria in samples BX983, 984, 997 and 998, no action was taken because the samples were previously qualified due to holding time exceedance.

BNA- Di-n-Butylphthlate was flagged J in sample BX997. Benzyl alcohol was flagged J in samples BY704, 710, 765, 769, 771 and BX983.

DATA ASSESSMENT:

6. SURROGATES:

All samples are spiked with surrogate compounds prior to sample preparation to evaluate overall laboratory performance and efficiency of the analytical technique. If the measured surrogate concentrations were outside contract specifications, qualifications were applied to the samples and analytes as shown below.

SDG No.- BX978

VOA- One surrogate spike in sample BX998 was outside of QC criteria, no action was taken because data was previously qualified for holding time exceedance.

DATA ASSESSMENT:

7. INTERNAL STANDARDS PERFORMANCE

Internal standard (IS) performance criteria ensure that the GC/MS sensitivity and response are stable during every experimental run. The internal standard area count must not vary by more than a factor of 2 (-50% to +100%) from the associated continuing calibration standard. The retention time of the internal standard must not vary more than ±30 seconds from the associated continuing calibration standard. If the area count is outside the (-50% to +100%) range of the associated standard, all of the positive results for compounds quantitated using that IS are qualified as estimated, "J", and all non-detects as "UJ" or "R" if there is a severe loss of sensitivity.

If an internal standard retention time varies by more than 30 seconds, the reviewer will use professional judgment to determine either partial or total rejection of the data for that sample fraction.

SDG No.- BX978

VOA- 4-Methyl-2-pentanone, 2-hexanone, tetrachloroethene, 1,1,2,2-tetrachloroethane, toluene, chlorobenzene, ethylbenzene, styrene and total xylenes in sample BX998 have already been qualifed due to holding time exceedance.

BNA- Di-n-octyl phthalate, benzo(B)fluroanthene, benzo(k)flouranthene, benzo(a)pyrene, indeno(1,2,3-cd)pyrene, dibenz(a,h)anthracene and benzo(g,h,i)perylene was flagged J in sample BX978.

DATA ASSESSMENT:

8. COMPOUND IDENTIFICATION:

A) VOLATILE AND SEMI-VOLATILE FRACTIONS:

TCL compounds are identified on the GC/MS by using the analyte's relative retention time (RRT) and by comparison to the ion spectra obtained from known standards. For the results to be a positive hit, the sample peak must be within ±0.06 RRT units of the standard compound and have an ion spectrum which has a ratio of the primary and secondary m/e intensities within 20% of that in the standard compound. For the tentatively identified compounds (TIC) the ion spectra must match accurately. In the cases in which there is not and adequate ion spectrum match, the laboratory may have provided false positive identification.*

B) PESTICIDE FRACTION:

The retention times of reported compounds must fall within the calculated retention time windows for the two chromatographic columns and a GC/MS confirmation is required if the concentration exceeds 10 ng/ml in the final sample extract.

SDG BT747

VOA- Phenol was rejected as a TIC in samples BY759 and 760 because it is a BNA TCL compound.
Due to missing spectra the following analytes were flagged N; carbon tetrachloride and trichloroethene in sample BX267, benzene and chlorobenzene in sample BX 268, acetone in sample BX976 and toluene in BY759.

Pest- %D was outside of QC limits on the primary column for sample BY759 no action was taken because %D was within control limits on the secondary column.

SDG BX978

Pest- ~~All analytes were flagged R in sample BX997 because %D was outside QC criteria on both the primary and secondary columns.~~ %D was outside of QC limits on the primary column for sample BX997 ← BX984 no action was taken because %D was within control limits on the secondary column.

*All TIC compound results (VOA and BNA) are flagged "J" (estimated), and also "N" (presumptive evidence of the presence of the compound) if an identification is made, to reflect the qualitative and quantitative error inherent in the analysis of compounds without corresponding calibration standards.

DATA ASSESSMENT:

9. MATRIX SPIKE/SPIKE DUPLICATE, MS/MSD:

The MS/MSD data are generated to determine the long-term precision and accuracy of the analytical method in various matrices. The MS/MSD may be used in conjunction with other QC criteria for some additional qualification of the data.

SDG No.- BT747

BNA- 1,4-dichlorobenzene, 4-nitrophenol, 2,4-dinitrotoluene and pentachorophenol were flagged R in sample BY759.

SDG No.- BX978

Pest- In sample BY775 gamma-BHC, heptachlor, aldrin, dieldrin, endrin and 4,4-DDT were outside of QC criteria, however no action was needed, ~~sample was previously qualified for surrogate recovery~~.

DATA ASSESSMENT:

10. OTHER QC DATA OUT OF SPECIFICATION:

SDG BX978

BNA- Naphthalene and 2-Methylnaphthalene results in sample BY770 and 4-methylphenol in BY759 exceeded calibration range but the lab did not reanalyze (as required by the SOW). Therefore these values were flagged "J".

11. SYSTEM PERFORMANCE AND OVERALL ASSESSMENT (continued on next page if necessary):

Lab failed to complete Form IX for secondary column, and the lab also indicated on all Form IXs (primary and secondary) that both columns were used for quantitation.

Reviewer was unable to exactly reproduce reported CRDLs, however differences were small and no data qualification is required.

12. CONTRACT PROBLEMS / NON-COMPLIANCE:

SDG BT747

VOA- Lab used X as a qualifier but did not define it in the narrative. Reviewer contacted lab to determine the definition of X (see attached phone log) as a result, reviewer flagged the positive Naphthalene results "J" in sample BY765.

No spectrum was supplied to support the identification of octadecane in BX263.

SDG BX978

BNA- Lab failed to flag internal standard out of QC limits for sample BX978, reviewer corrected.

Both SDGs-

Lab used qualifier "B" for TICs that were not found in the laboratory method blanks. These were removed by the reviever

13. This package contains re-extraction, re-analysis or dilution. Upon revieving the QA results, the following form I(s) are identified to be used.

Form I's are clearly marked.

DPO: [ ] ACTION [ ] FYI Region II

ORGANIC REGIONAL DATA ASSESSMENT SUMMARY

CASE NO. 12058 LABORATORY CEIMIC

SDG NO. BT747 + BX978 DATA USER

SOW 2/88 REVIEW COMPLETION DATE 4/23/90

NO. OF SAMPLES ____ WATER 32 SOIL ____ OTHER

REVIEWER [ ] ESD [ ] ESAT [ ] OTHER, CONTRACT/CONTRACTOR CDM

	VOA	BNA	PEST	OTHER
1. HOLDING TIMES	M	O	O	N/A
2. GC-MS TUNE/ GC PERFORMANCE	O			
3. INITIAL CALIBRATIONS				
4. CONTINUING CALIBRATIONS	Z	X		
5. FIELD BLANKS ("F" = not applicable)	O	O		
6. LABORATORY BLANKS	X			
7. SURROGATES	O			
8. MATRIX SPIKE/DUPLICATES	X			
9. REGIONAL QC ("F" = not applicable)	O			
10. INTERNAL STANDARDS		X		
11. COMPOUND IDENTIFICATION		O	Z	
12. COMPOUND QUANTITATION			O	
13. SYSTEM PERFORMANCE				
14. OVERALL ASSESSMENT	Z	X	Z	

O = No problems or minor problems that do not affect data usability.
X = No more than *about* 5% of the data points are qualified as either estimated or unusable.
M = More than *about* 5% of the data points are qualified as estimated.
Z = More than *about* 5% of the data points are qualified as unusable.

DPO ACTION ITEMS: _____

AREAS OF CONCERN: _____

TUT 001 0297

In Reference to Case No(s):
12058

Contract Laboratory Program
REGIONAL/LABORATORY COMMUNICATION SYSTEM
Telephone Record Log

Date of Call: 4/17/90

Laboratory Name: CEIMIC
Lab Contact: Kin S Chiu

Region: II
Regional Contact: R. Carter

Call Initiated By: ___ Laboratory ✓ Region

In reference to data for the following sample number(s):
VOA + ~~BNA~~ Fractions all samples
VOA SDG, BT747

Summary of Questions/Issues Discussed:
(1) Lab use X qualifier - does not provide explanation for qualifiers
(2) Please submit missing spectra (VOA), if available
Samples BX260 - carbon tetrachloride + trichloroethene
BX268 - benzene + chlorobenzene
BX976 - acetone
(3) Confirm RX calculation MSD chlorobenzene for BX266

Summary of Resolution:
See attached fax

R. Carter
Signature

4/17/90
Date

Distribution: (1) Lab Copy, (2) Region Copy, (3) SMO Copy

TIJT 001 0298

CEIMIC
CORPORATION

DATE: 4/17/90 FAX# 212-267-3057

TO: EPA - Region II
(COMPANY NAME)

ATTN: Rhonda Carter
(NAME)

FROM: Kin Chiu

NUMBER OF PAGES 1 (INCLUDING COVERSHEET)

RE:

COMMENTS/INSTRUCTIONS:

1) 'X' qualifier – in VOA analysis for xylenes, the isomers are added together for reporting purpose in FORM 1A

2) BX267 spectra missing for Carbontetrachloride and Trichloroethene
BX268 " " " Benzene and Chlorobenzene
BX976 " " " Acetone
These are not in original data; and if needed, CEIMIC can retri the information from the magnetic tapes. This will take a few days.

3) The recovery of chlorobenzene is confirmed to be 106% in BX266 MSD

400 Dean Knauss Drive, Narragansett, R.I. 02882 • (401) 782-8000 • FAX (401) 782-8015

TUT 001 0299

Kin Chiu

In Reference to Case No(s):
1205P

Contract Laboratory Program
REGIONAL/LABORATORY COMMUNICATION SYSTEM
Telephone Record Log

Date of Call: 1/29/90

Laboratory Name: CEIMIC
Lab Contact: Kin S Chiu (401) 782-8900

Region: II
Regional Contact: Rhonda Carter

Call Initiated By: ___ Laboratory ✓ Region

In reference to data for the following sample number(s):
All in BNA + Pest fraction
SDG BT747 - sample BY759

Summary of Questions/Issues Discussed:
BNA: Confirm CRQL and positive hit calculation
ie sample SDG - BX998 Phenol (CRQL) sample BT773
sample SDG - BT747 Phenol (positive hit) sample BY759

SDG-BT747 sample BY759MSD did lab use dilution of 210 or 200? [Form I states 200 raw data states 210]
VOA: Missing raw data for BFB/MS Tune of 6/16/89 12:22, please submit

Summary of Resolution:
BNA: Minor differences in calculations due to software formatting
② BY759 MSD dilution factor should be 200

VOA: Will fax missing raw data

Rhonda Carter — 1-29-90
Signature — Date

Distribution: (1) Lab Copy, (2) Region Copy, (3) SMO Copy

TUT 001 0300

CEIMIC
CORPORATION

DATE: 1/29/90 FAX# 1-212-267-3057

TO: EPA Region II
(COMPANY NAME)

ATTN: Rhonda
(NAME)

FROM: Kin Chiu

NUMBER OF PAGES 3 (INCLUDING COVERSHEET)

RE: BFB Tunes on 6/16/89

COMMENTS/INSTRUCTIONS:

100 Dean Knauss Drive, Narragansett, R.I. 02882 • (401) 782-8900 • FAX (401) 782-8905

TUT 001 0301

SOP NO. HW-6
Revision #6

CLP ORGANICS DATA REVIEW AND PRELIMINARY REVIEW

CONCURRED BY: _____ Date: 4/6/89
Louis Bevilacqua
Monitoring Management Branch

APPROVED BY: _____ Date: 4/14/89
Gerard F. McKenna, Chief
Monitoring Management Branch

TLIT 001 0302

PACKAGE COMPLETENESS AND DELIVERABLES

CASE NUMBER: 12058

LAB: CEIMIC

SITE: TUTTI

1.0 Data Completeness and Deliverables	YES	NO	N/A
1.1 Have any missing deliverables been received and added to the data package.	[✓]	___	___
ACTION: Call lab for explanation / resubmittal of any missing deliverables. If lab cannot provide them, note the effect on review of the package under the "Contract Problems/Non-compliance" section of reviewer narrative.			
1.2 Was SOW OCS checklist included with package?	[✓]	___	___
2.0 Cover Letter/Case Narrative			
2.1 Is the Narrative or Cover Letter present?	[✓]	___	___
2.2 Are Case Number and/or SAS number contained in the Narrative or Cover Letter?	[✓]	___	___

3.0 Data Validation Checklist

The following checklist is divided into three parts. Part A is filled out if the data package contains any VOA analyses, Part B for any BNA analyses and Part C for Pesticide/PCBs.

Does this package contain:

VOA data?	✓	___
BNA data?	✓	___
Pesticide/PCB data?	✓	___

ACTION: Complete corresponding parts of checklist.

	YES	NO	N/A

PART A: VOA ANALYSES

1.0 Traffic Reports and Laboratory Narrative

1.1 Are the Traffic Report Forms present for all samples? [✓] ___ ___

ACTION: If no, contact lab for replacement of missing or illegible copies.

1.2 Do the Traffic Reports or Lab Narrative indicate any problems with sample receipt, condition of samples, analytical problems or special notations affecting the quality of the data? ___ [✓] ___

ACTION: Use professional judgement to evaluate the effect on the quality of the data.

ACTION: If any sample analyzed as a soil contains more than 50% water, all data should be rejected.

ACTION: If both VOA vials for a sample have air bubbles, flag all positive results "J" and all non-detects "R".

2.0 Holding Times

2.1 Have any VOA holding times, determined from date of collection to date of analysis, been exceeded? [✓] [___] ___

If unpreserved, aqueous aromatic volatiles must be analyzed within 7 days of collection and non-aromatic volatiles must be analyzed within 14 days. If preserved with hydrochloric acid and stored at 4°C, then both aromatic and non-aromatic volatiles must be analyzed within 14 days. If uncertain about preservation, contact the sampler to determine whether the samples were preserved.

A ten-day holding time for soil samples is recommended.

Table of Holding Time Violations

Sample	Sample Matrix	Preserved ?	(See Traffic Report) Date Sampled	Date Lab Received	Date Analyzed
SDG-BT47 BX976✓	Soil	NO	6/7/89	6/10/89	6/19/89
BX977✓	Soil	NO	6/7/89	6/10/89	6/19/89
BX992✓	Soil	NO	6/6/89	6/08/89	6/18/89
BX993✓	Soil	NO	6/6/89	6/8/89	6/18/89

ACTION: If holding times are exceeded, flag all positive results as estimated ("J") and sample quantitation limits as estimated ("UJ"), and document in the narrative that holding times were exceeded.

Table of Holding Time Violations cont'd

SDG: BT747

Sample	Sample Matrix	Preserved?	Date Sampled	Date Received	Date Analyzed
BT760 ✓	Soil	NO	6/6/89	6/8/89	6/13/89
BT761 ✓	Soil	NO	6/6/89	6/8/89	6/13/89

DG: BX978

BX978 ✓	Soil	NO	6/10/89	6/10/89	6/19/89
BX983 ✓	Soil	NO	↓	6/10/89	6/20/89
BX984	↓	↓	6/8/89	↓	↓
BX997			6/10/89		
BX995			↓		
BX995RE ✓			↓	↓	6/25/89

TUT 001 0305

	YES	NO	N/A

If analyses were done more than 14 days beyond holding time, either on the first analysis or upon reanalysis, the reviewer must use professional judgement to determine the reliability of the data and the effects of additional storage on the sample results. The reviewer may determine that non-detect data are unusable ("R").

3.0 Surrogate Recovery (Form II)

3.1 Are the VOA Surrogate Recovery Summaries (Form II) present for each of the following matrices:

a. Low Water	[ ]	—	✓
b. Med Water	[ ]	—	✓
c. Low Soil	[✓]	—	—
d. Med Soil	[ ]	—	✓

3.2 Are all the VOA samples listed on the appropriate Surrogate Recovery Summaries for each of the following matrices:

a. Low Water	[ ]	—	✓
b. Med Water	[ ]	—	✓
c. Low Soil	[✓]	—	—
d. Med Soil	[ ]	—	✓

ACTION: Call lab for explanation / resubmittals. If missing deliverables are unavailable, document effect on data under "Conclusions" section of reviewer narrative.

3.3 Were outliers marked correctly with an asterisk?	[✓]	—	—

ACTION: Circle all outliers in red.

3.4 Was one or more VOA surrogate recovery outside of contract specifications for any sample or method blank?	✓	[ ]	—
If yes, were samples reanalyzed?	[✓]	—	—
Were method blanks reanalyzed?	[ ]	✓	—

ACTION: If surrogate recoveries are > 10% but all do not meet SOW specifications:

1. Flag all positive results as estimated ("J").
2. Flag all non-detects as estimated detection limits ("UJ").

	YES	NO	N/A
If any surrogate has a recovery of <10% : 1. Flag all positive results as estimated ("J"). 2. Flag all non-detects as unusable ("R"). Professional judgement should be used to qualify data that have method blank surrogate recoveries out of specification in both original and re-analyses. Check the internal standard areas.			
3.5 Are there any transcription/calculation errors between raw data and Form II?	___	[✓]	___
ACTION: If large errors exist, call lab for explanation / resubmittal, make any necessary corrections and note errors under "Conclusions".			
Matrix Spikes (Form III)			
4.1 Is the Matrix Spike Duplicate/Recovery Form (Form III) present?	[✓]	___	___
4.2 Were matrix spikes analyzed at the required frequency for each of the following matrices:			
a. Low Water	[___]	___	✓
b. Med Water	[___]	___	✓
c. Low Soil	[✓]	___	...
d. Med Soil	[___]	___	✓
ACTION: If any matrix spike data are missing, take the action specified in 3.2 above.			

4.3 How many VOA spike recoveries are outside QC limits?

	Water	Soils
for SDG BT747	N/A out of 10	0 out of 10
BX975	N/A	2 out of 10

4.4 How many RPD's for matrix spike and matrix spike duplicate recoveries are outside QC limits?

	Water	Soils
for SDG BT747	N/A out of 5	0 out of 5
BX975	N/A	5 out of 5

ACTION: If MS and MSD both have less than 10% recovery for an analyte, negative results for that analyte should be rejected, and positive results should be flagged "J". The above applies only to the sample used for the MS/MSD analysis. Use professional judgement in applying this criterion to other samples in the package

	YES	NO	N/A
5.0 Blanks (Form IV)			
5.1 Is the Method Blank Summary (Form IV) present?	[✓]	___	___
5.2 Frequency of Analysis: for the analysis of VOA TCL compounds, has a reagent/method blank been analyzed for each set of samples or every 20 samples of similar matrix (low water, med water, low soil, medium soil), whichever is more frequent?	[✓]	___	___
5.3 Has a VOA instrument blank been analyzed at least once every twelve hours for each GC/MS system used?	[✓]	___	___
ACTION: If any method blank data are missing, call lab for explanation / resubmittal. If not available, reject all associated positive data ("R").			
5.4 Chromatography: review the blank raw data - chromatograms (RICs), quant reports or data system printouts and spectra.			
Is the chromatographic performance (baseline stability) for each instrument acceptable for VOAs?	[✓]	___	___
ACTION: Use professional judgement to determine the effect on the data.			
6.0 Contamination			
NOTE: "Water blanks" and "distilled water blanks" are validated like any other sample and are not used to qualify data. Do not confuse them with the other QC blanks discussed below.			
6.1 Do any method/instrument/reagent blanks have positive results (TCL and/or TIC) for VOAs? When applied as described below, the contaminant concentration in these blanks are multiplied by the sample Dilution Factor.	✓	[___]	___
6.2 Do any field/trip/rinse blanks have positive VOA results (TCL and/or TIC)?	___	[___]	✓
ACTION: Prepare a list of the samples associated with each of the contaminated blanks. (Attach a separate sheet.)			
NOTE: Only field/rinse blanks taken the same day as the samples are used to qualify data. Trip blanks are used to qualify only those samples with which they were shipped. Blanks may not be qualified because of contamination in another blank. Blanks may be qualified for surrogate, spectral, tuning or calibration QC problems.			

SOG-BT747

ORGANICS
BLANK CONTAMINATIONS

CASE: 12058 LAB: CE/MLC
SITE: Tutu FRACTION: VOA

ANALYTES	METHOD BLANK CONTAMINATIONS				RINSE BLANK CONT.		TRIP BLANK CONT.	
	ID: LC0356	ID: LC0399	ID: BI650	ID: LC0348	NO: LC0372	NO:	NO:	NO:
TCL	AMOUNT	AMOUNT	AMOUNT	AMOUNT	AMOUNT	AMOUNT	AMOUNT	AMOUNT
Methylene Chloride	24	11	3	0.2	4			
Acetone	9			3				
Dibromochloromethane	1	2						
Carbon disulfide		2						
Chloroform		2						
1,1,1-Trichloroethane		1						
Chlorobenzene		3						
RT TIC								
24.94	S-4							
28.39	40							
31.63 Decane	25C							
AFFECTED SAMPLES	BX992	BX977	BX974	BT-747	BX268			
	BX759			BT-748	BX266MS			
	BX760			BT-749				
	BX761			BX262				

ORGANICS
BLANK CONTAMINATIONS

CASE: 12058 SITE: TuTu

LAB: CEIMIC FRACTION: VOA

ANALYTES	METHOD BLANK CONTAMINATIONS				RINSE BLANK CONT.		TRIP BLANK CONT.	
	ID CC476	ID @0399	ID	ID	NO:	NO:	NO:	NO:
TCL	AMOUNT	AMOUNT	AMOUNT	AMOUNT	AMOUNT	AMOUNT	AMOUNT	AMOUNT
Acetone	4							
Chloroform	2	2						
1,1,1-Trichloroethane	1	1						
Carbon Tetrachloride	2							
Trichloroethene	2							
Benzene	1							
Methylene Chloride		11						
Cyclohexane		2						
Dichlorodifluoromethane		2						
Chlorobenzene		3						
TIC								
RT 7.97		21						
AFFECTED SAMPLES	BX983	BX978						
	BX984							
	BX997							
	BX995							
	BX994MS							

YES NO N/A

ACTION: Follow the directions in the table below to qualify TCL results due to contamination. Use the largest value from all the associated blanks.

	Sample conc > CRQL but < 10x blank	Sample conc < CRQL & is < 10x blank value	Sample conc > CRQL value & >10x blank value
Methylene chloride Acetone Toluene 2-butanone	Flag sample result with a 'U'; cross out 'B' flag	Reject sample result and report CRQL; cross out 'B' flag	No qualification is needed

	Sample conc > CRQL but < 5x blank	Sample conc < CRQL & is < 5x blank value	Sample conc > CRQL value & > 5 blank value
Other Contaminants	Flag sample result with a 'U'; cross out 'B' flag	Reject sample result and report CRQL; cross out 'B' flag	No qualification is needed

ACTION: For TIC compounds, if the concentration in the sample is less than five times the concentration in the most contaminated associated blank, flag the sample data "R" (unusable).

6.3 Are there field/rinse/equipment blanks associated with every sample? [ ] [✓] [ ]

ACTION: For low level samples, note in data assessment that there is no associated field/rinse/equipment blank. Exception: samples taken from a drinking water tap do not have associated field blanks.

7.0 GC/MS Tuning and Mass Calibration (Form V)

7.1 Are the GC/MS Tuning and Mass Calibration Forms (Form V) present for Bromofluorobenzene (BFB)? [✓] [ ] [ ]

7.2 Are the enhanced bar graph spectrum and mass/charge (m/z) listing for the BFB provided for each twelve hour shift? [✓] [ ] [ ]

7.3 Has a tuning performance compound been analyzed for every twelve hours of sample analysis per instrument? [✓] [ ] [ ]

ACTION: If any tuning data are missing, take action specified in 3.2 above.

ACTION: List date, time, instrument ID, and sample analyses for which no associated GC/MS tuning data are available.

DATE	TIME	INSTRUMENT	SAMPLE NUMBERS

	YES	NO	N/A

ACTION: If lab cannot provide missing data, reject ("R") all data generated outside an acceptable twelve hour calibration interval.

7.4 Have the ion abundance criteria been met for each instrument used? [✓] ___ ___

ACTION: List all data which do not meet ion abundance criteria (attach a separate sheet).

ACTION: If tuning calibration is in error, flag all associated sample data as unusable ("R"). However, if expanded ion criteria are met (See 1988 Functional Guidelines), the data reviewer may accept data with appropriate qualifiers.

7.5 Are there any transcription / calculation errors between mass lists and Form Vs? (Check at least two values but if errors are found, check more.) ___ [✓] ___

7.6 Have the appropriate number of significant figures (two) been reported? (Check at least two values, but if errors are found check more values.) ✓ [___] ___

ACTION: If large errors exist, call lab for explanation / resubmittal, make necessary corrections and note errors under "Conclusions".

7.7 Are the spectra of the mass calibration compound acceptable? [✓] ___ ___

ACTION: Use professional judgement to determine whether associated data should be accepted, qualified, or rejected.

8.0 Target Compound List (TCL) Analytes

8.1 Are the Organic Analysis Data Sheets (Form I VOA) present with required header information on each page, for each of the following:

a. Samples and/or fractions as appropriate [✓] ___ ___

b. Matrix spikes and matrix spike duplicates [✓] ___ ___

c. Blanks [✓] ___ ___

	YES	NO	N/A
8.2 Are the VOA Reconstructed Ion Chromatograms, the mass spectra for the identified compounds, and the data system printouts (Quant Reports) included in the sample package for each of the following?			
a. Samples and/or fractions as appropriate	[ ]	✓*	
b. Matrix spikes and matrix spike duplicates (Mass spectra not required)	[✓]		
c. Blanks	[✓]		
ACTION: If any data are missing, take action specified in 3.2 above.			
8.3 Are the response factors shown in the Quant Report?	[ ]	✓	
8.4 Is chromatographic performance acceptable with respect to:			
Baseline stability	[✓]		
Resolution	[✓]		
Peak shape	[✓]		
Full-scale graph (attenuation)	[✓]		
Other: _____	[ ]		✓
ACTION: Use professional judgement to determine the acceptability of the data.			
8.5 Are the lab-generated standard mass spectra of the identified VOA compounds present for each sample?	[ ]	✓*	
ACTION: If any mass spectra are missing, take action specified in 3.2 above. If Lab does not generate their own standard spectra, make note in "Contract Problems/Non-compliance".	*See Data Assessment		
8.6 Is the RRT of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?	[✓]		
8.7 Are all ions present in the standard mass spectrum at a relative intensity greater than 10% also present in the sample mass spectrum?	[✓]		
8.8 Do sample and standard relative ion intensities agree within 20%?	[✓]		
ACTION: Use professional judgement to determine acceptability of data. If it is determined that incorrect identifications were made, all such data should be rejected, flagged "N" (presumptive evidence of the presence of the compound) or changed to not detected (at the calculated detection limit).			

	YES	NO	N/A
9.0 Tentatively Identified Compounds (TIC)			
9.1 Are all Tentatively Identified Compound Forms (Form I, Part B) present; and do listed TICs include scan number or retention time, estimated concentration and "J" qualifier?	[✓]	___	___
9.2 Are the mass spectra for the tentatively identified compounds and associated "best match" spectra included in the sample package for each of the following:			
a. Samples and/or fractions as appropriate	[✓]	___	___
b. Blanks	[✓]	___	___
ACTION: If any TIC data are missing, take action specified in 3.2 above.			
ACTION: Add "J" qualifier if missing and "N" qualifier to all identified TIC compounds on Form I, Part B.			
9.3 Are any TCL compounds (from any fraction) listed as TIC compounds (example: 1,2-dimethylbenzene is xylene--a VOA TCL--and should not be reported as a TIC)?	✓	[___]	___
ACTION: Flag with "R" any TCL compound listed as a TIC.			
9.4 Are all ions present in the reference mass spectrum with a relative intensity greater than 10% also present in the sample mass spectrum?	[✓]	___	___
9.5 Do TIC and "best match" standard relative ion intensities agree within 20%?	[✓]	___	___
ACTION: Use professional judgement to determine acceptability of TIC identifications. If it is determined that an incorrect identification was made, change identification to "unknown" or to some less specific identification (example: "C3 substituted benzene") as appropriate.			
10.0 Compound Quantitation and Reported Detection Limits			
10.1 Are there any transcription / calculation errors in Form I results? Check at least two positive values. Verify that the correct internal standard, quantitation ion, and RRF were used to calculate Form I result. Were any errors found?	✓	[___]	___
10.2 Are the CRQLs adjusted to reflect sample dilutions and, for soils, sample moisture?	___	[✓]	___

Minor differences due to software formatting

	YES	NO	N/A

ACTION: If errors are large, call lab for explanation / resubmittal, make any necessary corrections and note errors under "Conclusions".

ACTION: When a sample is analyzed at more than one dilution, the lowest CRQLs are used (unless a QC exceedance dictates the use of the higher CRQL data from the diluted sample analysis). Replace concentrations that exceed the calibration range in the original analysis by crossing out the "E" value on the original Form I and substituting it with data from the analysis of diluted sample. Specify which Form I is to be used, then draw a red "X" across the entire page of all Form I's that should not be used, including any in the summary package.

11.0 Standards Data (GC/MS)

11.1 Are the Reconstructed Ion Chromatograms, and data system printouts (Quant. Reports) present for initial and continuing calibration? [✓] — —

ACTION: If any calibration standard data are missing, take action specified in 3.2 above.

12.0 GC/MS Initial Calibration (Form VI)

12.1 Are the Initial Calibration Forms (Form VI) present and complete for the volatile fraction? [✓] — —

ACTION: If any calibration standard forms are missing, take action specified in 3.2 above.

12.2 Are response factors stable for volatiles over the concentration range of the calibration (RSD <30%)? [ ] ✓ —

ACTION: Circle all outliers in red.

ACTION: When RSD >30%, non-detects may be qualified using professional judgement. Flag all positive results "J". When RSD >90%, flag all non-detects as unusable ("R"). (Region II policy.)

12.3 Do any compounds have a RRF < 0.05? — [✓] —

ACTION: Circle all outliers in red.

ACTION: If any volatile compound has an average RRF < 0.05, flag positive results for that compound as estimated ("J"), and flag non-detects for that compound as unusable ("R").

	YES	NO	N/A
12.4 Are there any transcription / calculation errors in the reporting of average response factors (RRF) or %RSD? (Check at least two values but if errors are found, check more.)	___	[✓]	___

ACTION: Circle errors in red.

ACTION: If errors are large, call lab for explanation / resubmittal, make any necessary corrections and note errors under "Conclusions".

13.0 GC/MS Continuing Calibration (Form VII)

13.1 Are the Continuing Calibration Forms (Form VII) present and complete for the volatile fraction?	[✓]	___	___
13.2 Has a continuing calibration standard been analyzed for every twelve hours of sample analysis per instrument?	[✓]	___	___

ACTION: List below all sample analyses that were not within twelve hours of the previous continuing calibration analysis.

_____

_____

_____

ACTION: If any forms are missing or no continuing calibration standard has been analyzed within twelve hours of every sample analysis, call lab for explanation / resubmittal. If continuing calibration data are not available, flag all associated sample data as unusable ("R").

13.3 Do any continuing calibration standard compounds have a RRF < 0.05?	✓	[___]	___

ACTION: Circle all outliers in red.

ACTION: If any volatile compound has a RRF < 0.05, flag positive results for that compound as estimated ("J"), and flag non-detects for that compound as unusable ("R").

13.4 Do any compounds have a % difference between initial and continuing calibration RRF > 25%?	✓	[___]	___

ACTION: Circle all outliers in red and qualify associated sample data as outlined in the table below:

YES NO N/A

% DIFFERENCE

25-50	50-90	>90
'J' positive results, no action for non detects	'J' positive results, 'UJ' non detects	'J' positive results, "R" non detects

13.5 Are there any transcription / calculation errors in the reporting of average response factors (RRF) or difference (%D) between initial and continuing RRFs? (Check at least two values but if errors are found, check more.) ___ [✓] ___

ACTION: Circle errors in red.

ACTION: If errors are large, call lab for explanation / resubmittal, make any necessary corrections and note errors under "Conclusions".

14.0 Internal Standards (Form VIII)

14.1 Are the internal standard areas (Form VIII) of every sample and blank within the upper and lower limits for each continuing calibration? [___] ✓ ___

ACTION: List all the outliers below.

Sample #	Internal Std	Area	Lower Limit	Upper Limit
BX99	Chlorobenzene	16100	16950	67800
BX99SRE	1,4 Difluorobenzene	16300	18150	72600
BX99SRE	Chlorobenzene	9910	14850	59400

(Attach additional sheets if necessary.)

ACTION: If the internal standard area count is outside the upper or lower limit, flag with "J" all positive results and non-detects (U values) quantitated with this internal standard. If extremely low area counts are reported, or if performance exhibits a major abrupt drop off, flag all associated non-detects as unusable ("R").

14.2 Are the retention times of the internal standards within 30 seconds of the associated calibration standard? [✓] ___ ___

ACTION: Professional judgement should be used to qualify data if the retention times differ by more than 30 seconds.

15.0 Field Duplicates	YES	NO	N/A
15.1 Were any field duplicates submitted for VOA analysis?	[✓]	___	___

ACTION: Compare the reported results for field duplicates and calculate the relative percent difference.

ACTION: Any gross variation between field duplicate results must be addressed in the reviewer narrative. However, if large differences exist, identification of field duplicates should be confirmed by contacting the sampler.

	YES	NO	N/A

PART B: BNA ANALYSES

1.0 Traffic Reports and Laboratory Narrative

1.1 Are the Traffic Report Forms present for all samples? [✓] ___ ___

ACTION: If no, contact lab for replacement of missing or illegible copies.

1.2 Do the Traffic Reports or Lab Narrative indicate any problems with sample receipt, condition of samples, analytical problems or special notations affecting the quality of the data? ___ [✓] ___

ACTION: Use professional judgement to evaluate the effect on the quality of the data.

ACTION: If any sample analyzed as a soil contains more than 50% water, all data should be rejected.

2.0 Holding Times

2.1 Have any BNA holding times, determined from date of collection to date of extraction, been exceeded? ___ [✓] ___

Samples for BNA analysis, both soils and waters, must be extracted within seven days of the date of collection. Extracts must be analyzed within 40 days of the date of extraction.

Table of Holding Time Violations

Sample	Sample Matrix	Date Sampled	(See Traffic Report) Date Lab Received	Date Extracted	Date Analyzed
____	____	____	____	____	____
____	____	____	____	____	____
____	____	____	____	____	____
____	____	____	____	____	____
____	____	____	____	____	____
____	____	____	____	____	____

ACTION: If holding times are exceeded, flag all positive results as estimated ("J") and sample quantitation limits as estimated ("UJ"), and document in the narrative that holding times were exceeded.

	YES	NO	N/A

If analyses were done more than 14 days beyond holding time, either on the first analysis or upon reanalysis, the reviewer must use professional judgement to determine the reliability of the data and the effects of additional storage on the sample results. The reviewer may determine that non-detect data are unusable ("R").

3.0 Surrogate Recovery (Form II)

3.1 Are the BNA Surrogate Recovery Summaries (Form II) present for each of the following matrices:

a. Low Water	[ ]	—	✓
b. Med Water	[ ]	—	✓
c. Low Soil	[✓]	—	—
d. Med Soil	[ ]	—	✓

3.2 Are all the BNA samples listed on the appropriate Surrogate Recovery Summaries for each of the following matrices:

a. Low Water	[ ]	—	✓
b. Med Water	[ ]	—	✓
c. Low Soil	[✓]	—	—
d. Med Soil	[ ]	—	✓

ACTION: Call lab for explanation / resubmittals. If missing deliverables are unavailable, document effect on data under "Conclusions" section of reviewer narrative.

3.3 Were outliers marked correctly with an asterisk?	[ ]	—	✓

ACTION: Circle all outliers in red.

3.4 Were two or more base-neutral OR acid surrogate recoveries out of specification for any sample or method blank?	—	[✓]	—
If yes, were samples reanalyzed?	[ ]	—	✓
Were method blanks reanalyzed?	[ ]	—	✓

ACTION: If all BNA surrogate recoveries are > 10% but two within the base-neutral or acid fraction do not meet SOW specifications, for the affected fraction only (i.e. base-neutral OR acid compounds):

1. Flag all positive results as estimated ("J").
2. Flag all non-detects as estimated detection limits ("UJ").

	YES	NO	N/A
If any base-neutral or acid surrogate has a recovery of <10% : 1. Flag all positive results for that fraction (i.e. all acid or base-neutral compounds) "J". 2. Flag all non-detects for that fraction "R". Professional judgement should be used to qualify data that have method blank surrogate recoveries out of specification in both original and re-analyses. Check the internal standard areas.			
3.5 Are there any transcription/calculation errors between raw data and Form II?	___	[✓]	___
ACTION: If large errors exist, call lab for explanation / resubmittal, make any necessary corrections and note errors under "Conclusions".			

4.0 Matrix Spikes (Form III)

4.1 Is the Matrix Spike Duplicate/Recovery Form (Form III) present?	[✓]	___	.....
4.2 Were matrix spikes analyzed at the required frequency for each of the following matrices:			
a. Low Water	[___]	___	✓
b. Med Water	[___]	___	✓
c. Low Soil	[✓]	___	___
d. Med Soil	[___]	___	✓
ACTION: If any matrix spike data are missing, take the action specified in 3.2 above.			

4.3 How many BNA spike recoveries are outside QC limits?

	Water	Soils
SDG BT747 / BX978	N/A / N/A out of 22	14 / 0 out of 22

4.4 How many RPD's for matrix spike and matrix spike duplicate recoveries are outside QC limits?

	Water	Soils
SDG BT747 / BX977	N/A / N/A out of 11	3 / 0 out of 11

ACTION: If MS and MSD both have less than 10% recovery for an analyte, negative results for that analyte should be rejected, and positive results should be flagged "J". The above applies only to the sample used for MS/MSD analysis. Use professional judgement in applying this criterion to other samples

170049

	YES	NO	N/A
5.0 Blanks (Form IV)			
5.1 Is the Method Blank Summary (Form IV) present?	[✓]	--	--
5.2 Frequency of Analysis: for the analysis of BNA TCL compounds, has a reagent/method blank been analyzed for each set of samples or every 20 samples of similar matrix (low water, med water, low soil, medium soil), whichever is more frequent?	[✓]	--	--
5.3 Chromatography: review the blank raw data - chromatograms (RICs), quant reports or data system printouts and spectra.			
Is the chromatographic performance (baseline stability) ~~VOAs~~ BNA instrument acceptable for ~~VOAs~~ BNA?	[✓]	--	--
ACTION: Use professional judgement to determine the effect on the data			
6.0 Contamination			
NOTE: "Water blanks" and "distilled water blanks" are validated like any other sample and are not used to qualify data. Do not confuse them with the other QC blanks discussed below.			
6.1 Do any method/instrument/reagent blanks have positive results (TCL and/or TIC) for BNAs? When applied as described below, the contaminant concentration in these blanks are multiplied by the sample Dilution Factor.	✓	[ ]	--
6.2 Do any field/rinse blanks have positive BNA results (TCL and/or TIC)?	--	[ ]	✓
ACTION: Prepare a list of the samples associated with each of the contaminated blanks. (Attach a separate sheet.)			
NOTE: Only field/rinse blanks taken the same day as the samples are used to qualify data. Blanks may not be qualified because of contamination in another blank. Blanks may be qualified for surrogate, spectral, tuning or calibration QC problems.			

SDG BX771

ORGANICS
BLANK CONTAMINATIONS

CASE: 12058 LAB: CEIMIC
SITE: Tutu FRACTION: BNA

ANALYTES	METHOD BLANK CONTAMINATIONS				RINSE BLANK CONT.		TRIP BLANK CONT.	
	ID A1129	ID A1181	ID	ID	NO:	NO:	NO:	NO:
TCL	AMOUNT	AMOUNT	AMOUNT	AMOUNT	AMOUNT	AMOUNT	AMOUNT	AMOUNT
TIC								
1,2-Benzisothiazole	100	1400						
4-Hydroxy-4-methyl 2-pentanone	9200							
4,4-Dimethyloctane		730						
AFFECTED SAMPLES	BX771	BX704 BX710						
	BX983	BX711 BX765						
	BX984	BX769 BX770						
	BX991	BX771 BX772						
	BX998	BX773 BX774 BX775 BX775MS BX775MSD						

172 to 433

SDG BT747

ORGANICS
BLANK CONTAMINATIONS

CASE: 12058 LAB: CEIMIC
SITE: Tutu FRACTION: BNA

ANALYTES	METHOD BLANK CONTAMINATIONS				RINSE BLANK CONT.		TRIP BLANK CONT.	
	ID A1129	ID	ID	ID	NO:	NO:	NO:	NO:
TCL	AMOUNT	AMOUNT	AMOUNT	AMOUNT	AMOUNT	AMOUNT	AMOUNT	AMOUNT
TIC								
3 or 2 unknown	10							
4-hydroxy-4-methyl-2-pentanone	920							
AFFECTED SAMPLES	BT747 BX262 BX263 BX264 BX976 BX977 BT757 BT760 BT761							

TUT 001 0324

173 to 433

YES NO N/A

ACTION: Follow the directions in the table below to qualify TCL results due to contamination. Use the largest value from all the associated blanks.

	Sample conc > CRQL but < 10x blank	Sample conc < CRQL & is < 10x blank value	Sample conc > CRQL value & >10x blank value
Common Phthalate Esters	Flag sample result with a 'U'; cross out 'B' flag	Reject sample result and report CRQL; cross out 'B' flag	No qualification is needed

	Sample conc > CRQL but < 5x blank	Sample conc < CRQL & is < 5x blank value	Sample conc > CRQL value & > 5 blank value
Other Contaminants	Flag sample result with a 'U'; cross out 'B' flag	Reject sample result and report CRQL; cross out 'B' flag	No qualification is needed

ACTION: For TIC compounds, if the concentration in the sample is less than five times the concentration in the most contaminated associated blank, flag the sample data "R" (unusable).

6.3 Are there field/rinse/equipment blanks associated with every sample? [ ] [✓] [ ]

ACTION: For low level samples, note in data assessment that there is no associated field/rinse/equipment blank. Exception: samples taken from a drinking water tap do not have associated field blanks.

7.0 GC/MS Tuning and Mass Calibration (Form V)

7.1 Are the GC/MS Tuning and Mass Calibration Forms (Form V) present for Decafluorotriphenylphosphine (DFTPP)? [✓] [ ] [ ]

7.2 Are the enhanced bar graph spectrum and mass/charge (m/z) listing for the DFTPP provided for each twelve hour shift? [ ] [✓] [ ]

One missing but resubmitted

7.3 Has a tuning performance compound been analyzed for every twelve hours of sample analysis per instrument? [✓] [ ] [ ]

ACTION: If any tuning data are missing, take action specified in 3.2 above.

ACTION: List date, time, instrument ID, and sample analyses for which no associated GC/MS tuning data are available.

	YES	NO	N/A

DATE	TIME	INSTRUMENT	SAMPLE NUMBERS

ACTION: If lab cannot provide missing data, reject ("R") all data generated outside an acceptable twelve hour calibration interval.

7.4 Have the ion abundance criteria been met for each instrument used? [✓] ___ ___

ACTION: List all data which do not meet ion abundance criteria (attach a separate sheet).

ACTION: If tuning calibration is in error, flag all associated sample data as unusable ("R"). However, if expanded ion criteria are met (See 1988 Functional Guidelines), the data reviewer may accept data with appropriate qualifiers.

7.5 Are there any transcription / calculation errors between mass lists and Form Vs? (Check at least two values but if errors are found, check more.) ___ [✓] ___

7.6 Have the appropriate number of significant figures (two) been reported? (Check at least two values, but if errors are found check more values.) ✓ [___] ___

ACTION: If large errors exist, call lab for explanation / resubmittal, make necessary corrections and note errors under "Conclusions".

7.7 Are the spectra of the mass calibration compound acceptable? [✓] ___ ___

ACTION: Use professional judgement to determine whether associated data should be accepted, qualified, or rejected.

8.0 Target Compound List (TCL) Analytes

8.1 Are the Organic Analysis Data Sheets (Form I BNA) present with required header information on each page, for each of the following:

a. Samples and/or fractions as appropriate [✓] ___ ___

b. Matrix spikes and matrix spike duplicates [✓] ___ ___

c. Blanks [✓] ___ ___

TUT 001 0326

	YES	NO	N/A
8.2 Are the BNA Reconstructed Ion Chromatograms, the mass spectra for the identified compounds, and the data system printouts (Quant Reports) included in the sample package for each of the following?			
a. Samples and/or fractions as appropriate	[✓]	—	—
b. Matrix spikes and matrix spike duplicates (Mass spectra not required)	[✓]	—	—
c. Blanks	[✓]	—	—
ACTION: If any data are missing, take action specified in 3.2 above.			
8.3 Are the response factors shown in the Quant Report?	[—]	✓	—
8.4 Is chromatographic performance acceptable with respect to:			
Baseline stability	[✓]	—	—
Resolution	[✓]	—	—
Peak shape	[✓]	—	—
Full-scale graph (attenuation)	[✓]	—	—
Other:_____	[—]	—	✓
ACTION: Use professional judgement to determine the acceptability of the data.			
8.5 Are the lab-generated standard mass spectra of the identified BNA compounds present for each sample?	[✓]	—	—
ACTION: If any mass spectra are missing, take action specified in 3.2 above. If Lab does not generate their own standard spectra, make note in "Contract Problems/Non-compliance".			
8.6 Is the RRT of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?	[✓]	—	—
8.7 Are all ions present in the standard mass spectrum at a relative intensity greater than 10% also present in the sample mass spectrum?	[✓]	—	—
8.8 Do sample and standard relative ion intensities agree within 20%?	[✓]	—	—
ACTION: Use professional judgement to determine acceptability of data. If it is determined that incorrect identifications were made, all such data should be rejected, flagged "N" (presumptive evidence of the presence of the compound) or changed to not detected (at the calculated detection limit).			

TUT 001 0527

	YES	NO	N/A
.0 Tentatively Identified Compounds (TIC)			
9.1 Are all Tentatively Identified Compound Forms (Form I, Part B) present; and do listed TICs include scan number or retention time, estimated concentration and "J" qualifier?	[✓]	—	—
9.2 Are the mass spectra for the tentatively identified compounds and associated "best match" spectra included in the sample package for each of the following:			
a. Samples and/or fractions as appropriate	[✓]	—	—
b. Blanks	[✓]	—	—
ACTION: If any TIC data are missing, take action specified in 3.2 above.			
ACTION: Add "J" qualifier if missing and "N" qualifier to all identified TIC compounds on Form I, Part B.			
9.3 Are any TCL compounds (from any fraction) listed as TIC compounds (example: 1,2-dimethylbenzene is xylene--a VOA TCL--and should not be reported as a TIC)?	—	[✓]	—
ACTION: Flag with "R" any TCL compound listed as a TIC.			
9.4 Are all ions present in the reference mass spectrum with a relative intensity greater than 10% also present in the sample mass spectrum?	[✓]	—	—
9.5 Do TIC and "best match" standard relative ion intensities agree within 20%?	[✓]	—	—
ACTION: Use professional judgement to determine acceptability of TIC identifications. If it is determined that an incorrect identification was made, change identification to "unknown" or to some less specific identification (example: "C3 substituted benzene") as appropriate.			
10.0 Compound Quantitation and Reported Detection Limits			
10.1 Are there any transcription / calculation errors in Form I results? Check at least two positive values. Verify that the correct internal standard, quantitation ion, and RRF were used to calculate Form I result. Were any errors found?	✓	[ ]	—
10.2 Are the CRQLs adjusted to reflect sample dilutions and, for soils, sample moisture?	←	[ ]	—

Minor errors due to software formatting

	YES	NO	N/A

ACTION: If errors are large, call lab for explanation / resubmittal, make any necessary corrections and note errors under "Conclusions".

ACTION: When a sample is analyzed at more than one dilution, the lowest CRQLs are used (unless a QC exceedance dictates the use of the higher CRQL data from the diluted sample analysis). Replace concentrations that exceed the calibration range in the original analysis by crossing out the "E" value on the original Form I and substituting it with data from the analysis of diluted sample. Specify which Form I is to be used, then draw a red "X" across the entire page of all Form I's that should not be used, including any in the summary package.

11.0 Standards Data (GC/MS)

11.1 Are the Reconstructed Ion Chromatograms, and data system printouts (Quant. Reports) present for initial and continuing calibration? [✓] — —

ACTION: If any calibration standard data are missing, take action specified in 3.2 above.

12. GC/MS Initial Calibration (Form VI)

12.1 Are the Initial Calibration Forms (Form VI) present and complete for the BNA fraction? [✓] — —

ACTION: If any calibration standard forms are missing, take action specified in 3.2 above.

12.2 Are response factors stable for BNAs over the concentration range of the calibration (RSD <30%)? [✓] — —

ACTION: Circle all outliers in red.

ACTION: When RSD >30%, non-detects may be qualified using professional judgement. Flag all positive results "J". When RSD >90%, flag all non-detects as unusable ("R"). (Region II policy.)

12.3 Do any compounds have a RRF < 0.05? — [✓] —

ACTION: Circle all outliers in red.

ACTION: If any BNA compound has an average RRF < 0.05, flag positive results for that compound as estimated ("J"), and flag non-detects for that compound as unusable ("R").

	YES	NO	N/A
12.4 Are there any transcription / calculation errors in the reporting of average response factors (RRF) or %RSD? (Check at least two values but if errors are found, check more.)	___	[✓]	___

ACTION: Circle errors in red.

ACTION: If errors are large, call lab for explanation / resubmittal, make any necessary corrections and note errors under "Conclusions".

13.0 GC/MS Continuing Calibration (Form VII)

13.1 Are the Continuing Calibration Forms (Form VII) present and complete for the BNA fraction?	[✓]	___	___
13.2 Has a continuing calibration standard been analyzed for every twelve hours of sample analysis per instrument?	[✓]	___	___

ACTION: List below all sample analyses that were not within twelve hours of the previous continuing calibration analysis.

_____

_____

_____

ACTION: If any forms are missing or no continuing calibration standard has been analyzed within twelve hours of every sample analysis, call lab for explanation / resubmittal. If continuing calibration data are not available, flag all associated sample data as unusable ("R").

13.3 Do any continuing calibration standard compounds have a RRF < 0.05?	___	[✓]	___

ACTION: Circle all outliers in red.

ACTION: If any BNA compound has a RRF < 0.05, flag positive results for that compound as estimated ("J"), and flag non-detects for that compound as unusable ("R").

13.4 Do any compounds have a % difference between initial and continuing calibration RRF > 25%?	✓	[___]	___

ACTION: Circle all outliers in red and qualify associated sample data as outlined in the table below:

YES NO N/A

% DIFFERENCE

25-50	50-90	>90
'J' positive results, no action for non detects	'J' positive results, 'UJ' non detects	'J' positive results, "R" non detects

13.5 Are there any transcription / calculation errors in the reporting of average response factors (RRF) or difference (%D) between initial and continuing RRFs? (Check at least two values but if errors are found, check more.) [ ] [✓] [ ]

ACTION: Circle errors in red.

ACTION: If errors are large, call lab for explanation / resubmittal, make any necessary corrections and note errors under "Conclusions".

Internal Standards (Form VIII)

Are the internal standard areas (Form VIII) of every sample and blank within the upper and lower limits for each continuing calibration? [ ] [✓] [ ]

ACTION: List all the outliers below.

Sample #	Internal Std	Area	Lower Limit	Upper Limit
BK977	Perylene-d12	70500	785 00	314000

(Attach additional sheets if necessary.)

ACTION: If the internal standard area count is outside the upper or lower limit, flag with "J" all positive results and non-detects (U values) quantitated with this internal standard. If extremely low area counts are reported, or if performance exhibits a major abrupt drop off, flag all associated non-detects as unusable ("R").

14.2 Are the retention times of the internal standards within 30 seconds of the associated calibration standard? [✓] [ ] [ ]

ACTION: Professional judgement should be used to qualify data if the retention times differ by more than 30 seconds.

	YES	NO	N/A
15.0 Field Duplicates			
15.1 Were any field duplicates submitted for BNA analysis?	[✓]	___	___

ACTION: Compare the reported results for field duplicates and calculate the relative percent difference.

ACTION: Any gross variation between field duplicate results must be addressed in the reviewer narrative. However, if large differences exist, identification of field duplicates should be confirmed by contacting the sampler.

TUT 001 0332

	YES	NO	N/A
PART C: PESTICIDE/PCB ANALYSES			
1.0 Traffic Reports and Laboratory Narrative			
1.1 Are the Traffic Report Forms present for all samples?	[✓]	—	—
ACTION: If no, contact lab for replacement of missing or illegible copies.			
1.2 Do the Traffic Reports or Lab Narrative indicate any problems with sample receipt, condition of samples, analytical problems or special notations affecting the quality of the data?	—	[✓]	—
ACTION: Use professional judgement to evaluate the effect on the quality of the data.			
ACTION: If any sample analyzed as a soil contains more than 50% water, all data should be rejected.			
2.0 Holding Times			
2.1 Have any PEST/PCB holding times, determined from date of collection to date of extraction, been exceeded?	—	[✓]	—
Samples for PEST/PCB analysis, both soils and waters, must be extracted within seven days of the date of collection. Extracts must be analyzed within 40 days of the date of extraction.			
3.0 Surrogate Recovery (Form II)			
3.1 Are the PEST/PCB Surrogate Recovery Summaries (Form II) present for each of the following matrices:			
a. Low Water	[—]	—	✓
b. Med Water	[—]	—	✓
c. Low Soil	[✓]	—	—
d. Med Soil	[—]	—	✓
3.2 Are all the PEST/PCB samples listed on the appropriate Surrogate Recovery Summaries for each of the following matrices:			
a. Low Water	[—]	—	✓
b. Med Water	[—]	—	✓
c. Low Soil	[✓]	—	—
d. Med Soil	[—]	—	✓

TUT 001 0333

	YES	NO	N/A

ACTION: Call lab for explanation / resubmittals. If missing deliverables are unavailable, document effect on data under "Conclusions" section of reviewer narrative.

3.3 Were outliers marked correctly with an asterisk? [✓] ___ ___

ACTION: Circle all outliers in red.

3.4 Was surrogate (DBC) recovery outside of the contract specification for any sample or blank? ✓ [___] ___

ACTION: No qualification is done if surrogates are diluted beyond detection. If recovery is below contract limit (but above zero), flag all results for that sample "J". If recovery is zero, flag positive results "J" and non-detects "R". If recovery for the blank is zero, flag non-detects for all associated samples "R". If recovery is above contract limit, flag all positive results for that sample "J", unless in the reviewers professional judgement the high recovery is due to co-eluting interference (check the associated blank - if recovery is high there also, flag the sample data).

3.5 Are there any transcription/calculation errors between raw data and Form II? ___ [✓] ___

ACTION: If large errors exist, call lab for explanation / resubmittal, make any necessary corrections and note errors under "Conclusions".

4.0 Matrix Spikes (Form III)

4.1 Is the Matrix Spike Duplicate/Recovery Form (Form III) present? [✓] ___ ___

4.2 Were matrix spikes analyzed at the required frequency for each of the following matrices:

a. Low Water [___] ___ ✓

b. Med Water [___] ___ ✓

c. Low Soil [✓] ___ ___

d. Med Soil [___] ___ ✓

ACTION: If any matrix spike data are missing, take the action specified in 3.2 above.

4.3 How many PEST/PCB spike recoveries are outside QC limits?

Water	Soils
SDG MC BK978 N/A out of 12	6 out of 12
BT947 N/A	

	YES	NO	N/A

4.4 How many RPD's for matrix spike and matrix spike duplicate recoveries are outside QC limits?

	Water	Soils
SDG No. BK995 BT747	N/A out of 6 N/A	0 out of 6 1

ACTION: If MS and MSD both have less than zero recovery for an analyte, negative results for that analyte should be rejected, and positive results should be flagged "J". The above applies only to the sample used for MS/MSD analysis. Use professional judgement in applying this criterion to other samples.

5.0 Blanks (Form IV)

5.1 Is the Method Blank Summary (Form IV) present? [✓] ___ ___

5.2 Frequency of Analysis: for the analysis of Pesticide TCL compounds, has a reagent/method blank been analyzed for each set of samples or every 20 samples of similar matrix (low water, med water, low soil, medium soil), whichever is more frequent? [✓] ___ ___

5.3 Chromatography: review the blank raw data - chromatograms, quant reports or data system printouts.

Is the chromatographic performance (baseline stability) for each instrument acceptable for PEST/PCBs? [✓] ___ ___

ACTION: Use professional judgement to determine the effect on the data.

6.0 Contamination

NOTE: "Water blanks" and "distilled water blanks" are validated like any other sample and are not used to qualify data. Do not confuse them with the other QC blanks discussed below.

6.1 Do any method/instrument/reagent blanks have positive results for PEST/PCBs? When applied as described below, the contaminant concentration in these blanks are multiplied by the sample Dilution Factor. ___ [✓] ___

6.2 Do any field/rinse blanks have positive PEST/PCB results? ___ [___] ✓

ACTION: Prepare a list of the samples associated with each of the contaminated blanks. (Attach a separate sheet.)

YES NO N/A

NOTE: Only field/rinse blanks taken the same day as the samples are used to qualify data. Blanks may not be qualified because of contamination in another blank. Blanks may be qualified for surrogate, spectral, tuning or calibration QC problems.

ACTION: Follow the directions in the table below to qualify TCL results due to contamination. Use the largest value from all the associated blanks.

Sample conc > CRQL but < 5x blank	Sample conc < CRQL & is < 5x blank value	Sample conc > CRQL & > 5x blank value
Flag sample result with a "U"; cross out "B" flag	Reject sample result and report CRQL; cross out "B" flag	No qualification is needed

Are there field/rinse/equipment blanks associated with every sample? [ ] ✓ ___

ACTION: For low level samples, note in data assessment that there is no associated field/rinse/equipment blank. Exception: samples taken from a drinking water tap do not have associated field blanks.

7.0 Calibration and QC Performance

7.1 Are the following Gas Chromatograms and Data System Printouts for both Primary and Confirmation (confirmation standards not required if there are no positive results above CRQL) column present:

a. Evaluation Standard Mix A [✓] ___ ___

b. Evaluation Standard Mix B [✓] ___ ___

c. Evaluation Standard Mix C [✓] ___ ___

d. Individual Standard Mix A [✓] ___ ___

e. Individual Standard Mix B [✓] ___ ___

f. Multi-component Pesticides Toxaphene & Chlordane [✓] ___ ___

g. Aroclors 1016/1260 (1660) [✓] ___ ___

h. Aroclors 1221, 1232, 1242, 1248, and 1254 [✓] ___ ___

ACTION: If no, take action specified in 3.2 above

	YES	NO	N/A
7.2 Is Form VIII Pest-1 present and complete for each GC column (primary and confirmation) and each 72 hour sequence of analyses?	[✓]		

ACTION: If no, take action specified in 3.2 above.

7.3 Are there any transcription/calculation errors between raw data and Form VIII?		[✓]	

ACTION: If large errors exist, call lab for explanation / resubmittal, make any necessary corrections and note errors under "Conclusions".

7.4 Has the total breakdown on quantitation or confirmation column exceeded 20% for DDT?		[✓]	
- for Endrin?		[✓]	
or if Endrin aldehyde and 4,4'-DDD co-elute and there is a peak at their retention time, has the combined DDT and Endrin breakdown exceeded 20%?		[✓]	

ACTION:

a. If DDT breakdown is greater than 20% on quantitation column beginning with the samples following the last in control standard:

1. Flag all positive DDT results "J".
2. If DDT was not detected but DDD and/or DDE are positive, flag the DDT non-detect "R".
3. Flag positive DDD and DDE results "JN".
4. If DDT breakdown is > 20% on confirmation column and DDT is identified on quantitation column but not on confirmation column, use professional judgement to determine whether DDT should be reported on Form I (if reported, flag result "N").

b. If Endrin breakdown is > 20% on quantitation column, beginning with the samples following the last in control standard:

1. Flag all positive Endrin results "J".
2. If Endrin was not detected, but Endrin Aldehyde and/or Endrin Ketone are positive, flag the Endrin non-detect "R".
3. Flag Endrin Ketone positive results "JN".
4. If Endrin breakdown is > 20% on confirmation column and Endrin is identified on quantitation column but not on confirmation column, use professional judgement to determine whether Endrin should be reported on Form I (if reported, flag result "N").

c. If the combined breakdown is used (it can only be used if the conditions in 7.4 above are met) and is > 20% on quantitation column beginning with the last in control standard, take the actions specified in 7.4 a and b above. If the combined breakdown is >20% on confirmation column and Endrin or DDT is identified on quantitation column but not on confirmation column, use professional judgement to determine whether Endrin or DDT should be reported on Form I (if reported, flag result "N").

	YES	NO	N/A
7.5 Is the linearity check RSD of all four calibration factors <10% for the quantitation column?	[✓]	—	—
ACTION: If no, flag positive hits for all pesticide and PCB analytes "J" for all associated samples. Do not flag toxaphene or DDT if they are quantified from a 3-point calibration curve.			
7.6 Is the % difference between the EVAL A and each analysis (quantitation and confirmation) DBC retention time within QC limits (2% for packed column, 0.3% for capillary [I.D. < 0.32 mm], 1% for megabore [0.32 < I.D. < 2 mm]) ?	[—]	✓*	—
ACTION: DBC retention time cannot be evaluated if DBC is not detected. If it is present and has a retention time out of QC limits, then use professional judgement to determine the reliability of the analysis and flag results "R", if appropriate.			
7.7 Was the proper analytical sequence followed for each 72 hour period of analyses (page PEST D-36 in 8/87 SOW).	[✓]	—	—
ACTION: If no, use professional judgement to determine the severity of the effect on the data and accept or reject it accordingly. Generally, the effect is negligible unless the sequence was grossly altered or the calibration was also out of limits.			
8.0 Pesticide/PCB Standards Summary			
8.1 Is Form IX present and complete for each GC column and 72 hr sequence of analyses?	[—]	✓*	—
ACTION: If no, take action specified in 3.2 above.		*See assessment	
8.2 Are there any transcription/calculation errors between raw data and Form IX?	—	[✓]	—
ACTION: If large errors exist, call lab for explanation / resubmittal, make any necessary corrections and note errors under "Conclusions".			
8.3 Is DDT retention time for packed columns > 12 min (except OV-1 and OV-101 columns)?	[✓]	—	—
ACTION: If no, check that there is adequate resolution between individual components. If not, flag results for compounds that interfere with each other (co-elute) "R".			
8.4 Do all standard retention times fall within the windows established for the first IND A and IND B analyses?	[✓]	—	—

	YES	NO	N/A
ACTION: Beginning with the samples following the last <u>in control</u> standard, check to see if the chromatograms contain peaks within an expanded window surrounding the expected retention times. If no peaks are found and, DBC is visible non-detects are valid. If peaks are present and cannot be identified through "pattern recognition" or a consistent shift in standard retention times, flag all affected compound results "R".			
8.5 Are the continuing calibration standard calibration factors within 15% (for quantitation column) or 20% (for confirmation column) of the initial (at beginning of 72 hr sequence) calibration factors?	[✓]	—	—
ACTION: If no, flag all associated positive results "J". Use professional judgement to determine whether or not to flag non-detects.			
9.0 Pesticide/PCB Identification			
9.1 Is Form X complete for every sample in which a pesticide or PCB was detected?	[✓]	—	—
ACTION: If no, take action specified in 3.2 above.			
9.2 Are there any transcription errors between raw data and Form X?	—	[✓]	—
ACTION: If large errors exist, call lab for explanation / resubmittal, make any necessary corrections and note errors under "Conclusions".			
9.3 Are retention times of sample compounds within the calculated retention time windows for both quantitation and confirmation analyses?	[✓]	—	—
Was GC/MS confirmation provided when required (when compound concentration is > 10 ug/ml in final extract)?	[ ]	—	[✓]
ACTION: Reject ("R") all positive results (meeting quantitation column criteria, but missing confirmation by a second column or GC/MS (if appropriate). Also, reject ("R") all positive results not meeting retention time window criteria unless associated standard compounds are similarly biased (i.e. base on RRT to DBC).			
9.4 Check chromatograms for false negatives, especially for the multiple peak components toxaphene and PCB's. Were there any false negatives?	—	[✓]	—
ACTION: If appropriate PCB standards were not analyzed, or if the lab performed no confirmation analysis, flag the appropriate data with an "R".			

	YES	NO	N/A
10.0 Compound Quantitation and Reported Detection Limits			
10.1 Are there any transcription / calculation errors in Form I results? Check at least two positive values. Were any errors found?	___	[✓]	___
NOTE: Simple peak pesticide results can be checked for rough agreement between quantitative results obtained on the two GC columns. The reviewer should use professional judgement to decide whether a much larger concentration obtained on one column versus the other indicates the presence of an interfering compound. If an interfering compound is indicated, the lower of the two values should be reported and qualified as presumptively present at an estimated quantity ("JN"). This necessitates a determination of an estimated concentration on the confirmation column. The narrative should indicate that the presence of interferences has obscured the attempt at a second column confirmation.			
10.2 Are the CRQLs adjusted to reflect sample dilutions and, for soils, sample moisture?	[✓]	[___]	___
ACTION: If errors are large, call lab for explanation / resubmittal, make any necessary corrections and note errors under "Conclusions".			
ACTION: When a sample is analyzed at more than one dilution, the lowest CRQLs are used (unless a QC exceedance dictates the use of the higher CRQL data from the diluted sample analysis). Replace concentrations that exceed the calibration range in the original analysis by crossing out the "E" value on the original Form I and substituting it with data from the analysis of diluted sample. Specify which Form I is to be used, then draw a red "X" across the entire page of all Form I's that should not be used, including any in the summary package.			
11.0 Chromatogram Quality			
11.1 Were baselines stable?	[✓]	___	___
11.2 Were any electropositive displacement (negative peaks) or unusual peaks seen?	___	[✓]	___
11.3 Were early eluting peaks (for early eluting analytes) resolved to baseline?	[✓]	___	___
ACTION: For 11.1 and 11.2, comment only. For 11.3, reject ("R") those analytes that are not sufficiently resolved.			

	YES	NO	N/A
2.0 Field Duplicates			
12.1 Were any field duplicates submitted for PEST/PCB analysis?	[✓]	___	___

ACTION: Compare the reported results for field duplicates and calculate the relative percent difference.

ACTION: Any gross variation between field duplicate results must be addressed in the reviewer narrative. However, if large differences exist, identification of field duplicates should be confirmed by contacting the sampler.

RECEIVED
AUG 07 1989

ORGANICS
LABORATORY RESPONSE TO RESULTS OF CCS

SAMPLE	FRACTION	CRITERION	COMMENTS
~~Blank~~	~~A~~		
BV151	BNA	II	CRQL for phenol was changed to 900,000.
	VOA	II	Task Narrative was revised with the Region dated.
BV165	VOA	II	Again for benzene & chlorobenzene
PBlk03	Pest	P3	PBlk03 was renamed as PBLK03 ~~was renamed~~ (as PBK01 because to the new blank run on different instruments on different days
all	VOA	II	Injection date + time was written on all TICs
all	BNA	II	Injection date & time was written on all TICs

Previously turned in case, by Meredith

Resubmittals

No effect on duty (or have also been inserted into package

R. Carter

7/7/89

1912 of 4338

REJECTION SUMMARY FORM
(No. of Compounds/No. of Fractions (Samples))

Type of Review: Total Date: 4/23/90 Case #: 12058

Project: Tutu Lab Name: Ceimic

Reviewer's Initials: RC Number of Samples: 33

Analytes Rejected Due to Exceeding Review Criteria:

	Surrogates	Holding Time	Calibration	Contamination	ID	Other	* Total # Samples	Total # Rejected/ Total # in all Samples
Acids (15)	0	0	0	0	0	2 (MS)	25	2 / 375
B/N (50)	↓	↓	↓	↓	↓	4	25	4 / 1250
VOA (~~35~~ 34)	↓	↓	7	12	↓	0	21	16 / 714
PEST (20)	↓	↓	0	0	20	↓	25	20 / 500
PCB (7)	↓	↓	↓	↓	7	↓	25	7 / 175
TCDD (1)								

Analytes Estimated Due to Exceeding Review Criteria for:

Acids (15)	0	0	0	0	0	0	25	0 / 375
B/N (50)	↓	↓	8	↓	↓	7 (IS)	25	15 / 1250
VOA (~~35~~ 34)	↓	370	31	↓	↓	1	21	402 / 714
PEST (20)	↓	0	0	↓	↓	0	25	0 / 500
PCB (7)	↓	↓	↓	↓	↓	↓	25	0 / 175
TCDD (1)								

* Includes any trip and field blanks, which are not subject to qualification based on some QC criteria (such as method blank contamination).

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TUT 001 0344

CEIMIC
CORPORATION

DATE: 4/17/90 FAX# 212-267-3057

TO: EPA - Region II
(COMPANY NAME)

ATTN: Rhonda Carter
(NAME)

FROM: Kin Chiu

NUMBER OF PAGES 4 (INCLUDING COVERSHEET)

RE:

COMMENTS/INSTRUCTIONS:

'X' qualifier – in VOA analysis for xylenes, the isomers are added together for reporting purpose in FORM I A

BX 267 spectra missing for Carbontetrachloride and Trichloroethene
BX268 " " " Benzene and Chlorobenzene
BX976 " " " Acetone

These are not in original data; and if needed, CEIMIC can retrieve the information from the magnetic tapes. This will take a few days.

The recovery of chlorobenzene is confirmed to be 106% in BX266 MSD

400 Dean Knauss Drive, Narragansett, R.I. 02882 • (401) 782-8900 • FAX (401) 7

TUT 001 0345

In Reference to Case No(s):

12058

Contract Laboratory Program
REGIONAL/LABORATORY COMMUNICATION SYSTEM

Telephone Record Log

Date of Call: 4/17/90

Laboratory Name: CEIMIC

Lab Contact: Kin S Chiu

Region: II

Regional Contact: R. Carter

Call Initiated By: ___ Laboratory ✓ Region

In reference to data for the following sample number(s):

VOA + ~~BNA~~ Fractions all samples
VOA SDG BT747

Summary of Questions/Issues Discussed:

① Lab use X qualifier - does not provide explanation in narrative

② Please submit missing spectra (VOA), if available
Samples BX266 - carbon tetrachloride + trichloroethene
BX263 - benzene + chlorobenzene
BY976 - acetone

③ Confirm ~~BX~~ calculation MSD chlorobenzene for BX266

Summary of Resolution:

See attached fax

R. Carter
Signature

4/17/90
Date

Distribution: (1) Lab Copy, (2) Region Copy, (3) SMO Copy

TUT 001 0346

CEIMIC
CORPORATION

DATE: 1/29/90 FAX# 1-212-267-3057

TO: EPA Region II
(COMPANY NAME)

ATTN: Rhonda
(NAME)

FROM: Kin Chiu

NUMBER OF PAGES 3 (INCLUDING COVERSHEET)

RE: BFB Tunes on 6/16/89

COMMENTS/INSTRUCTIONS:

100 Dean Knauss Drive, Narragansett, R.I. 02882 • (401) 782-8900 • FAX (401) 782-8905

TLIT 001 0347

In Reference to Case No(s): 12058

Contract Laboratory Program
REGIONAL/LABORATORY COMMUNICATION SYSTEM
Telephone Record Log

Date of Call: 1/29/90

Laboratory Name: CEIMIC
Lab Contact: Kin S Chiu (401) 782-8900

Region: II
Regional Contact: Rhonda Carter

Call Initiated By: ___ Laboratory ✓ Region

In reference to data for the following sample number(s):
All in BNA + Pest fraction
SDG BT747 - sample BY759

Summary of Questions/Issues Discussed:
BNA · Confirm CRQL and positive hit calculation
ie. sample SDG - BX998 Phenol (CRQL) sample BY773
sample SDG - BT747 Phenol (positive hit) sample BY759

SDG-BT747 sample BY759MSD did lab use dilution of 210 or 200? [Form I states 200 raw data states 210]
VOA · Missing raw data for GC/MS Tune at 6/16/89 12:12, Heave below

Summary of Resolution:
BNA ① Minor differences in calculations due to software formatting
② BY759 MSD dilution factor should be 200

VOA · Will fax missing raw data

Rhonda Carter
Signature

1-29-90
Date

Distribution: (1) Lab Copy, (2) Region Copy, (3) SMO Copy

In Reference to Case No(s):
12053

Contract Laboratory Program
REGIONAL/LABORATORY COMMUNICATION SYSTEM
Telephone Record Log

Date of Call: 4/17/90

Laboratory Name: CC [illegible]
Lab Contact: [illegible]
Region: II
Regional Contact: R Carter

Call Initiated By: ___ Laboratory ✓ Region

* Do to poor copy quality I traced over the Original for better resolution Some words were not identifiable
Richard Tenberg 6/4/91

In reference to data for the following sample number(s):
VOA — Fractions all samples
VOA SNG BT 247

Summary of Questions/Issues Discussed:
(1) Lab use X qualifier - does not - no explanation
(2) Please submit mass spectrum (VOA) if available.
BX269 - carbon tetrachloride + trichloroethene
BX266 - benzene + chlorobenzene
BX276 - acetone
— calculation MSD chlorobenzene for BX266

Summary of Resolution:
See Attached fax

R Carter
Signature

4/17/90
Date

Distribution: (1) Lab Copy, (2) Region Copy, (3) SMO Copy

TLIT 001 0349

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BT747

Lab Name: SEIMIC CORP Contract: 68D90025

Lab Code: SEIMIC Case No.: 12058 SAS No.: _____ SDG No.: BT747

Matrix: (soil/water) SOIL Lab Sample ID: 890107-01

Sample wt/vol: 5.0 (g/mL) G Lab File ID: C0354

Level: (low/med) LOW Date Received: 06/08/89

% Moisture: not dec. 8 Date Analyzed: 06/15/89

Column: (pack/cap) PACK Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	11	U
74-83-9	Bromomethane	11	U
75-01-4	Vinyl Chloride	11	U
75-00-3	Chloroethane	11	U
75-09-2	Methylene Chloride	55	B
67-64-1	Acetone	20	B
75-15-0	Carbon Disulfide	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	5	U
540-59-0	1,2-Dichloroethene (total)	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone	11	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon Tetrachloride	5	U
108-05-4	Vinyl Acetate	11	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	5	U
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	Trans-1,3-Dichloropropene	5	U
75-25-2	Bromoform	5	U
108-10-1	4-Methyl-2-Pentanone	11	U
591-78-6	2-Hexanone	11	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Total Xylenes	5	U

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BT748

Lab Name: CERMIC CORP Contract: 68D90028

Lab Code: CERMIC Case No.: 12058 SAS No.: _____ SDG No.: BT747

Matrix: (soil/water) SOIL Lab Sample ID: 890107-02

Sample wt/vol: 5.0 (g/mL) G Lab File ID: C0355

Level: (low/med) LOW Date Received: 06/08/89

% Moisture: not dec. 9 Date Analyzed: 06/15/89

Column: (pack/cap) PACK Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	11	U
74-83-9	Bromomethane	11	U
75-01-4	Vinyl Chloride	11	U
75-00-3	Chloroethane	11	U
75-09-2	Methylene Chloride	67	B
67-64-1	Acetone	11	U
75-15-0	Carbon Disulfide	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	5	U
540-59-0	1,2-Dichloroethene (total)	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone	11	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon Tetrachloride	5	U
108-05-4	Vinyl Acetate	11	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	5	U
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	Trans-1,3-Dichloropropene	5	U
75-25-2	Bromoform	5	U
108-10-1	4-Methyl-2-Pentanone	11	U
591-78-6	2-Hexanone	11	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Total Xylenes	5	U

185

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BT749

Lab Name: CEIMIC CORP Contract: 68D90022

Lab Code: CEIMIC Case No.: 12058 SAS No.: _____ SDG No.: BT747

Matrix: (soil/water) SOIL Lab Sample ID: 890107-03

Sample wt/vol: 5.0 (g/mL) G Lab File ID: C0356

Level: (low/med) LOW Date Received: 06/08/89

% Moisture: not dec. 14 Date Analyzed: 06/15/89

Column: (pack/cap) PACK Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	12	U
74-83-9	Bromomethane	12	U
75-01-4	Vinyl Chloride	12	U
75-00-3	Chloroethane	12	U
75-09-2	Methylene Chloride	63	B
67-64-1	Acetone	6	BJ
75-15-0	Carbon Disulfide	6	U
75-35-4	1,1-Dichloroethene	6	U
75-34-3	1,1-Dichloroethane	6	U
540-59-0	1,2-Dichloroethene (total)	6	U
67-66-3	Chloroform	6	U
107-06-2	1,2-Dichloroethane	6	U
78-93-3	2-Butanone	12	U
71-55-6	1,1,1-Trichloroethane	6	U
56-23-5	Carbon Tetrachloride	6	U
108-05-4	Vinyl Acetate	12	U
75-27-4	Bromodichloromethane	6	U
78-87-5	1,2-Dichloropropane	6	U
10061-01-5	cis-1,3-Dichloropropene	6	U
79-01-6	Trichloroethene	6	U
124-48-1	Dibromochloromethane	6	U
79-00-5	1,1,2-Trichloroethane	6	U
71-43-2	Benzene	6	U
10061-02-6	Trans-1,3-Dichloropropene	6	U
75-25-2	Bromoform	6	U
108-10-1	4-Methyl-2-Pentanone	12	U
591-78-6	2-Hexanone	12	U
127-18-4	Tetrachloroethene	6	U
79-34-5	1,1,2,2-Tetrachloroethane	6	U
108-88-3	Toluene	6	U
108-90-7	Chlorobenzene	6	U
100-41-4	Ethylbenzene	6	U
100-42-5	Styrene	6	U
1330-20-7	Total Xylenes	6	U

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BX262

Lab Name: CHEMIC CORP Contract: 68D90029

Lab Code: CHEMIC Case No.: 12058 SAS No.: _____ SDG No.: BT747

Matrix: (soil/water) SOIL Lab Sample ID: 890107-04

Sample wt/vol: 5.0 (g/mL) G Lab File ID: C0357

Level: (low/med) LOW Date Received: 06/08/89

% Moisture: not dec. 16 Date Analyzed: 06/15/89

Column: (pack/cap) PACK Dilution Factor: 1.0

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

CAS NO.	COMPOUND	Q
74-87-3	Chloromethane	12 U
74-83-9	Bromomethane	12 U
75-01-4	Vinyl Chloride	12 U
75-00-3	Chloroethane	12 U
75-09-2	Methylene Chloride	63 B
67-64-1	Acetone	12 B
75-15-0	Carbon Disulfide	6 U
75-35-4	1,1-Dichloroethene	6 U
75-34-3	1,1-Dichloroethane	6 U
540-59-0	1,2-Dichloroethene (total)	6 U
67-66-3	Chloroform	6 U
107-06-2	1,2-Dichloroethane	6 U
78-93-3	2-Butanone	12 U
71-55-6	1,1,1-Trichloroethane	6 U
56-23-5	Carbon Tetrachloride	6 U
108-05-4	Vinyl Acetate	12 U
75-27-4	Bromodichloromethane	6 U
78-87-5	1,2-Dichloropropane	6 U
10061-01-5	cis-1,3-Dichloropropene	6 U
79-01-6	Trichloroethene	6 U
124-48-1	Dibromochloromethane	6 U
79-00-5	1,1,2-Trichloroethane	6 U
71-43-2	Benzene	6 U
10061-02-6	Trans-1,3-Dichloropropene	6 U
75-25-2	Bromoform	6 U
108-10-1	4-Methyl-2-Pentanone	12 U
591-78-6	2-Hexanone	12 U
127-18-4	Tetrachloroethene	6 U
79-34-5	1,1,2,2-Tetrachloroethane	6 U
108-88-3	Toluene	6 U
108-90-7	Chlorobenzene	6 U
100-41-4	Ethylbenzene	6 U
100-42-5	Styrene	6 U
1330-20-7	Total Xylenes	6 U

15

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

DX242

Lab Name: CEIMIC CORP Contract: 68D90028

Lab Code: CEIMIC Case No.: 12058 SAS No.: _____ SDG No.: BT747

Matrix: (soil/water) SOIL Lab Sample ID: 890107-04

Sample wt/vol: 5.0 (g/mL) G Lab File ID: 00357

Level: (low/med) LOW Date Received: 06/08/89

% Moisture: not dec. 16 Date Analyzed: 06/15/89

Column (pack/cap) PACK Dilution Factor: 1.0

Number TICs found: 0 CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

T3263

Lab Name: CRIMIC CORP Contract: 68D90055

Lab Code: CRIMIC Case No.: 12056 SAS No.: _____ SDG No.: BT7A7

Matrix: (soil/water) SOIL Lab Sample ID: 890617-05

Sample wt/vol: 5.0 (g/mL) G Lab File ID: C0362

Level: (low/med) LOW Date Received: 06/08/89

% Moisture: not dec. 12 Date Analyzed: 06/16/89

Column: (pack/cap) PACK Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	11	U
74-83-9	Bromomethane	11	U
75-01-4	Vinyl Chloride	11	U
75-00-3	Chloroethane	11	U
75-09-2	Methylene Chloride	7	
67-64-1	Acetone	11	U
75-15-0	Carbon Disulfide	6	U
75-35-4	1,1-Dichloroethene	6	U
75-34-3	1,1-Dichloroethane	6	U
540-59-0	1,2-Dichloroethene (total)	6	U
67-66-3	Chloroform	6	U
107-06-2	1,2-Dichloroethane	6	U
78-93-3	2-Butanone	11	U
71-55-6	1,1,1-Trichloroethane	6	U
56-23-5	Carbon Tetrachloride	6	U
108-05-4	Vinyl Acetate	11	U
75-27-4	Bromodichloromethane	6	U
78-87-5	1,2-Dichloropropane	6	U
10061-01-5	cis-1,3-Dichloropropene	6	U
79-01-6	Trichloroethene	6	U
124-48-1	Dibromochloromethane	6	U
79-00-5	1,1,2-Trichloroethane	6	U
71-43-2	Benzene	6	U
10061-02-6	Trans-1,3-Dichloropropene	6	U
75-25-2	Bromoform	6	U
108-10-1	4-Methyl-2-Pentanone	11	U
591-78-6	2-Hexanone	11	U
127-18-4	Tetrachloroethene	6	U
79-34-5	1,1,2,2-Tetrachloroethane	6	U
108-88-3	Toluene	6	U
108-90-7	Chlorobenzene	6	U
100-41-4	Ethylbenzene	6	U
100-42-5	Styrene	6	U
1330-20-7	Total Xylenes	6	U

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BX263

Lab Name: CEIMIC CORP Contract: 68D90028

Lab Code: CEIMIC Case No.: 12058 SAS No.: _____ SDG No.: BT747

Matrix: (soil/water) SOIL Lab Sample ID: 890107-05

Sample wt/vol: 30.6 (g/mL) G Lab File ID: A1277

Level: (low/med) LOW Date Received: 06/08/89

% Moisture: not dec. 14 dec. _____ Date Extracted: 06/12/89

Extraction: (SepF/Cont/Sonc) SONC Date Analyzed: 07/01/89

GPC Cleanup: (Y/N) N pH: 7.1 Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	C
99-09-2	3-Nitroaniline	1900	U
83-32-9	Acenaphthene	380	U
51-28-5	2,4-Dinitrophenol	1900	U
100-02-7	4-Nitrophenol	1900	U
132-64-9	Dibenzofuran	380	U
121-14-2	2,4-Dinitrotoluene	380	U
84-66-2	Diethylphthalate	380	U
7005-72-3	4-Chlorophenyl-phenylether	380	U
86-73-7	Fluorene	380	U
100-10-6	4-Nitroaniline	1900	U
534-52-1	4,6-Dinitro-2-Methylphenol	1900	U
86-30-6	N-Nitrosodiphenylamine (1)	380	U
101-55-3	4-Bromophenyl-phenylether	380	U
118-74-1	Hexachlorobenzene	380	U
87-86-5	Pentachlorophenol	1900	U
85-01-8	Phenanthrene	380	U
120-12-7	Anthracene	380	U
84-74-2	Di-n-Butylphthalate	380	U
206-44-0	Fluoranthene	380	U
129-00-0	Pyrene	380	U
85-68-7	Butylbenzylphthalate	380	U
91-94-1	3,3'-Dichlorobenzidine	770	U
56-55-3	Benzo(a)Anthracene	380	U
218-01-9	Chrysene	380	U
117-81-7	bis(2-Ethylhexyl)Phthalate	46	J
117-84-0	Di-n-Octyl Phthalate	380	U
205-99-2	Benzo(b)Fluoranthene	380	U
207-08-9	Benzo(k)Fluoranthene	380	U
50-32-8	Benzo(a)Pyrene	380	U
193-39-5	Indeno(1,2,3-cd)Pyrene	380	U
53-70-3	Dibenz(a,h)Anthracene	380	U
191-24-2	Benzo(g,h,i)Perylene	380	U

(1) - Cannot be separated from Diphenylamine

490

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BX264

Lab Name: CRINIC CORP Contract: 68D90039

Lab Code: CRINIC Case No.: 12038 SAS No.: _____ SDG No.: BT747

Matrix: (soil/water) SOIL Lab Sample ID: 890107-06

Sample wt/vol: 5.0 (g/mL) G Lab File ID: CC363

Level: (low/med) LOW Date Received: 06/00/89

% Moisture: not dec. 13 Date Analyzed: 06/16/89

Column: (pack/cap) PACK Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	11	U
74-83-9	Bromomethane	11	U
75-01-4	Vinyl Chloride	11	U
75-00-3	Chloroethane	11	U
75-09-2	Methylene Chloride	4	J
67-64-1	Acetone	11	U
75-15-0	Carbon Disulfide	6	U
75-35-4	1,1-Dichloroethene	6	U
75-34-3	1,1-Dichloroethane	6	U
540-59-0	1,2-Dichloroethene (total)	6	U
67-66-3	Chloroform	6	U
107-06-2	1,2-Dichloroethane	6	U
78-93-3	2-Butanone	11	U
71-55-6	1,1,1-Trichloroethane	6	U
56-23-5	Carbon Tetrachloride	6	U
108-05-4	Vinyl Acetate	11	U
75-27-4	Bromodichloromethane	6	U
78-87-5	1,2-Dichloropropene	6	U
10061-01-5	cis-1,3-Dichloropropene	6	U
79-01-6	Trichloroethene	6	U
124-48-1	Dibromochloromethane	6	U
79-00-5	1,1,2-Trichloroethane	6	U
71-43-2	Benzene	6	U
10061-02-6	Trans-1,3-Dichloropropene	6	U
75-25-2	Bromoform	6	U
108-10-1	4-Methyl-2-Pentanone	11	U
591-78-6	2-Hexanone	11	U
127-18-4	Tetrachloroethene	6	U
79-34-5	1,1,2,2-Tetrachloroethane	6	U
108-88-3	Toluene	6	U
108-90-7	Chlorobenzene	6	U
100-41-4	Ethylbenzene	6	U
100-42-5	Styrene	6	U
1330-20-7	Total Xylenes	6	U

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BX265

Lab Name: CHEMIC CORP Contract: 68D90028

Lab Code: CHEMIC Case No.: 12058 SAS No.: _____ SDG No.: BT747

Matrix: (soil/water) SOIL Lab Sample ID: 890107-07

Sample wt/vol: 5.0 (g/mL) G Lab File ID: C0364

Level: (low/med) LOW Date Received: 06/08/89

% Moisture: not dec. 11 Date Analyzed: 06/16/89

Column: (pack/cap) PACK Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	11	U
74-83-9	Bromomethane	11	U
75-01-4	Vinyl Chloride	11	U
75-00-3	Chloroethane	11	U
75-09-2	Methylene Chloride	4	J
67-64-1	Acetone	11	U
75-15-0	Carbon Disulfide	6	U
75-35-4	1,1-Dichloroethene	6	U
75-34-3	1,1-Dichloroethane	6	U
540-59-0	1,2-Dichloroethene (total)	6	U
67-66-3	Chloroform	6	U
107-06-2	1,2-Dichloroethane	6	U
78-93-3	2-Butanone	11	U
71-55-6	1,1,1-Trichloroethane	6	U
56-23-5	Carbon Tetrachloride	6	U
108-05-4	Vinyl Acetate	11	U
75-27-4	Bromodichloromethane	6	U
78-87-5	1,2-Dichloropropane	6	U
10061-01-5	cis-1,3-Dichloropropene	6	U
79-01-6	Trichloroethene	6	U
124-48-1	Dibromochloromethane	6	U
79-00-5	1,1,2-Trichloroethane	6	U
71-43-2	Benzene	6	U
10061-02-6	Trans-1,3-Dichloropropene	6	U
75-25-2	Bromoform	6	U
108-10-1	4-Methyl-2-Pentanone	11	U
591-78-6	2-Hexanone	11	U
127-18-4	Tetrachloroethene	6	U
79-34-5	1,1,2,2-Tetrachloroethane	6	U
108-88-3	Toluene	6	U
108-90-7	Chlorobenzene	6	U
100-41-4	Ethylbenzene	6	U
100-42-5	Styrene	6	U
1330-20-7	Total Xylenes	6	U

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

5X266

Lab Name: CEIMIC CORP Contract: 68D90055

Lab Code: CEIMIC Case No.: 12058 SAS No.: _____ CFS No.: ST747

Matrix: (soil/water) SOIL Lab Sample ID: 890107-05

Sample wt/vol: 5.0 (g/mL) G Lab File ID: C0365

Level: (low/med) LOW Date Received: 06/08/89

% Moisture: not dec. 11 Date Analyzed: 06/16/89

Column: (pack/cap) PACK Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	11	U
74-83-9	Bromomethane	11	U
75-01-4	Vinyl Chloride	11	U
75-00-3	Chloroethane	11	U
75-09-2	Methylene Chloride	6	U
67-64-1	Acetone	11	U
75-15-0	Carbon Disulfide	6	U
75-35-4	1,1-Dichloroethene	6	U
75-34-3	1,1-Dichloroethane	6	U
540-59-0	1,2-Dichloroethene (total)	6	U
67-66-3	Chloroform	6	U
107-06-2	1,2-Dichloroethane	6	U
78-93-3	2-Butanone	11	U
71-55-6	1,1,1-Trichloroethane	6	U
56-23-5	Carbon Tetrachloride	6	U
108-05-4	Vinyl Acetate	11	U
75-27-4	Bromodichloromethane	6	U
78-87-5	1,2-Dichloropropane	6	U
10061-01-5	cis-1,3-Dichloropropene	6	U
79-01-6	Trichloroethene	6	U
124-48-1	Dibromochloromethane	6	U
79-00-5	1,1,2-Trichloroethane	6	U
71-43-2	Benzene	6	U
10061-02-6	Trans-1,3-Dichloropropene	6	U
75-25-2	Bromoform	6	U
108-10-1	4-Methyl-2-Pentanone	11	U
591-78-6	2-Hexanone	11	U
127-18-4	Tetrachloroethene	6	U
79-34-5	1,1,2,2-Tetrachloroethane	6	U
108-88-3	Toluene	6	U
108-90-7	Chlorobenzene	6	U
100-41-4	Ethylbenzene	6	U
100-42-5	Styrene	6	U
1330-20-7	Total Xylenes	6	U

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BX266MSD

Lab Name: CEIMIC CORP Contract: 68D90028

Lab Code: CEIMIC Case No.: 13058 SAS No.: _____ SDG No.: BT747

Matrix: (soil/water) SOIL Lab Sample ID: S90107-08MSD

Sample wt/vol: 5.0 (g/mL) G Lab File ID: C0373

Level: (low/med) LOW Date Received: 06/08/89

% Moisture: not dec. 11 Date Analyzed: 06/17/89

Column: (pack/cap) PACK Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	11	U
74-83-9	Bromomethane	11	U
75-01-4	Vinyl Chloride	11	U
75-00-3	Chloroethane	11	U
75-09-2	Methylene Chloride	10	B
67-64-1	Acetone	2	J
75-15-0	Carbon Disulfide	6	U
75-35-4	1,1-Dichloroethene	6	U
75-34-3	1,1-Dichloroethane	6	U
540-59-0	1,2-Dichloroethene (total)	6	U
67-66-3	Chloroform	6	U
107-06-2	1,2-Dichloroethane	6	U
78-93-3	2-Butanone	11	U
71-55-6	1,1,1-Trichloroethane	6	U
56-23-5	Carbon Tetrachloride	6	U
108-05-4	Vinyl Acetate	11	U
75-27-4	Bromodichloromethane	6	U
78-87-5	1,2-Dichloropropane	6	U
10061-01-5	cis-1,3-Dichloropropene	6	U
79-01-6	Trichloroethene	6	U
124-48-1	Dibromochloromethane	6	U
79-00-5	1,1,2-Trichloroethane	6	U
71-43-2	Benzene	6	U
10061-02-6	Trans-1,3-Dichloropropene	6	U
75-25-2	Bromoform	6	U
108-10-1	4-Methyl-2-Pentanone	11	U
591-78-6	2-Hexanone	11	U
127-18-4	Tetrachloroethene	6	U
79-34-5	1,1,2,2-Tetrachloroethane	6	U
108-88-3	Toluene	6	U
108-90-7	Chlorobenzene	6	U
100-41-4	Ethylbenzene	6	U
100-42-5	Styrene	6	U
1330-20-7	Total Xylenes	6	U

441

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BX267

Lab Name: SEIMIC CORP Contract: 68D90053

Lab Code: SEIMIC Case No.: 12368 SAS No.: _____ SDG No.: BT747

Matrix: (soil/water) SOIL Lab Sample ID: 890107-09

Sample wt/vol: 5.0 (g/mL) G Lab File ID: B2368

Level: (low/med) LOW Date Received: 06/08/89

% Moisture: not dec. 13 Date Analyzed: 06/16/89

Column: (pack/cap) PACK Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	11	U
74-83-9	Bromomethane	11	U
75-01-4	Vinyl Chloride	11	U
75-00-3	Chloroethane	11	U
75-09-2	Methylene Chloride	31	
67-64-1	Acetone	8	J
75-15-0	Carbon Disulfide	6	U
75-35-4	1,1-Dichloroethene	6	U
75-34-3	1,1-Dichloroethane	6	U
540-59-0	1,2-Dichloroethene (total)	6	U
67-66-3	Chloroform	6	U
107-06-2	1,2-Dichloroethane	6	U
78-93-3	2-Butanone	11	U
71-55-6	1,1,1-Trichloroethane	39	
56-23-5	Carbon Tetrachloride	5	J
108-05-4	Vinyl Acetate	11	U
75-27-4	Bromodichloromethane	6	U
78-87-5	1,2-Dichloropropane	6	U
10061-01-5	cis-1,3-Dichloropropene	6	U
79-01-6	Trichloroethene	3	J
124-48-1	Dibromochloromethane	6	U
79-00-5	1,1,2-Trichloroethane	6	U
71-43-2	Benzene	3	J
10061-02-6	Trans-1,3-Dichloropropene	6	U
75-25-2	Bromoform	6	U
108-10-1	4-Methyl-2-Pentanone	11	U
591-78-6	2-Hexanone	11	U
127-18-4	Tetrachloroethene	160	
79-34-5	1,1,2,2-Tetrachloroethane	6	U
108-88-3	Toluene	6	U
108-90-7	Chlorobenzene	1	J
100-41-4	Ethylbenzene	6	U
100-42-5	Styrene	6	U
1330-20-7	Total Xylenes	140	X

230

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BX268

Lab Name: CCIMIC CORP Contract: 68D90028

Lab Code: CCIMIC Case No.: 12058 SAS No.: _____ SDG No.: BT747

Matrix: (soil/water) SOIL Lab Sample ID: 890167-10

Sample wt/vol: 5.0 (g/mL) G Lab File ID: C0374

Level: (low/med) LOW Date Received: 06/08/89

% Moisture: not dec. 11 Date Analyzed: 06/17/89

Column: (pack/cap) PACK Dilution Factor: 1.0

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

CAS NO.	COMPOUND	Q
74-87-3	Chloromethane	U
74-83-9	Bromomethane	U
75-01-4	Vinyl Chloride	U
75-00-3	Chloroethane	U
75-09-2	Methylene Chloride	U
67-64-1	Acetone	U
75-15-0	Carbon Disulfide	U
75-35-4	1,1-Dichloroethene	U
75-34-3	1,1-Dichloroethane	U
540-59-0	1,2-Dichloroethene (total)	U
67-66-3	Chloroform	U
107-06-2	1,2-Dichloroethane	U
78-93-3	2-Butanone	U
71-55-6	1,1,1-Trichloroethane	U
56-23-5	Carbon Tetrachloride	U
108-05-4	Vinyl Acetate	U
75-27-4	Bromodichloromethane	U
78-87-5	1,2-Dichloropropane	U
10061-01-5	cis-1,3-Dichloropropene	U
79-01-6	Trichloroethene	U
124-48-1	Dibromochloromethane	U
79-00-5	1,1,2-Trichloroethane	U
71-43-2	Benzene	J
10061-02-6	Trans-1,3-Dichloropropene	U
75-25-2	Bromoform	U
108-10-1	4-Methyl-2-Pentanone	U
591-78-6	2-Hexanone	U
127-18-4	Tetrachloroethene	U
79-34-5	1,1,2,2-Tetrachloroethane	U
108-88-3	Toluene	U
108-90-7	Chlorobenzene	J
100-41-4	Ethylbenzene	U
100-42-5	Styrene	U
1330-20-7	Total Xylenes	U

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BX976

Lab Name: CEIMIC CORP Contract: 68D90028

Lab Code: CEIMIC Case No.: 12058 SAS No.: _____ SDG No.: BT747

Matrix: (soil/water) SOIL Lab Sample ID: 890107-15

Sample wt/vol: 5.0 (g/mL) G Lab File ID: B1651

Level: (low/med) LOW Date Received: 06/10/89

% Moisture: not dec. 13 Date Analyzed: 06/19/89

Column: (pack/cap) PACK Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG		Q
74-87-3	Chloromethane	11	U	J
74-83-9	Bromomethane	11	U	
75-01-4	Vinyl Chloride	11	U	
75-00-3	Chloroethane	11	U	
75-09-2	Methylene Chloride	6	U	Re
67-64-1	Acetone	67		N
75-15-0	Carbon Disulfide	7		
75-35-4	1,1-Dichloroethene	6	U	
75-34-3	1,1-Dichloroethane	6	U	
540-59-0	1,2-Dichloroethene (total)	6	U	
67-66-3	Chloroform	6	U	
107-06-2	1,2-Dichloroethane	6	U	
78-93-3	2-Butanone	33		
71-55-6	1,1,1-Trichloroethane	6	U	
56-23-5	Carbon Tetrachloride	6	U	
108-05-4	Vinyl Acetate	11	U	
75-27-4	Bromodichloromethane	6	U	
78-87-5	1,2-Dichloropropane	6	U	
10061-01-5	cis-1,3-Dichloropropene	6	U	
79-01-6	Trichloroethene	6	U	
124-48-1	Dibromochloromethane	6	U	
79-00-5	1,1,2-Trichloroethane	6	U	
71-43-2	Benzene	13		
10061-02-6	Trans-1,3-Dichloropropene	6	U	
75-25-2	Bromoform	6	U	
108-10-1	4-Methyl-2-Pentanone	20		
591-78-6	2-Hexanone	11	U	
127-18-4	Tetrachloroethene	6	U	
79-34-5	1,1,2,2-Tetrachloroethane	6	U	
108-88-3	Toluene	6	U	
108-90-7	Chlorobenzene	6	U	
100-41-4	Ethylbenzene	110		
100-42-5	Styrene	6	U	
1330-20-7	Total Xylenes	6	U	

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BX977

Lab Name: CEIMIC CORP Contract: 68D90038

Lab Code: CEIMIC Case No.: 12058 SAS No.: _____ SDG No.: BT747

Matrix: (soil/water) SOIL Lab Sample ID: 890107-16

Sample wt/vol: 30.5 (g/mL) G Lab File ID: A125I

Level: (low/med) LOW Date Received: 06/10/89

% Moisture: not dec. 19 dec. ____ Date Extracted: 06/12/89

Extraction: (SepF/Cont/Sonc) SONC Date Analyzed: 06/29/89

GPC Cleanup: (Y/N) N pH: 7.9 Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
108-95-2	Phenol	410	U
111-44-4	bis(2-Chloroethyl)Ether	410	U
95-57-8	2-Chlorophenol	410	U
541-73-1	1,3-Dichlorobenzene	410	U
106-46-7	1,4-Dichlorobenzene	410	U
100-51-6	Benzyl Alcohol	410	U
95-50-1	1,2-Dichlorobenzene	410	U
95-48-7	2-Methylphenol	410	U
39638-32-9	bis(2-Chloroisopropyl)Ether	410	U
106-44-5	4-Methylphenol	410	U
621-64-7	N-Nitroso-Di-n-Propylamine	410	U
67-72-1	Hexachloroethane	410	U
98-95-3	Nitrobenzene	410	U
78-59-1	Isophorone	410	U
88-75-5	2-Nitrophenol	410	U
105-67-9	2,4-Dimethylphenol	410	U
65-85-0	Benzoic Acid	2000	U
111-91-1	bis(2-Chloroethoxy)Methane	410	U
120-83-2	2,4-Dichlorophenol	410	U
120-82-1	1,2,4-Trichlorobenzene	410	U
91-20-3	Naphthalene	410	U
106-47-8	4-Chloroaniline	410	U
87-68-3	Hexachlorobutadiene	410	U
59-50-7	4-Chloro-3-Methylphenol	410	U
91-57-6	2-Methylnaphthalene	410	U
77-47-4	Hexachlorocyclopentadiene	410	U
88-06-2	2,4,6-Trichlorophenol	410	U
95-95-4	2,4,5-Trichlorophenol	2000	U
91-58-7	2-Chloronaphthalene	410	U
88-74-4	2-Nitroaniline	2000	U
131-11-3	Dimethyl Phthalate	410	U
208-96-8	Acenaphthylene	410	U
606-20-2	2,6-Dinitrotoluene	410	U

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BX978

Lab Name: CEIMIC CORP Contract: 68D90028

Lab Code: CEIMIC Case No.: 12058 SAS No.: _____ SDG No.: BX978

Matrix: (soil/water) SOIL Lab Sample ID: 890107-17

Sample wt/vol: 5.0 (g/mL) G Lab File ID: C0401

Level: (low/med) LOW Date Received: 06/10/89

% Moisture: not dec. 22 Date Analyzed: 06/19/89

Column: (pack/cap) PACK Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	13	U
74-83-9	Bromomethane	13	U
75-01-4	Vinyl Chloride	13	U
75-00-3	Chloroethane	13	U
75-09-2	Methylene Chloride	22	B
67-64-1	Acetone	43	
75-15-0	Carbon Disulfide	6	U
75-35-4	1,1-Dichloroethene	6	U
75-34-3	1,1-Dichloroethane	6	U
540-59-0	1,2-Dichloroethene (total)	6	U
67-66-3	Chloroform	6	U
107-06-2	1,2-Dichloroethane	6	U
78-93-3	2-Butanone	13	U
71-55-6	1,1,1-Trichloroethane	6	U
56-23-5	Carbon Tetrachloride	6	U
108-05-4	Vinyl Acetate	13	U
75-27-4	Bromodichloromethane	6	U
78-87-5	1,2-Dichloropropane	6	U
10061-01-5	cis-1,3-Dichloropropene	6	U
79-01-6	Trichloroethene	6	U
124-48-1	Dibromochloromethane	6	U
79-00-5	1,1,2-Trichloroethane	6	U
71-43-2	Benzene	6	U
10061-02-6	Trans-1,3-Dichloropropene	6	U
75-25-2	Bromoform	6	U
108-10-1	4-Methyl-2-Pentanone	13	U
591-78-6	2-Hexanone	13	U
127-18-4	Tetrachloroethene	6	U
79-34-5	1,1,2,2-Tetrachloroethane	6	U
108-88-3	Toluene	6	U
108-90-7	Chlorobenzene	6	U
100-41-4	Ethylbenzene	6	U
100-42-5	Styrene	6	U
1330-20-7	Total Xylenes	6	U

PC

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1C

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BX778

Lab Name: CEIMIC CORP Contract: 68D90020

Lab Code: CEIMIC Case No.: 12058 SAS No.: _____ SDG No.: BX978

Matrix: (soil/water) SOIL Lab Sample ID: 890107-17

Sample wt/vol: 30.9 (g/mL) G Lab File ID: A1271

Level: (low/med) LOW Date Received: 06/10/89

% Moisture: not dec. 21 dec. _____ Date Extracted: 06/12/89

Extraction: (SepF/Cont/Sonc) SONC Date Analyzed: 06/30/89

GPC Cleanup: (Y/N) N pH: 8.6 Dilution Factor: 2.1

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

CAS NO.	COMPOUND		Q
99-09-2	3-Nitroaniline	4100	U
83-32-9	Acenaphthene	840	U
51-28-5	2,4-Dinitrophenol	4100	U
100-02-7	4-Nitrophenol	4100	U
132-64-9	Dibenzofuran	840	U
121-14-2	2,4-Dinitrotoluene	840	U
84-66-2	Diethylphthalate	840	U
7005-72-3	4-Chlorophenyl-phenylether	840	U
86-73-7	Fluorene	840	U
100-10-6	4-Nitroaniline	4100	U
534-52-1	4,6-Dinitro-2-Methylphenol	4100	U
86-30-6	N-Nitrosodiphenylamine (1)	840	U
101-55-3	4-Bromophenyl-phenylether	840	U
118-74-1	Hexachlorobenzene	840	U
87-86-5	Pentachlorophenol	4100	U
85-01-8	Phenanthrene	840	U
120-12-7	Anthracene	840	U
84-74-2	Di-n-Butylphthalate	840	U
206-44-0	Fluoranthene	840	U
129-00-0	Pyrene	840	U
85-68-7	Butylbenzylphthalate	840	U
91-94-1	3,3'-Dichlorobenzidine	1700	U
56-55-3	Benzo(a)Anthracene	840	U
218-01-9	Chrysene	840	U
117-81-7	bis(2-Ethylhexyl)Phthalate	840	U
117-84-0	Di-n-Octyl Phthalate	840	U
205-99-2	Benzo(b)Fluoranthene	840	U
207-08-9	Benzo(k)Fluoranthene	840	U
50-32-8	Benzo(a)Pyrene	840	U
193-39-5	Indeno(1,2,3-cd)Pyrene	840	U
53-70-3	Dibenz(a,h)Anthracene	840	U
191-24-2	Benzo(g,h,i)Perylene	840	U

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(1) - Cannot be separated from Diphenylamine

TUT 001 0366

1B

EPA SAMPLE NO.

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

BX983

Lab Name: CEIMIC CORP Contract: 68D90026

Lab Code: CEIMIC Case No.: 12058 SAS No.: _____ SDG No.: BX978

Matrix: (soil/water) SOIL Lab Sample ID: 890107-18

Sample wt/vol: 31.4 (g/mL) G Lab File ID: A1254

Level: (low/med) LOW Date Received: 06/10/89

% Moisture: not dec. 18 dec. ____ Date Extracted: 06/12/89

Extraction: (SepF/Cont/Sonc) SONC Date Analyzed: 06/29/89

GPC Cleanup: (Y/N) N pH: 8.8 Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
108-95-2	Phenol	400	U
111-44-4	bis(2-Chloroethyl)Ether	400	U
95-57-8	2-Chlorophenol	400	U
541-73-1	1,3-Dichlorobenzene	400	U
106-46-7	1,4-Dichlorobenzene	400	U
100-51-6	Benzyl Alcohol	400	U
95-50-1	1,2-Dichlorobenzene	400	U
95-48-7	2-Methylphenol	400	U
39638-32-9	bis(2-Chloroisopropyl)Ether	400	U
106-44-5	4-Methylphenol	400	U
621-64-7	N-Nitroso-Di-n-Propylamine	400	U
67-72-1	Hexachloroethane	400	U
98-95-3	Nitrobenzene	400	U
78-59-1	Isophorone	400	U
88-75-5	2-Nitrophenol	400	U
105-67-9	2,4-Dimethylphenol	400	U
65-85-0	Benzoic Acid	2000	U
111-91-1	bis(2-Chloroethoxy)Methane	400	U
120-83-2	2,4-Dichlorophenol	400	U
120-82-1	1,2,4-Trichlorobenzene	400	U
91-20-3	Naphthalene	400	U
106-47-8	4-Chloroaniline	400	U
87-68-3	Hexachlorobutadiene	400	U
59-50-7	4-Chloro-3-Methylphenol	400	U
91-57-6	2-Methylnaphthalene	400	U
77-47-4	Hexachlorocyclopentadiene	400	U
88-06-2	2,4,6-Trichlorophenol	400	U
95-95-4	2,4,5-Trichlorophenol	2000	U
91-58-7	2-Chloronaphthalene	400	U
88-74-4	2-Nitroaniline	2000	U
131-11-3	Dimethyl Phthalate	400	U
208-96-8	Acenaphthylene	400	U
606-20-2	2,6-Dinitrotoluene	400	U

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1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BX983

Lab Name: CEIMIC CORP Contract: 68D90028

Lab Code: CEIMIC Case No.: 12058 SAS No.: _____ SDG No.: BX978

Matrix: (soil/water) SOIL Lab Sample ID: 890107-18

Sample wt/vol: 5.0 (g/mL) G Lab File ID: C0407

Level: (low/med) LOW Date Received: 06/10/89

% Moisture: not dec. 17 Date Analyzed: 06/20/89

Column: (pack/cap) PACK Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	12	U
74-83-9	Bromomethane	12	U
75-01-4	Vinyl Chloride	12	U
75-00-3	Chloroethane	12	U
75-09-2	Methylene Chloride	3	J
67-64-1	Acetone	12	U
75-15-0	Carbon Disulfide	6	U
75-35-4	1,1-Dichloroethene	6	U
75-34-3	1,1-Dichloroethane	6	U
540-59-0	1,2-Dichloroethene (total)	6	U
67-66-3	Chloroform	6	U
107-06-2	1,2-Dichloroethane	6	U
78-93-3	2-Butanone	12	U
71-55-6	1,1,1-Trichloroethane	6	U
56-23-5	Carbon Tetrachloride	6	U
108-05-4	Vinyl Acetate	12	U
75-27-4	Bromodichloromethane	6	U
78-87-5	1,2-Dichloropropane	6	U
10061-01-5	cis-1,3-Dichloropropene	6	U
79-01-6	Trichloroethene	6	U
124-48-1	Dibromochloromethane	6	U
79-00-5	1,1,2-Trichloroethane	6	U
71-43-2	Benzene	6	U
10061-02-6	Trans-1,3-Dichloropropene	6	U
75-25-2	Bromoform	6	U
108-10-1	4-Methyl-2-Pentanone	12	U
591-78-6	2-Hexanone	12	U
127-18-4	Tetrachloroethene	6	U
79-34-5	1,1,2,2-Tetrachloroethane	6	U
108-88-3	Toluene	6	U
108-90-7	Chlorobenzene	6	U
100-41-4	Ethylbenzene	6	U
100-42-5	Styrene	6	U
1330-20-7	Total Xylenes	6	U

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VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BX984

Lab Name: CEIMIC CORP Contract: 68D90028

Lab Code: CEIMIC Case No.: 12058 SAS No.: _____ SDG No.: BX978

Matrix: (soil/water) SOIL Lab Sample ID: 890107-19

Sample wt/vol: 5.0 (g/mL) G Lab File ID: C0414

Level: (low/med) LOW Date Received: 06/10/89

% Moisture: not dec. 17 Date Analyzed: 06/20/89

Column: (pack/cap) PACK Dilution Factor: 5.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	60	U
74-83-9	Bromomethane	60	U
75-01-4	Vinyl Chloride	60	U
75-00-3	Chloroethane	60	U
75-09-2	Methylene Chloride	200	
67-64-1	Acetone	60 ~~22~~	~~B~~
75-15-0	Carbon Disulfide	30	U
75-35-4	1,1-Dichloroethene	30	U
75-34-3	1,1-Dichloroethane	30	U
540-59-0	1,2-Dichloroethene (total)	30	U
67-66-3	Chloroform	30	U
107-06-2	1,2-Dichloroethane	30	U
78-93-3	2-Butanone	60	U
71-55-6	1,1,1-Trichloroethane	30	U
56-23-5	Carbon Tetrachloride	30	U
108-05-4	Vinyl Acetate	60	U
75-27-4	Bromodichloromethane	30	U
78-87-5	1,2-Dichloropropane	30	U
10061-01-5	cis-1,3-Dichloropropene	30	U
79-01-6	Trichloroethene	30	U
124-48-1	Dibromochloromethane	30	U
79-00-5	1,1,2-Trichloroethane	30	U
71-43-2	Benzene	30	U
10061-02-6	Trans-1,3-Dichloropropene	30	U
75-25-2	Bromoform	30	U
108-10-1	4-Methyl-2-Pentanone	60	U
591-78-6	2-Hexanone	60	U
127-18-4	Tetrachloroethene	30	U
79-34-5	1,1,2,2-Tetrachloroethane	30	U
108-88-3	Toluene	30	U
108-90-7	Chlorobenzene	30	U
100-41-4	Ethylbenzene	30	U
100-42-5	Styrene	30	U
1330-20-7	Total Xylenes	490	X

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BX984

Lab Name: CHEMIC CORP Contract: 68D90028

Lab Code: CHEMIC Case No.: 10058 SAS No.: _____ SDG No.: BX978

Matrix: (soil/water) SOIL Lab Sample ID: 890107-19

Sample wt/vol: 30.2 (g/mL) G Lab File ID: A1285

Level: (low/med) LOW Date Received: 06/10/89

% Moisture: not dec. 16 dec. _____ Date Extracted: 06/12/89

Extraction: (SepF/Cont/Sonc) SONC Date Analyzed: 07/01/89

GPC Cleanup: (Y/N) N pH: 8.5 Dilution Factor: 4.0

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

CAS NO.	COMPOUND		Q
108-95-2	Phenol	1600	U
111-44-4	bis(2-Chloroethyl)Ether	1600	U
95-57-8	2-Chlorophenol	1600	U
541-73-1	1,3-Dichlorobenzene	1600	U
106-46-7	1,4-Dichlorobenzene	1600	U
100-51-6	Benzyl Alcohol	1600	U
95-50-1	1,2-Dichlorobenzene	1600	U
95-48-7	2-Methylphenol	1600	U
39638-32-9	bis(2-Chloroisopropyl)Ether	1600	U
106-44-5	4-Methylphenol	1600	U
621-64-7	N-Nitroso-Di-n-Propylamine	1600	U
67-72-1	Hexachloroethane	1600	U
98-95-3	Nitrobenzene	1600	U
78-59-1	Isophorone	1600	U
88-75-5	2-Nitrophenol	1600	U
105-67-9	2,4-Dimethylphenol	1600	U
65-85-0	Benzoic Acid	7600	U
111-91-1	bis(2-Chloroethoxy)Methane	1600	U
120-83-2	2,4-Dichlorophenol	1600	U
120-82-1	1,2,4-Trichlorobenzene	1600	U
91-20-3	Naphthalene	4400	
106-47-8	4-Chloroaniline	1600	U
87-68-3	Hexachlorobutadiene	1600	U
59-50-7	4-Chloro-3-Methylphenol	1600	U
91-57-6	2-Methylnaphthalene	6100	
77-47-4	Hexachlorocyclopentadiene	1600	U
88-06-2	2,4,6-Trichlorophenol	1600	U
95-95-4	2,4,5-Trichlorophenol	7600	U
91-58-7	2-Chloronaphthalene	1600	U
88-74-4	2-Nitroaniline	7600	U
131-11-3	Dimethyl Phthalate	1600	U
208-96-8	Acenaphthylene	1600	U
606-20-2	2,6-Dinitrotoluene	1600	U

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SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BX984

Lab Name: CEIMIC CORP Contract: 68D90020

Lab Code: CEIMIC Case No.: 12058 SAS No.: _____ SDG No.: BX978

Matrix: (soil/water) SOIL Lab Sample ID: 890107-19

Sample wt/vol: 30.2 (g/mL) G Lab File ID: A1285

Level: (low/med) LOW Date Received: 06/10/89

% Moisture: not dec. 16 dec. ____ Date Extracted: 06/12/89

Extraction: (SepF/Cont/Sonc) SONC Date Analyzed: 07/01/89

GPC Cleanup: (Y/N) N pH: 8.5 Dilution Factor: 4.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
99-09-2	3-Nitroaniline	7600	U
83-32-9	Acenaphthene	190	J
51-28-5	2,4-Dinitrophenol	7600	U
100-02-7	4-Nitrophenol	7600	U
132-64-9	Dibenzofuran	1600	U
121-14-2	2,4-Dinitrotoluene	1600	U
84-66-2	Diethylphthalate	1600	U
7005-72-3	4-Chlorophenyl-phenylether	1600	U
86-73-7	Fluorene	420	J
100-10-6	4-Nitroaniline	7600	U
534-52-1	4,6-Dinitro-2-Methylphenol	7600	U
86-30-6	N-Nitrosodiphenylamine (1)	1600	U
101-55-3	4-Bromophenyl-phenylether	1600	U
118-74-1	Hexachlorobenzene	1600	U
87-86-5	Pentachlorophenol	7600	U
85-01-8	Phenanthrene	1600	U
120-12-7	Anthracene	1600	U
84-74-2	Di-n-Butylphthalate	1600	U
206-44-0	Fluoranthene	740	J
129-00-0	Pyrene	2000	
85-68-7	Butylbenzylphthalate	1600	U
91-94-1	3,3'-Dichlorobenzidine	3100	U
56-55-3	Benzo(a)Anthracene	1600	U
218-01-9	Chrysene	1600	U
117-81-7	bis(2-Ethylhexyl)Phthalate	5400	
117-84-0	Di-n-Octyl Phthalate	1600	U
205-99-2	Benzo(b)Fluoranthene	870	J
207-08-9	Benzo(k)Fluoranthene	1600	U
50-32-8	Benzo(a)Pyrene	770	J
193-39-5	Indeno(1,2,3-cd)Pyrene	1600	U
53-70-3	Dibenz(a,h)Anthracene	1600	U
191-24-2	Benzo(g,h,i)Perylene	430	J

(1) - Cannot be separated from Diphenylamine

365

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BX984MS

Lab Name: CEIMIC CORP Contract: 68D90028

Lab Code: CEIMIC Case No.: 12058 SAS No.: _____ SDG No.: BX978

Matrix: (soil/water) SOIL Lab Sample ID: 890107-19MS

Sample wt/vol: 5.0 (g/mL) G Lab File ID: C0415

Level: (low/med) LOW Date Received: 06/10/89

% Moisture: not dec. 17 Date Analyzed: 06/20/89

Column: (pack/cap) PACK Dilution Factor: 5.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	60	U
74-83-9	Bromomethane	60	U
75-01-4	Vinyl Chloride	60	U
75-00-3	Chloroethane	60	U
75-09-2	Methylene Chloride	200	
67-64-1	Acetone	48	BJ
75-15-0	Carbon Disulfide	30	U
75-35-4	1,1-Dichloroethene	380	
75-34-3	1,1-Dichloroethane	30	U
540-59-0	1,2-Dichloroethene (total)	30	U
67-66-3	Chloroform	30	U
107-06-2	1,2-Dichloroethane	30	U
78-93-3	2-Butanone	60	U
71-55-6	1,1,1-Trichloroethane	30	U
56-23-5	Carbon Tetrachloride	30	U
108-05-4	Vinyl Acetate	60	U
75-27-4	Bromodichloromethane	30	U
78-87-5	1,2-Dichloropropane	30	U
10061-01-5	cis-1,3-Dichloropropene	30	U
79-01-6	Trichloroethene	290	B
124-48-1	Dibromochloromethane	30	U
79-00-5	1,1,2-Trichloroethane	30	U
71-43-2	Benzene	330	
10061-02-6	Trans-1,3-Dichloropropene	30	U
75-25-2	Bromoform	30	U
108-10-1	4-Methyl-2-Pentanone	60	U
591-78-6	2-Hexanone	60	U
127-18-4	Tetrachloroethene	30	U
79-34-5	1,1,2,2-Tetrachloroethane	30	U
108-88-3	Toluene	440	
108-90-7	Chlorobenzene	340	
100-41-4	Ethylbenzene	30	U
100-42-5	Styrene	30	U
1330-20-7	Total Xylenes	890	

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.: BX984MSD

Lab Name: CEIMIC CORP Contract: 68D90028

Lab Code: CEIMIC Case No.: 12058 SAS No.: _____ SDG No.: BX978

Matrix: (soil/water) SOIL Lab Sample ID: 890107-19MSD

Sample wt/vol: 5.0 (g/mL) G Lab File ID: C0441

Level: (low/med) LOW Date Received: 06/10/89

% Moisture: not dec. 17 Date Analyzed: 06/25/89

Column: (pack/cap) PACK Dilution Factor: 5.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	60	U
74-83-9	Bromomethane	60	U
75-01-4	Vinyl Chloride	60	U
75-00-3	Chloroethane	60	U
75-09-2	Methylene Chloride	21	J
67-64-1	Acetone	60	U
75-15-0	Carbon Disulfide	30	U
75-35-4	1,1-Dichloroethene	30	U
75-34-3	1,1-Dichloroethane	30	U
540-59-0	1,2-Dichloroethene (total)	30	U
67-66-3	Chloroform	30	U
107-06-2	1,2-Dichloroethane	30	U
78-93-3	2-Butanone	60	U
71-55-6	1,1,1-Trichloroethane	30	U
56-23-5	Carbon Tetrachloride	30	U
108-05-4	Vinyl Acetate	60	U
75-27-4	Bromodichloromethane	30	U
78-87-5	1,2-Dichloropropane	30	U
10061-01-5	cis-1,3-Dichloropropene	30	U
79-01-6	Trichloroethene	30	U
124-48-1	Dibromochloromethane	30	U
79-00-5	1,1,2-Trichloroethane	30	U
71-43-2	Benzene	30	U
10061-02-6	Trans-1,3-Dichloropropene	30	U
75-25-2	Bromoform	30	U
108-10-1	4-Methyl-2-Pentanone	60	U
591-78-6	2-Hexanone	60	U
127-18-4	Tetrachloroethene	30	U
79-34-5	1,1,2,2-Tetrachloroethane	30	U
108-88-3	Toluene	30	U
108-90-7	Chlorobenzene	30	U
100-41-4	Ethylbenzene	30	U
100-42-5	Styrene	30	U
1330-20-7	Total Xylenes	30	U

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BX997

Lab Name: CEIMIC CORP Contract: 68D90028

Lab Code: CEIMIC Case No.: 12058 SAS No.: _____ SDG No.: BX978

Matrix: (soil/water) SOIL Lab Sample ID: 890107-20

Sample wt/vol: 5.0 (g/mL) G Lab File ID: C0409

Level: (low/med) LOW Date Received: 06/10/89

% Moisture: not dec. 21 Date Analyzed: 06/20/89

Column: (pack/cap) PACK Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	13	U
74-83-9	Bromomethane	13	U
75-01-4	Vinyl Chloride	13	U
75-00-3	Chloroethane	13	U
75-09-2	Methylene Chloride	13	
67-64-1	Acetone	10 B	BJU
75-15-0	Carbon Disulfide	6	U
75-35-4	1,1-Dichloroethene	6	U
75-34-3	1,1-Dichloroethane	6	U
540-59-0	1,2-Dichloroethene (total)	6	U
67-66-3	Chloroform	6	U
107-06-2	1,2-Dichloroethane	6	U
78-93-3	2-Butanone	13	U
71-55-6	1,1,1-Trichloroethane	6	U
56-23-5	Carbon Tetrachloride	6	U
108-05-4	Vinyl Acetate	13	U
75-27-4	Bromodichloromethane	6	U
78-87-5	1,2-Dichloropropane	6	U
10061-01-5	cis-1,3-Dichloropropene	6	U
79-01-6	Trichloroethene	6	U
124-48-1	Dibromochloromethane	6	U
79-00-5	1,1,2-Trichloroethane	6	U
71-43-2	Benzene	6	U
10061-02-6	Trans-1,3-Dichloropropene	6	U
75-25-2	Bromoform	6	U
108-10-1	4-Methyl-2-Pentanone	13	U
591-78-6	2-Hexanone	13	U
127-18-4	Tetrachloroethene	6	U
79-34-5	1,1,2,2-Tetrachloroethane	6	U
108-88-3	Toluene	6	U
108-90-7	Chlorobenzene	6	U
100-41-4	Ethylbenzene	3	J
100-42-5	Styrene	6	U
1330-20-7	Total Xylenes	15	J

RC

203

1C

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

SV997

Lab Name: CECIL CORP Contract: 68D80023

Lab Code: CECIL Case No.: 12052 SAS No.: _____ SDG No.: PX970

Matrix: (soil/water) SOIL Lab Sample ID: 880107-20

Sample wt/vol: 30.3 (g/mL) G Lab File ID: A1267

Level: (low/med) LOW Date Received: 06/10/89

% Moisture: not dec. 19 dec. ____ Date Extracted: 06/12/89

Extraction: (SepF/Cont/Sonc) SONC Date Analyzed: 06/20/89

GPC Cleanup: (Y/N) N pH: 8.4 Dilution Factor: 20

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
99-09-2	3-Nitroaniline	40000	U
83-32-9	Acenaphthene	8100	U
51-28-5	2,4-Dinitrophenol	40000	U
100-02-7	4-Nitrophenol	40000	U
132-64-9	Dibenzofuran	8100	U
121-14-2	2,4-Dinitrotoluene	8100	U
84-66-2	Diethylphthalate	8100	U
7005-72-3	4-Chlorophenyl-phenylether	8100	U
86-73-7	Fluorene	8100	U
100-10-6	4-Nitroaniline	40000	U
534-52-1	4,6-Dinitro-2-Methylphenol	40000	U
86-30-6	N-Nitrosodiphenylamine (1)	8100	U
101-55-3	4-Bromophenyl-phenylether	8100	U
118-74-1	Hexachlorobenzene	8100	U
87-86-5	Pentachlorophenol	40000	U
85-01-8	Phenanthrene	8100	U
120-12-7	Anthracene	8100	U
84-74-2	Di-n-Butylphthalate	2100	J
206-44-0	Fluoranthene	8100	U
129-00-0	Pyrene	8100	U
85-68-7	Butylbenzylphthalate	2000	J
91-94-1	3,3'-Dichlorobenzidine	16000	U
56-55-3	Benzo(a)Anthracene	8100	U
218-01-9	Chrysene	8100	U
117-81-7	bis(2-Ethylhexyl)Phthalate	10000	
117-84-0	Di-n-Octyl Phthalate	8100	U
205-99-2	Benzo(b)Fluoranthene	8100	U
207-08-9	Benzo(k)Fluoranthene	8100	U
50-32-8	Benzo(a)Pyrene	8100	U
193-39-5	Indeno(1,2,3-cd)Pyrene	8100	U
53-70-3	Dibenz(a,h)Anthracene	8100	U
191-24-2	Benzo(g,h,i)Perylene	8100	U

(1) - Cannot be separated from Diphenylamine

01

TUT 001 0375

USE -PHC RC

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BX998

Lab Name: CEIMIC CORP Contract: 68D90028

Lab Code: CEIMIC Case No.: 12058 SAS No.: _____ SDG No.: BX978

Matrix: (soil/water) SOIL Lab Sample ID: S90107-21

Sample wt/vol: 5.0 (g/mL) G Lab File ID: C0410

Level: (low/med) LOW Date Received: 06/10/89

% Moisture: not dec. 17 Date Analyzed: 06/20/89

Column: (pack/cap) PACK Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	12	U
74-83-9	Bromomethane	12	U
75-01-4	Vinyl Chloride	12	U
75-00-3	Chloroethane	12	U
75-09-2	Methylene Chloride	27	
67-64-1	Acetone	21	BU
75-15-0	Carbon Disulfide	6	U
75-35-4	1,1-Dichloroethene	6	U
75-34-3	1,1-Dichloroethane	6	U
540-59-0	1,2-Dichloroethene (total)	6	U
67-66-3	Chloroform	6	U
107-06-2	1,2-Dichloroethane	6	U
78-93-3	2-Butanone	12	U
71-55-6	1,1,1-Trichloroethane	6	U
56-23-5	Carbon Tetrachloride	6	U
108-05-4	Vinyl Acetate	12	U
75-27-4	Bromodichloromethane	6	U
78-87-5	1,2-Dichloropropane	6	U
10061-01-5	cis-1,3-Dichloropropene	6	U
79-01-6	Trichloroethene	6	U
124-48-1	Dibromochloromethane	6	U
79-00-5	1,1,2-Trichloroethane	6	U
71-43-2	Benzene	6	U
10061-02-6	Trans-1,3-Dichloropropene	6	U
75-25-2	Bromoform	6	U
108-10-1	4-Methyl-2-Pentanone	12	U
591-78-6	2-Hexanone	12	U
127-18-4	Tetrachloroethene	6	U
79-34-5	1,1,2,2-Tetrachloroethane	6	U
108-88-3	Toluene	6	U
108-90-7	Chlorobenzene	6	U
100-41-4	Ethylbenzene	85	
100-42-5	Styrene	6	U
1330-20-7	Total Xylenes	6	U

214

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

VBLK01

Lab Name: CEIMIC CORP Contract: 68D90028

Lab Code: CEIMIC Case No.: 12058 SAS No.: _____ SDG No.: BT747

Matrix: (soil/water) SOIL Lab Sample ID: V030615-B1

Sample wt/vol: 5.0 (g/mL) G Lab File ID: C0348

Level: (low/med) LOW Date Received: 06/08/89

% Moisture: not dec. 0 Date Analyzed: 06/15/89

Column: (pack/cap) PACK Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	0.2	J
67-64-1	Acetone	3	J
75-15-0	Carbon Disulfide	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	5	U
540-59-0	1,2-Dichloroethene (total)	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone	10	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon Tetrachloride	5	U
108-05-4	Vinyl Acetate	10	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	5	U
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	Trans-1,3-Dichloropropene	5	U
75-25-2	Bromoform	5	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Total Xylenes	5	U

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

VBLK02

Lab Name: CEIMIC CORP Contract: 68D90028

Lab Code: CEIMIC Case No.: 12058 SAS No.: SDG No.: BT747

Matrix: (soil/water) SOIL Lab Sample ID: V30616-B2

Sample wt/vol: 5.0 (g/mL) G Lab File ID: C0361

Level: (low/med) LOW Date Received: 06/08/89

% Moisture: not dec. 0 Date Analyzed: 06/16/89

Column: (pack/cap) PACK Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	5	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	5	U
540-59-0	1,2-Dichloroethene (total)	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone	10	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon Tetrachloride	5	U
108-05-4	Vinyl Acetate	10	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	5	U
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	Trans-1,3-Dichloropropene	5	U
75-25-2	Bromoform	5	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Total Xylenes	5	U

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1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

VBLK03

Lab Name: CEIMIC CORP Contract: 68D90028

Lab Code: CEIMIC Case No.: 12058 SAS No.: SDG No.: BT747

Matrix: (soil/water) SOIL Lab Sample ID: VB0617-B2

Sample wt/vol: 5.0 (g/mL) G Lab File ID: C0372

Level: (low/med) LOW Date Received: 06/08/89

% Moisture: not dec. 0 Date Analyzed: 06/17/89

Column: (pack/cap) PACK Dilution Factor: 1.0

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

CAS NO.	COMPOUND	Q
74-87-3	Chloromethane	U
74-83-9	Bromomethane	U
75-01-4	Vinyl Chloride	U
75-00-3	Chloroethane	U
75-09-2	Methylene Chloride	J
67-64-1	Acetone	U
75-15-0	Carbon Disulfide	U
75-35-4	1,1-Dichloroethene	U
75-34-3	1,1-Dichloroethane	U
540-59-0	1,2-Dichloroethene (total)	U
67-66-3	Chloroform	U
107-06-2	1,2-Dichloroethane	U
78-93-3	2-Butanone	U
71-55-6	1,1,1-Trichloroethane	U
56-23-5	Carbon Tetrachloride	U
108-05-4	Vinyl Acetate	U
75-27-4	Bromodichloromethane	U
78-87-5	1,2-Dichloropropane	U
10061-01-5	cis-1,3-Dichloropropene	U
79-01-6	Trichloroethene	U
124-48-1	Dibromochloromethane	U
79-00-5	1,1,2-Trichloroethane	U
71-43-2	Benzene	U
10061-02-6	Trans-1,3-Dichloropropene	U
75-25-2	Bromoform	U
108-10-1	4-Methyl-2-Pentanone	U
591-78-6	2-Hexanone	U
127-18-4	Tetrachloroethene	U
79-34-5	1,1,2,2-Tetrachloroethane	U
108-88-3	Toluene	U
108-90-7	Chlorobenzene	U
100-41-4	Ethylbenzene	U
100-42-5	Styrene	U
1330-20-7	Total Xylenes	U

401

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

VBLK04

Lab Name: CCIMIC CORP Contract: 68D90028

Lab Code: CCIMIC Case No.: 12056 SAS No.: SDG No.: ET747

Matrix: (soil/water) SOIL Lab Sample ID: C90167-04

Sample wt/vol: 5.0 (g/mL) G Lab File ID: C0386

Level: (low/med) LOW Date Received: 06/08/89

% Moisture: not dec. 0 Date Analyzed: 06/10/89

Column: (pack/cap) PACK Dilution Factor: 1.0

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

CAS NO.	COMPOUND	Q	
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	24	
67-64-1	Acetone	9	J
75-15-0	Carbon Disulfide	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	5	U
540-59-0	1,2-Dichloroethene (total)	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone	10	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon Tetrachloride	5	U
108-05-4	Vinyl Acetate	10	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	5	U
124-48-1	Dibromochloromethane	1	J
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	Trans-1,3-Dichloropropene	5	U
75-25-2	Bromoform	5	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Total Xylenes	5	U

407

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

VBLK05

Lab Name: CEIMIC CORP Contract: 68D90028

Lab Code: CEIMIC Case No.: 12058 SAS No.: _____ SDG No.: BX978

Matrix: (soil/water) SOIL Lab Sample ID: V20619-B1

Sample wt/vol: 5.0 (g/mL) G Lab File ID: C0399

Level: (low/med) LOW Date Received: 06/08/89

% Moisture: not dec. 0 Date Analyzed: 06/19/89

Column: (pack/cap) PACK Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	11	
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	2	J
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	5	U
540-59-0	1,2-Dichloroethene (total)	5	U
67-66-3	Chloroform	2	J
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone	10	U
71-55-6	1,1,1-Trichloroethane	1	J
56-23-5	Carbon Tetrachloride	5	U
108-05-4	Vinyl Acetate	10	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	5	U
124-48-1	Dibromochloromethane	2	J
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	Trans-1,3-Dichloropropene	5	U
75-25-2	Bromoform	5	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	3	J
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Total Xylenes	5	U

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1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

VBLK06

Lab Name: SEIMIC CORP Contract: 68D90092

Lab Code: SEIMIC Case No.: 12058 SAS No.: _____ SDG No.: DT747

Matrix: (soil/water) SOIL Lab Sample ID: V0619-B1

Sample wt/vol: 5.0 (g/mL) G Lab File ID: B1650

Level: (low/med) LOW Date Received: 06/02/89

% Moisture: not dec. 0 Date Analyzed: 06/19/89

Column: (pack/cap) PACK Dilution Factor: 1.0

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

CAS NO.	COMPOUND	Q
74-87-3	Chloromethane	10 U
74-83-9	Bromomethane	10 U
75-01-4	Vinyl Chloride	10 U
75-00-3	Chloroethane	10 U
75-09-2	Methylene Chloride	3 J
67-64-1	Acetone	10 U
75-15-0	Carbon Disulfide	5 U
75-35-4	1,1-Dichloroethene	5 U
75-34-3	1,1-Dichloroethane	5 U
540-59-0	1,2-Dichloroethene (total)	5 U
67-66-3	Chloroform	5 U
107-06-2	1,2-Dichloroethane	5 U
78-93-3	2-Butanone	10 U
71-55-6	1,1,1-Trichloroethane	5 U
56-23-5	Carbon Tetrachloride	5 U
108-05-4	Vinyl Acetate	10 U
75-27-4	Bromodichloromethane	5 U
78-87-5	1,2-Dichloropropane	5 U
10061-01-5	cis-1,3-Dichloropropene	5 U
79-01-6	Trichloroethene	5 U
124-48-1	Dibromochloromethane	5 U
79-00-5	1,1,2-Trichloroethane	5 U
71-43-2	Benzene	5 U
10061-02-6	Trans-1,3-Dichloropropene	5 U
75-25-2	Bromoform	5 U
108-10-1	4-Methyl-2-Pentanone	10 U
591-78-6	2-Hexanone	10 U
127-18-4	Tetrachloroethene	5 U
79-34-5	1,1,2,2-Tetrachloroethane	5 U
108-88-3	Toluene	5 U
108-90-7	Chlorobenzene	5 U
100-41-4	Ethylbenzene	5 U
100-42-5	Styrene	5 U
1330-20-7	Total Xylenes	5 U

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

VBLK07

Lab Name: CEIMIC CORP Contract: 68D90028

Lab Code: CEIMIC Case No.: 12058 SAS No.: _____ SDG No.: BX978

Matrix: (soil/water) SOIL Lab Sample ID: V30620-B1

Sample wt/vol: 5.0 (g/mL) G Lab File ID: C0406

Level: (low/med) LOW Date Received: 06/08/89

% Moisture: not dec. 0 Date Analyzed: 06/20/89

Column: (pack/cap) PACK Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	5	U
67-64-1	Acetone	4	J
75-15-0	Carbon Disulfide	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	5	U
540-59-0	1,2-Dichloroethene (total)	5	U
67-66-3	Chloroform	2	J
107-06-2	1,2-Dichloroethane	2	J
78-93-3	2-Butanone	10	U
71-55-6	1,1,1-Trichloroethane	1	J
56-23-5	Carbon Tetrachloride	2	J
108-05-4	Vinyl Acetate	10	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	2	J
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	Trans-1,3-Dichloropropene	5	U
75-25-2	Bromoform	1	J
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Total Xylenes	5	U

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BY704

Lab Name: CEIMIC CORP Contract: 68D90028

Lab Code: CEIMIC Case No.: 10058 SAS No.: _____ SDG No.: BX978

Matrix: (soil/water) SOIL Lab Sample ID: 890107-30

Sample wt/vol: 30.8 (g/mL) G Lab File ID: A1258

Level: (low/med) LOW Date Received: 06/13/89

% Moisture: not dec. 9 dec. ____ Date Extracted: 06/13/89

Extraction: (SepF/Cont/Sonc) SONC Date Analyzed: 06/29/89

GPC Cleanup: (Y/N) N pH: 9.1 Dilution Factor: 1.0

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

CAS NO.	COMPOUND		
108-95-2	Phenol	360	U
111-44-4	bis(2-Chloroethyl)Ether	360	U
95-57-8	2-Chlorophenol	360	U
541-73-1	1,3-Dichlorobenzene	360	U
106-46-7	1,4-Dichlorobenzene	360	U
100-51-6	Benzyl Alcohol	360	U
95-50-1	1,2-Dichlorobenzene	360	U
95-48-7	2-Methylphenol	360	U
39638-32-9	bis(2-Chloroisopropyl)Ether	360	U
106-44-5	4-Methylphenol	360	U
621-64-7	N-Nitroso-Di-n-Propylamine	360	U
67-72-1	Hexachloroethane	360	U
98-95-3	Nitrobenzene	360	U
78-59-1	Isophorone	360	U
88-75-5	2-Nitrophenol	360	U
105-67-9	2,4-Dimethylphenol	360	U
65-85-0	Benzoic Acid	1800	U
111-91-1	bis(2-Chloroethoxy)Methane	360	U
120-83-2	2,4-Dichlorophenol	360	U
120-82-1	1,2,4-Trichlorobenzene	360	U
91-20-3	Naphthalene	1400	
106-47-8	4-Chloroaniline	360	U
87-68-3	Hexachlorobutadiene	360	U
59-50-7	4-Chloro-3-Methylphenol	360	U
91-57-6	2-Methylnaphthalene	1700	
77-47-4	Hexachlorocyclopentadiene	360	U
88-06-2	2,4,6-Trichlorophenol	360	U
95-95-4	2,4,5-Trichlorophenol	1800	U
91-58-7	2-Chloronaphthalene	360	U
88-74-4	2-Nitroaniline	1800	U
131-11-3	Dimethyl Phthalate	360	U
208-96-8	Acenaphthylene	360	U
606-20-2	2,6-Dinitrotoluene	360	U

1C

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BY704

Lab Name: CEIMIC CORP Contract: 68D90028

Lab Code: CEIMIC Case No.: 12058 SAS No.: _____ SDG No.: BX978

Matrix: (soil/water) SOIL Lab Sample ID: 890107-30

Sample wt/vol: 30.8 (g/mL) G Lab File ID: A1258

Level: (low/med) LOW Date Received: 06/13/89

% Moisture: not dec. 9 dec. _____ Date Extracted: 06/13/89

Extraction: (SepF/Cont/Sonc) SONC Date Analyzed: 06/29/89

GPC Cleanup: (Y/N) N pH: 9.1 Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
99-09-2	3-Nitroaniline	1800	U
83-32-9	Acenaphthene	360	U
51-28-5	2,4-Dinitrophenol	1800	U
100-02-7	4-Nitrophenol	1800	U
132-64-9	Dibenzofuran	360	U
121-14-2	2,4-Dinitrotoluene	360	U
84-66-2	Diethylphthalate	360	U
7005-72-3	4-Chlorophenyl-phenylether	360	U
86-73-7	Fluorene	150	J
100-10-6	4-Nitroaniline	1800	U
534-52-1	4,6-Dinitro-2-Methylphenol	1800	U
86-30-6	N-Nitrosodiphenylamine (1)	360	U
101-55-3	4-Bromophenyl-phenylether	360	U
118-74-1	Hexachlorobenzene	360	U
87-86-5	Pentachlorophenol	1800	U
85-01-8	Phenanthrene	140	J
120-12-7	Anthracene	360	U
84-74-2	Di-n-Butylphthalate	360	U
206-44-0	Fluoranthene	360	U
129-00-0	Pyrene	360	U
85-68-7	Butylbenzylphthalate	360	U
91-94-1	3,3'-Dichlorobenzidine	700	U
56-55-3	Benzo(a)Anthracene	360	U
218-01-9	Chrysene	360	U
117-81-7	bis(2-Ethylhexyl)Phthalate	240	J
117-84-0	Di-n-Octyl Phthalate	360	U
205-99-2	Benzo(b)Fluoranthene	360	U
207-08-9	Benzo(k)Fluoranthene	360	U
50-32-8	Benzo(a)Pyrene	360	U
193-39-5	Indeno(1,2,3-cd)Pyrene	360	U
53-70-3	Dibenz(a,h)Anthracene	360	U
191-24-2	Benzo(g,h,i)Perylene	360	U

(1) - Cannot be separated from Diphenylamine

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BY710

Lab Name: SEIMIC CORP Contract: 68D90089

Lab Code: SEIMIC Case No.: 12058 SAS No.: _____ SDG No.: BX979

Matrix: (soil/water) SOIL Lab Sample ID: 890107-31

Sample wt/vol: 30.2 (g/mL) G Lab File ID: A1260

Level: (low/med) LOW Date Received: 06/13/89

% Moisture: not dec. 23 dec. _____ Date Extracted: 06/13/89

Extraction: (SepF/Cont/Sonc) SONC Date Analyzed: 06/29/89

GPC Cleanup: (Y/N) N pH: 9.0 Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
108-95-2	Phenol	430	U
111-44-4	bis(2-Chloroethyl)Ether	430	U
95-57-8	2-Chlorophenol	430	U
541-73-1	1,3-Dichlorobenzene	430	U
106-46-7	1,4-Dichlorobenzene	430	U
100-51-6	Benzyl Alcohol	430	U J
95-50-1	1,2-Dichlorobenzene	430	U
95-48-7	2-Methylphenol	430	U
39638-32-9	bis(2-Chloroisopropyl)Ether	430	U
106-44-5	4-Methylphenol	430	U
621-64-7	N-Nitroso-Di-n-Propylamine	430	U
67-72-1	Hexachloroethane	430	U
98-95-3	Nitrobenzene	430	U
78-59-1	Isophorone	430	U
88-75-5	2-Nitrophenol	430	U
105-67-9	2,4-Dimethylphenol	430	U
65-85-0	Benzoic Acid	2100	U
111-91-1	bis(2-Chloroethoxy)Methane	430	U
120-83-2	2,4-Dichlorophenol	430	U
120-82-1	1,2,4-Trichlorobenzene	430	U
91-20-3	Naphthalene	3100	
106-47-8	4-Chloroaniline	430	U
87-68-3	Hexachlorobutadiene	430	U
59-50-7	4-Chloro-3-Methylphenol	430	U
91-57-6	2-Methylnaphthalene	2500	
77-47-4	Hexachlorocyclopentadiene	430	U
88-06-2	2,4,6-Trichlorophenol	430	U
95-95-4	2,4,5-Trichlorophenol	2100	U
91-58-7	2-Chloronaphthalene	430	U
88-74-4	2-Nitroaniline	2100	U
131-11-3	Dimethyl Phthalate	430	U
208-96-8	Acenaphthylene	430	U
606-20-2	2,6-Dinitrotoluene	430	U

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1C

EPA SAMPLE NO.

BY710

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

Lab Name: [illegible] CORP Contract: 68D90029

Lab Code: [illegible] Case No.: 12058 SAS No.: _____ SDG No.: BX978

Matrix: (soil/water) SOIL Lab Sample ID: BF0107-71

Sample wt/vol: 30.2 (g/mL) G Lab File ID: A1240

Level: (low/med) LOW Date Received: 06/13/89

% Moisture: not dec. 23 dec. ____ Date Extracted: 06/13/89

Extraction: (SepF/Cont/Sonc) SONC Date Analyzed: 06/29/89

GPC Cleanup: (Y/N) N pH: 9.0 Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
99-09-2	3-Nitroaniline	2100	U
83-32-9	Acenaphthene	430	U
51-28-5	2,4-Dinitrophenol	2100	U
100-02-7	4-Nitrophenol	2100	U
132-64-9	Dibenzofuran	430	U
121-14-2	2,4-Dinitrotoluene	430	U
84-66-2	Diethylphthalate	89	J
7005-72-3	4-Chlorophenyl-phenylether	430	U
86-73-7	Fluorene	180	J
100-01-6	4-Nitroaniline	2100	U
534-52-1	4,6-Dinitro-2-Methylphenol	2100	U
86-30-6	N-Nitrosodiphenylamine (1)	430	U
101-55-3	4-Bromophenyl-phenylether	430	U
118-74-1	Hexachlorobenzene	430	U
87-86-5	Pentachlorophenol	2100	U
85-01-8	Phenanthrene	170	J
120-12-7	Anthracene	430	U
84-74-2	Di-n-Butylphthalate	430	U
206-44-0	Fluoranthene	430	U
129-00-0	Pyrene	430	U
85-68-7	Butylbenzylphthalate	430	U
91-94-1	3,3'-Dichlorobenzidine	860	U
56-55-3	Benzo(a)Anthracene	430	U
218-01-9	Chrysene	430	U
117-81-7	bis(2-Ethylhexyl)Phthalate	95	J
117-84-0	Di-n-Octyl Phthalate	430	U
205-99-2	Benzo(b)Fluoranthene	430	U
207-08-9	Benzo(k)Fluoranthene	430	U
50-32-8	Benzo(a)Pyrene	430	U
193-39-5	Indeno(1,2,3-cd)Pyrene	430	U
53-70-3	Dibenz(a,h)Anthracene	430	U
191-24-2	Benzo(g,h,i)Perylene	430	U

(1) - Cannot be separated from Diphenylamine

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SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BY711

Lab Name: CHEMED CORP. Contract: 68D90026

Lab Code: CHEMED Case No.: 10456 SAS No.: _____ SDG No.: IX978

Matrix: (soil/water) SOIL Lab Sample ID: 890107-72

Sample wt/vol: 30.4 (g/mL) G Lab File ID: A1269

Level: (low/med) LOW Date Received: 06/17/89

% Moisture: not dec. 20 dec. _____ Date Extracted: 06/17/89

Extraction: (SepF/Cont/Sonc) SONC Date Analyzed: 06/20/89

GPC Cleanup: (Y/N) N pH: 7.3 Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
108-95-2	Phenol	410	U
111-44-4	bis(2-Chloroethyl)Ether	410	U
95-57-8	2-Chlorophenol	410	U
541-73-1	1,3-Dichlorobenzene	410	U
106-46-7	1,4-Dichlorobenzene	410	U
100-51-6	Benzyl Alcohol	410	U
95-50-1	1,2-Dichlorobenzene	410	U
95-48-7	2-Methylphenol	410	U
39638-32-9	bis(2-Chloroisopropyl)Ether	410	U
106-44-5	4-Methylphenol	410	U
621-64-7	N-Nitroso-Di-n-Propylamine	410	U
67-72-1	Hexachloroethane	410	U
98-95-3	Nitrobenzene	410	U
78-59-1	Isophorone	410	U
88-75-5	2-Nitrophenol	410	U
105-67-9	2,4-Dimethylphenol	410	U
65-85-0	Benzoic Acid	2000	U
111-91-1	bis(2-Chloroethoxy)Methane	410	U
120-83-2	2,4-Dichlorophenol	410	U
120-82-1	1,2,4-Trichlorobenzene	410	U
91-20-3	Naphthalene	1200	
106-47-8	4-Chloroaniline	410	U
87-68-3	Hexachlorobutadiene	410	U
59-50-7	4-Chloro-3-Methylphenol	410	U
91-57-6	2-Methylnaphthalene	2000	
77-47-4	Hexachlorocyclopentadiene	410	U
88-06-2	2,4,6-Trichlorophenol	410	U
95-95-4	2,4,5-Trichlorophenol	2000	U
91-58-7	2-Chloronaphthalene	410	U
88-74-4	2-Nitroaniline	2000	U
131-11-3	Dimethyl Phthalate	410	U
208-96-8	Acenaphthylene	410	U
606-20-2	2,6-Dinitrotoluene	410	U

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SEMIVOLATILE ORGANICS-2 DATA SHEET

EPA SAMPLE NO.

BY711

Lab Name: ERINIC CORP Contract: 68D90035

Lab Code: ERINIC Case No.: 1515F SAS No.: _____ SDG No.: BY778

Matrix: (soil/water) SOIL Lab Sample ID: 890107-32

Sample wt/vol: 30.4 (g/mL) G Lab File ID: A1269

Level: (low/med) LOW Date Received: 06/17/89

% Moisture: not dec. 22 dec. ____ Date Extracted: 06/17/89

Extraction: (SepF/Cont/Sonc) SONC Date Analyzed: 06/30/89

GPC Cleanup: (Y/N) N pH: 9.2 Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
99-09-2	3-Nitroaniline	2000	U
83-32-9	Acenaphthene	410	U
51-28-5	2,4-Dinitrophenol	2000	U
100-02-7	4-Nitrophenol	2000	U
132-64-9	Dibenzofuran	410	U
121-14-2	2,4-Dinitrotoluene	410	U
84-66-2	Diethylphthalate	380	J
7005-72-3	4-Chlorophenyl-phenylether	410	U
86-73-7	Fluorene	150	J
100-10-6	4-Nitroaniline	2000	U
534-52-1	4,6-Dinitro-2-Methylphenol	2000	U
86-30-6	N-Nitrosodiphenylamine (1)	410	U
101-55-3	4-Bromophenyl-phenylether	410	U
118-74-1	Hexachlorobenzene	410	U
87-86-5	Pentachlorophenol	2000	U
85-01-8	Phenanthrene	120	J
120-12-7	Anthracene	410	U
84-74-2	Di-n-Butylphthalate	410	U
206-44-0	Fluoranthene	410	U
129-00-0	Pyrene	410	U
85-68-7	Butylbenzylphthalate	410	U
91-94-1	3,3'-Dichlorobenzidine	830	U
56-55-3	Benzo(a)Anthracene	410	U
218-01-9	Chrysene	410	U
117-81-7	bis(2-Ethylhexyl)Phthalate	200	J
117-84-0	Di-n-Octyl Phthalate	410	U
205-99-2	Benzo(b)Fluoranthene	410	U
207-08-9	Benzo(k)Fluoranthene	410	U
50-32-8	Benzo(a)Pyrene	410	U
193-39-5	Indeno(1,2,3-cd)Pyrene	410	U
53-70-3	Dibenz(a,h)Anthracene	410	U
191-24-2	Benzo(g,h,i)Perylene	410	U

(1) - Cannot be separated from Diphenylamine

506

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BY759

Lab Name: CEIMIC CORP Contract: 68D90028

Lab Code: CEIMIC Case No.: 12058 SAS No.: _____ SDG No.: BT747

Matrix: (soil/water) SOIL Lab Sample ID: 890107-12

Sample wt/vol: 5.0 (g/mL) G Lab File ID: C0389

Level: (low/med) LOW Date Received: 06/08/89

% Moisture: not dec. 12 Date Analyzed: 06/18/89

Column: (pack/cap) PACK Dilution Factor: 5.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	57	U
74-83-9	Bromomethane	57	U
75-01-4	Vinyl Chloride	57	U
75-00-3	Chloroethane	57	U
75-09-2	Methylene Chloride	57	BR
67-64-1	Acetone	250	BU J
75-15-0	Carbon Disulfide	28	U
75-35-4	1,1-Dichloroethene	28	U
75-34-3	1,1-Dichloroethane	28	U
540-59-0	1,2-Dichloroethene (total)	28	U
67-66-3	Chloroform	28	U
107-06-2	1,2-Dichloroethane	28	U
78-93-3	2-Butanone	57	U
71-55-6	1,1,1-Trichloroethane	28	U
56-23-5	Carbon Tetrachloride	28	U
108-05-4	Vinyl Acetate	57	U
75-27-4	Bromodichloromethane	28	U
78-87-5	1,2-Dichloropropane	28	U
10061-01-5	cis-1,3-Dichloropropene	28	U
79-01-6	Trichloroethene	28	U
124-48-1	Dibromochloromethane	28	U
79-00-5	1,1,2-Trichloroethane	28	U
71-43-2	Benzene	28	U
10061-02-6	Trans-1,3-Dichloropropene	28	U
75-25-2	Bromoform	28	U
108-10-1	4-Methyl-2-Pentanone	57	U
591-78-6	2-Hexanone	57	U
127-18-4	Tetrachloroethene	28	U
79-34-5	1,1,2,2-Tetrachloroethane	28	U
108-88-3	Toluene	200	N
108-90-7	Chlorobenzene	28	U
100-41-4	Ethylbenzene	420	
100-42-5	Styrene	28	U
1330-20-7	Total Xylenes	1400	BX

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FORM I VOA

TUT 001 0390

Resubmitted 2B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BY759

Lab Name: CEIMIC CORP Contract: 68D90028

Client: CEIMIC Case No.: 12058 SAS No.: _____ SDG No.: BT747

Matrix: (soil/water) SOIL Lab Sample ID: 890107-12

Sample wt/vol: 30.7 (g/mL) G Lab File ID: A1278

Level: (low/med) LOW Date Received: 06/08/89

Moisture: not dec. 15 dec. _____ Date Extracted: 06/12/89

Extraction: (SepF/Cont/Sonc) SONC Date Analyzed: 07/01/89

GPC Cleanup: (Y/N) N pH: 9.0 Dilution Factor: 200

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/LG	Q
108-95-2	Phenol	900000	
111-44-4	bis(2-Chloroethyl)Ether	78000	U
95-57-8	2-Chlorophenol	78000	U
541-73-1	1,3-Dichlorobenzene	78000	U
106-46-7	1,4-Dichlorobenzene	78000	U
100-51-6	Benzyl Alcohol	78000	U
95-50-1	1,2-Dichlorobenzene	78000	U
95-48-7	2-Methylphenol	320000	
39638-32-9	bis(2-Chloroisopropyl)Ether	78000	U
106-44-5	4-Methylphenol	1300000	E
621-64-7	N-Nitroso-Di-n-Propylamine	78000	U
67-72-1	Hexachloroethane	78000	U
98-95-3	Nitrobenzene	78000	U
78-59-1	Isophorone	78000	U
88-75-5	2-Nitrophenol	78000	U
105-67-9	2,4-Dimethylphenol	42000	J
65-85-0	Benzoic Acid	380000	U
111-91-1	bis(2-Chloroethoxy)Methane	78000	U
120-83-2	2,4-Dichlorophenol	78000	U
120-82-1	1,2,4-Trichlorobenzene	78000	U
91-20-3	Naphthalene	7700	J
106-47-8	4-Chloroaniline	78000	U
87-68-3	Hexachlorobutadiene	78000	U
59-50-7	4-Chloro-3-Methylphenol	78000	U
91-57-6	2-Methylnaphthalene	78000	U
77-47-4	Hexachlorocyclopentadiene	78000	U
88-06-2	2,4,6-Trichlorophenol	78000	U
95-95-4	2,4,5-Trichlorophenol	380000	U
91-58-7	2-Chloronaphthalene	78000	U
88-74-4	2-Nitroaniline	380000	U
131-11-3	Dimethyl Phthalate	78000	U
208-96-8	Acenaphthylene	78000	U
606-20-2	2,6-Dinitrotoluene	78000	U

1B

EPA SAMPLE NO.

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

BY759MS

Lab Name: CRIMIC CORP Contract: 68D90028

Lab Code: CRIMIC Case No.: 12058 SAS No.: _____ SDG No.: BT747

Matrix: (soil/water) SOIL Lab Sample ID: 890107-12MS

Sample wt/vol: 31.2 (g/mL) G Lab File ID: A1279

Level: (low/med) LOW Date Received: 06/08/89

% Moisture: not dec. 15 dec. ____ Date Extracted: 06/12/89

Extraction: (SepF/Cont/Sonc) SONC Date Analyzed: 07/01/89

GPC Cleanup: (Y/N) N pH: 9.0 Dilution Factor: 210

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
108-95-2	Phenol	78000	U
111-44-4	bis(2-Chloroethyl)Ether	78000	U
95-57-8	2-Chlorophenol	78000	U
541-73-1	1,3-Dichlorobenzene	78000	U
106-46-7	1,4-Dichlorobenzene	78000	U
100-51-6	Benzyl Alcohol	78000	U
95-50-1	1,2-Dichlorobenzene	78000	U
95-48-7	2-Methylphenol	310000	
39638-32-9	bis(2-Chloroisopropyl)Ether	78000	U
106-44-5	4-Methylphenol	1300000	E
621-64-7	N-Nitroso-Di-n-Propylamine	78000	U
67-72-1	Hexachloroethane	78000	U
98-95-3	Nitrobenzene	78000	U
78-59-1	Isophorone	78000	U
88-75-5	2-Nitrophenol	78000	U
105-67-9	2,4-Dimethylphenol	37000	J
65-85-0	Benzoic Acid	380000	U
111-91-1	bis(2-Chloroethoxy)Methane	78000	U
120-83-2	2,4-Dichlorophenol	78000	U
120-82-1	1,2,4-Trichlorobenzene	78000	U
91-20-3	Naphthalene	78000	U
106-47-8	4-Chloroaniline	78000	U
87-68-3	Hexachlorobutadiene	78000	U
59-50-7	4-Chloro-3-Methylphenol	78000	U
91-57-6	2-Methylnaphthalene	78000	U
77-47-4	Hexachlorocyclopentadiene	78000	U
88-06-2	2,4,6-Trichlorophenol	78000	U
95-95-4	2,4,5-Trichlorophenol	380000	U
91-58-7	2-Chloronaphthalene	78000	U
88-74-4	2-Nitroaniline	380000	U
131-11-3	Dimethyl Phthalate	78000	U
208-96-8	Acenaphthylene	78000	U
606-20-2	2,6-Dinitrotoluene	78000	U

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FORM I SV-1

TUT 001 0392

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1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BY759MSD

Lab Name: CHEMIC CORP Contract: 68D90028

Lab Code: CHEMIC Case No.: 12058 SAS No.: _____ SDG No.: BT747

Matrix: (soil/water) SOIL Lab Sample ID: 890107-12MSD

Sample wt/vol: 32.1 (g/mL) G Lab File ID: A1280

Level: (low/med) LOW Date Received: 06/08/89

% Moisture: not dec. 15 dec. ____ Date Extracted: 06/12/89

Extraction: (SepF/Cont/Sonc) SONC Date Analyzed: 07/01/89

GPC Cleanup: (Y/N) N pH: 9.0 Dilution Factor: 210

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

CAS NO.	COMPOUND		C
108-95-2	Phenol	78000	U
111-44-4	bis(2-Chloroethyl)Ether	78000	U
95-57-8	2-Chlorophenol	78000	U
541-73-1	1,3-Dichlorobenzene	78000	U
106-46-7	1,4-Dichlorobenzene	78000	U
100-51-6	Benzyl Alcohol	78000	U
95-50-1	1,2-Dichlorobenzene	78000	U
95-48-7	2-Methylphenol	270000	
39638-32-9	bis(2-Chloroisopropyl)Ether	78000	U
106-44-5	4-Methylphenol	1100000	
621-64-7	N-Nitroso-Di-n-Propylamine	78000	U
67-72-1	Hexachloroethane	78000	U
98-95-3	Nitrobenzene	78000	U
78-59-1	Isophorone	78000	U
88-75-5	2-Nitrophenol	78000	U
105-67-9	2,4-Dimethylphenol	35000	J
65-85-0	Benzoic Acid	380000	U
111-91-1	bis(2-Chloroethoxy)Methane	78000	U
120-83-2	2,4-Dichlorophenol	78000	U
120-82-1	1,2,4-Trichlorobenzene	78000	U
91-20-3	Naphthalene	78000	U
106-47-8	4-Chloroaniline	75000	U
87-68-3	Hexachlorobutadiene	78000	U
59-50-7	4-Chloro-3-Methylphenol	78000	U
91-57-6	2-Methylnaphthalene	78000	U
77-47-4	Hexachlorocyclopentadiene	78000	U
88-06-2	2,4,6-Trichlorophenol	78000	U
95-95-4	2,4,5-Trichlorophenol	380000	U
91-58-7	2-Chloronaphthalene	78000	U
88-74-4	2-Nitroaniline	380000	U
131-11-3	Dimethyl Phthalate	78000	U
208-96-8	Acenaphthylene	78000	U
606-20-2	2,6-Dinitrotoluene	78000	U

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SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BY760

Lab Name: CHEMIC CORP Contract: 68D90028

Lab Code: CHEMIC Case No.: 12058 SAS No.: _____ SDG No.: BT747

Matrix: (soil/water) SOIL Lab Sample ID: 890107-13

Sample wt/vol: 30.1 (g/mL) G Lab File ID: A1282

Level: (low/med) LOW Date Received: 06/08/89

% Moisture: not dec. 16 dec. _____ Date Extracted: 06/12/89

Extraction: (SepF/Cont/Sonc) SONC Date Analyzed: 07/01/89

GPC Cleanup: (Y/N) N pH: 8.5 Dilution Factor: 10

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
108-95-2	Phenol	3900	U
111-44-4	bis(2-Chloroethyl)Ether	3900	U
95-57-8	2-Chlorophenol	3900	U
541-73-1	1,3-Dichlorobenzene	3900	U
106-46-7	1,4-Dichlorobenzene	3900	U
100-51-6	Benzyl Alcohol	3900	U
95-50-1	1,2-Dichlorobenzene	3900	U
95-48-7	2-Methylphenol	3900	U
39638-32-9	bis(2-Chloroisopropyl)Ether	3900	U
106-44-5	4-Methylphenol	3900	U
621-64-7	N-Nitroso-Di-n-Propylamine	3900	U
67-72-1	Hexachloroethane	3900	U
98-95-3	Nitrobenzene	3900	U
78-59-1	Isophorone	3900	U
88-75-5	2-Nitrophenol	3900	U
105-67-9	2,4-Dimethylphenol	3900	U
65-85-0	Benzoic Acid	19000	U
111-91-1	bis(2-Chloroethoxy)Methane	3900	U
120-83-2	2,4-Dichlorophenol	3900	U
120-82-1	1,2,4-Trichlorobenzene	3900	U
91-20-3	Naphthalene	4100	
106-47-8	4-Chloroaniline	3900	U
87-68-3	Hexachlorobutadiene	3900	U
59-50-7	4-Chloro-3-Methylphenol	3900	U
91-57-6	2-Methylnaphthalene	750	J
77-47-4	Hexachlorocyclopentadiene	3900	U
88-06-2	2,4,6-Trichlorophenol	3900	U
95-95-4	2,4,5-Trichlorophenol	19000	U
91-58-7	2-Chloronaphthalene	3900	U
88-74-4	2-Nitroaniline	19000	U
131-11-3	Dimethyl Phthalate	3900	U
208-96-8	Acenaphthylene	3900	U
606-20-2	2,6-Dinitrotoluene	3900	U

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1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BY761

Name: CERMIC CORP Contract: 68D90028

Case: CERMIC Case No.: 12058 SAS No.: SDG No.: BT747

Matrix: (soil/water) SOIL Lab Sample ID: 890107-14

Sample wt/vol: 5.0 (g/mL) G Lab File ID: C0387

Level: (low/med) LOW Date Received: 06/12/89

% Moisture: not dec. 14 Date Analyzed: 06/18/89

GC Column: (pack/cap) PACK Dilution Factor: 1.0

CONCENTRATION UNITS:

CAS NO.	COMPOUND	(ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	12	U
74-83-9	Bromomethane	12	U
75-01-4	Vinyl Chloride	12	U
75-00-3	Chloroethane	12	U
75-09-2	Methylene Chloride	26	B
67-64-1	Acetone	14	B
75-15-0	Carbon Disulfide	6	U
75-35-4	1,1-Dichloroethene	6	U
75-34-3	1,1-Dichloroethane	6	U
540-59-0	1,2-Dichloroethene (total)	6	U
67-66-3	Chloroform	6	U
107-06-2	1,2-Dichloroethane	6	U
78-93-3	2-Butanone	12	U
71-55-6	1,1,1-Trichloroethane	6	U
56-23-5	Carbon Tetrachloride	6	U
108-05-4	Vinyl Acetate	12	U
75-27-4	Bromodichloromethane	6	U
78-87-5	1,2-Dichloropropane	6	U
10061-01-5	cis-1,3-Dichloropropene	6	U
79-01-6	Trichloroethene	6	U
124-48-1	Dibromochloromethane	6	U
79-00-5	1,1,2-Trichloroethane	6	U
71-43-2	Benzene	6	U
10061-02-6	Trans-1,3-Dichloropropene	6	U
75-25-2	Bromoform	6	U
108-10-1	4-Methyl-2-Pentanone	12	U
591-78-6	2-Hexanone	12	U
127-18-4	Tetrachloroethene	6	U
79-34-5	1,1,2,2-Tetrachloroethane	6	U
108-88-3	Toluene	6	U
108-90-7	Chlorobenzene	6	U
100-41-4	Ethylbenzene	6	U
100-42-5	Styrene	6	U
1330-20-7	Total Xylenes	6	U

IE Preliminary

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

BY761

Lab Name: CHEMIC CORP Contract: 68D90028

Lab Code: CCHIC Case No.: L2058 SAS No.: SDG No.: BT747

Matrix: (soil/water) SOIL Lab Sample ID: 89010/-14

Sample wt/vol: 5.0 (g/ml) G Lab File ID: C0387

Level: (low/med) LOW Date Received: 06/12/89

% Moisture: not dec. 14 Date Analyzed: 06/18/89

Column (pack/cap) PACK Dilution Factor: 1.0

Number TICs found: 3 CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1. 000000	Unknown	8.02	8.1	BJ
2. 000000	Unknown	28.44	160	BJ
3. 000000	Unknown	31.79	38	BJ

1C

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BY761

Lab Name: CHEMIC CORP Contract: 68D90028

Lab Code: CHEMIC Case No.: 12058 SAS No.: _____ SDG No.: HT747

Matrix: (soil/water) SOIL Lab Sample ID: 890107-14

Sample wt/vol: 31.4 (g/mL) G Lab File ID: A1270

Level: (low/med) LOW Date Received: 06/08/89

% Moisture: not dec. 22 dec. ____ Date Extracted: 06/12/89

Extraction: (SepF/Cont/Sonc) SONC Date Analyzed: 06/30/89

GPC Cleanup: (Y/N) N pH: 8.0 Dilution Factor: 2.1

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
99-09-2	3-Nitroaniline	4100	U
83-32-9	Acenaphthene	850	U
51-28-5	2,4-Dinitrophenol	4100	U
100-02-7	4-Nitrophenol	4100	U
132-64-9	Dibenzofuran	850	U
121-14-2	2,4-Dinitrotoluene	850	U
84-66-2	Diethylphthalate	850	U
7005-72-3	4-Chlorophenyl-phenylether	850	U
86-73-7	Fluorene	850	U
100-10-6	4-Nitroaniline	4100	U
534-52-1	4,6-Dinitro-2-Methylphenol	4100	U
86-30-6	N-Nitrosodiphenylamine (1)	850	U
101-55-3	4-Bromophenyl-phenylether	850	U
118-74-1	Hexachlorobenzene	850	U
87-86-5	Pentachlorophenol	4100	U
85-01-8	Phenanthrene	850	U
120-12-7	Anthracene	850	U
84-74-2	Di-n-Butylphthalate	850	U
206-44-0	Fluoranthene	850	U
129-00-0	Pyrene	850	U
85-68-7	Butylbenzylphthalate	120	J
91-94-1	3,3'-Dichlorobenzidine	1700	U
56-55-3	Benzo(a)Anthracene	850	U
218-01-9	Chrysene	850	U
117-81-7	bis(2-Ethylhexyl)Phthalate	850	U
117-84-0	Di-n-Octyl Phthalate	850	U
205-99-2	Benzo(b)Fluoranthene	850	U
207-08-9	Benzo(k)Fluoranthene	850	U
50-32-8	Benzo(a)Pyrene	850	U
193-39-5	Indeno(1,2,3-cd)Pyrene	850	U
53-70-3	Dibenz(a,h)Anthracene	850	U
191-24-2	Benzo(g,h,i)Perylene	850	U

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(1) - Cannot be separated from Diphenylamine

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

SY715

Lab Name: [illegible] Contract: 4529A05

Lab Code: [illegible] Case No.: 10459 SAS No.: [illegible] SDG No.: SY578

Matrix: (soil/water) SOIL Lab Sample ID: 490107-20

Sample wt/vol: 30.1 (g/mL) G Lab File ID: 61055

Level: (low/med) LOW Date Received: 06/12/89

% Moisture: not dec. 12 dec. ____ Date Extracted: 06/13/89

Extraction: (SepF/Cont/Sonc) SONC Date Analyzed: 06/29/89

GPC Cleanup: (Y/N) N pH: 8.2 Dilution Factor: 1.0

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

CAS NO.	COMPOUND		Q
108-95-2	Phenol	370	U
111-44-4	bis(2-Chloroethyl)Ether	370	U
95-57-8	2-Chlorophenol	370	U
541-73-1	1,3-Dichlorobenzene	370	U
106-46-7	1,4-Dichlorobenzene	370	U
100-51-6	Benzyl Alcohol	370	U
95-50-1	1,2-Dichlorobenzene	370	U
95-48-7	2-Methylphenol	370	U
39638-32-9	bis(2-Chloroisopropyl)Ether	370	U
106-44-5	4-Methylphenol	370	U
621-64-7	N-Nitroso-Di-n-Propylamine	370	U
67-72-1	Hexachloroethane	370	U
98-95-3	Nitrobenzene	370	U
78-59-1	Isophorone	370	U
88-75-5	2-Nitrophenol	370	U
105-67-9	2,4-Dimethylphenol	370	U
65-85-0	Benzoic Acid	1000	U
111-91-1	bis(2-Chloroethoxy)Methane	370	U
120-83-2	2,4-Dichlorophenol	370	U
120-82-1	1,2,4-Trichlorobenzene	370	U
91-20-3	Naphthalene	5700	
106-47-8	4-Chloroaniline	370	U
87-68-3	Hexachlorobutadiene	370	U
59-50-7	4-Chloro-3-Methylphenol	370	U
91-57-6	2-Methylnaphthalene	3000	
77-47-4	Hexachlorocyclopentadiene	370	U
88-06-2	2,4,6-Trichlorophenol	370	U
95-95-4	2,4,5-Trichlorophenol	1800	U
91-58-7	2-Chloronaphthalene	370	U
88-74-4	2-Nitroaniline	1800	U
131-11-3	Dimethyl Phthalate	370	U
208-96-8	Acenaphthylene	370	U
606-20-2	2,6-Dinitrotoluene	370	U

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FORM I SV-1

TUT 001 0398

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1C

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BY765

Lab Name: CEIMIC CORP Contract: 68D90026

Lab Code: CEIMIC Case No.: 12058 SAS No.: SDG No.: B7978

Matrix: (soil/water) SOIL Lab Sample ID: 890107-32

Sample wt/vol: 30.1 (g/mL) G Lab File ID: A1255

Level: (low/med) LOW Date Received: 06/12/89

% Moisture: not dec. 12 dec. Date Extracted: 06/13/89

Extraction: (SepF/Cont/Sonc) SONC Date Analyzed: 06/29/89

GPC Cleanup: (Y/N) N pH: 8.2 Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
99-09-2	3-Nitroaniline	1800	U
83-32-9	Acenaphthene	370	U
51-28-5	2,4-Dinitrophenol	1800	U
100-02-7	4-Nitrophenol	1800	U
132-64-9	Dibenzofuran	370	U
121-14-2	2,4-Dinitrotoluene	370	U
84-66-2	Diethylphthalate	370	U
7005-72-3	4-Chlorophenyl-phenylether	370	U
86-73-7	Fluorene	330	J
100-10-6	4-Nitroaniline	1800	U
534-52-1	4,6-Dinitro-2-Methylphenol	1800	U
86-30-6	N-Nitrosodiphenylamine (1)	370	U
101-55-3	4-Bromophenyl-phenylether	370	U
118-74-1	Hexachlorobenzene	370	U
87-86-5	Pentachlorophenol	1800	U
85-01-8	Phenanthrene	300	J
120-12-7	Anthracene	370	U
84-74-2	Di-n-Butylphthalate	370	U
206-44-0	Fluoranthene	370	U
129-00-0	Pyrene	370	U
85-68-7	Butylbenzylphthalate	370	U
91-94-1	3,3'-Dichlorobenzidine	750	U
56-55-3	Benzo(a)Anthracene	370	U
218-01-9	Chrysene	370	U
117-81-7	bis(2-Ethylhexyl)Phthalate	50	J
117-84-0	Di-n-Octyl Phthalate	370	U
205-99-2	Benzo(b)Fluoranthene	370	U
207-08-9	Benzo(k)Fluoranthene	370	U
50-32-8	Benzo(a)Pyrene	370	U
193-39-5	Indeno(1,2,3-cd)Pyrene	370	U
53-70-3	Dibenz(a,h)Anthracene	370	U
191-24-2	Benzo(g,h,i)Perylene	370	U

(1) - Cannot be separated from Diphenylamine

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BY769

Lab Name: CEIMIC CORP Contract: 68D90028

Lab Code: CEIMIC Case No.: 12058 SAS No.: _____ SDG No.: BY979

Matrix: (soil/water) SOIL Lab Sample ID: 890127-23

Sample wt/vol: 70.3 (g/mL) G Lab File ID: A1256

Level: (low/med) LOW Date Received: 06/12/89

% Moisture: not dec. 17 dec. ____ Date Extracted: 06/13/89

Extraction: (SepF/Cont/Sonc) SONC Date Analyzed: 06/29/89

GPC Cleanup: (Y/N) N pH: 8.8 Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
108-95-2	Phenol	400	U
111-44-4	bis(2-Chloroethyl)Ether	400	U
95-57-8	2-Chlorophenol	400	U
541-73-1	1,3-Dichlorobenzene	400	U
106-46-7	1,4-Dichlorobenzene	400	U
100-51-6	Benzyl Alcohol	400	U
95-50-1	1,2-Dichlorobenzene	400	U
95-48-7	2-Methylphenol	400	U
39638-32-9	bis(2-Chloroisopropyl)Ether	400	U
106-44-5	4-Methylphenol	400	U
621-64-7	N-Nitroso-Di-n-Propylamine	400	U
67-72-1	Hexachloroethane	400	U
98-95-3	Nitrobenzene	400	U
78-59-1	Isophorone	400	U
88-75-5	2-Nitrophenol	400	U
105-67-9	2,4-Dimethylphenol	400	U
65-85-0	Benzoic Acid	1900	U
111-91-1	bis(2-Chloroethoxy)Methane	400	U
120-83-2	2,4-Dichlorophenol	400	U
120-82-1	1,2,4-Trichlorobenzene	400	U
91-20-3	Naphthalene	1800	
106-47-8	4-Chloroaniline	400	U
87-68-3	Hexachlorobutadiene	400	U
59-50-7	4-Chloro-3-Methylphenol	400	U
91-57-6	2-Methylnaphthalene	1600	
77-47-4	Hexachlorocyclopentadiene	400	U
88-06-2	2,4,6-Trichlorophenol	400	U
95-95-4	2,4,5-Trichlorophenol	1900	U
91-58-7	2-Chloronaphthalene	400	U
88-74-4	2-Nitroaniline	1900	U
131-11-3	Dimethyl Phthalate	400	U
208-96-8	Acenaphthylene	400	U
606-20-2	2,6-Dinitrotoluene	400	U

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BY769

Lab Name: SEIMIC CORP Contract: 68D90059

Lab Code: SEIMIC Case No.: 12058 SAS No.: _____ SDG No.: BX978

Matrix: (soil/water) SOIL Lab Sample ID: 090107-23

Sample wt/vol: 30.3 (g/mL) G Lab File ID: A1256

Level: (low/med) LOW Date Received: 06/12/89

% Moisture: not dec. 17 dec. _____ Date Extracted: 06/17/89

Extraction: (SepF/Cont/Sonc) SONC Date Analyzed: 06/29/89

GPC Cleanup: (Y/N) N pH: 8.8 Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
99-09-2	3-Nitroaniline	1900	U
83-32-9	Acenaphthene	400	U
51-28-5	2,4-Dinitrophenol	1900	U
100-02-7	4-Nitrophenol	1900	U
132-64-9	Dibenzofuran	400	U
121-14-2	2,4-Dinitrotoluene	400	U
84-66-2	Diethylphthalate	400	U
7005-72-3	4-Chlorophenyl-phenylether	400	U
86-73-7	Fluorene	130	J
100-10-6	4-Nitroaniline	1900	U
534-52-1	4,6-Dinitro-2-Methylphenol	1900	U
86-30-6	N-Nitrosodiphenylamine (1)	400	U
101-55-3	4-Bromophenyl-phenylether	400	U
118-74-1	Hexachlorobenzene	400	U
87-86-5	Pentachlorophenol	1900	U
85-01-8	Phenanthrene	400	U
120-12-7	Anthracene	400	U
84-74-2	Di-n-Butylphthalate	400	U
206-44-0	Fluoranthene	400	U
129-00-0	Pyrene	400	U
85-68-7	Butylbenzylphthalate	400	U
91-94-1	3,3'-Dichlorobenzidine	800	U
56-55-3	Benzo(a)Anthracene	400	U
218-01-9	Chrysene	400	U
117-81-7	Bis(2-Ethylhexyl)Phthalate	400	U
117-84-0	Di-n-Octyl Phthalate	400	U
205-99-2	Benzo(b)Fluoranthene	400	U
207-08-9	Benzo(k)Fluoranthene	400	U
50-32-8	Benzo(a)Pyrene	400	U
193-39-5	Indeno(1,2,3-cd)Pyrene	400	U
53-70-3	Dibenz(a,h)Anthracene	400	U
191-24-2	Benzo(g,h,i)Perylene	400	U

(1) - Cannot be separated from Diphenylamine

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BY770

Lab Name: CHEMIC CORP Contract: 68D90028

Lab Code: CHEMIC Case No.: 12058 SAS No.: SDG No.: BY973

Matrix: (soil/water) SOIL Lab Sample ID: 890107-24

Sample wt/vol: 30.2 (g/mL) G Lab File ID: A1231

Level: (low/med) LOW Date Received: 06/12/89

% Moisture: not dec. 11 dec. Date Extracted: 06/17/89

Extraction: (SepF/Cont/Sonc) SONC Date Analyzed: 07/01/89

GPC Cleanup: (Y/N) N pH: 8.9 Dilution Factor: 4.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
108-95-2	Phenol	1500	U
111-44-4	bis(2-Chloroethyl)Ether	1500	U
95-57-8	2-Chlorophenol	1500	U
541-73-1	1,3-Dichlorobenzene	1500	U
106-46-7	1,4-Dichlorobenzene	1500	U
100-51-6	Benzyl Alcohol	1500	U
95-50-1	1,2-Dichlorobenzene	1500	U
95-48-7	2-Methylphenol	1500	U
39638-32-9	bis(2-Chloroisopropyl)Ether	1500	U
106-44-5	4-Methylphenol	1500	U
621-64-7	N-Nitroso-Di-n-Propylamine	1500	U
67-72-1	Hexachloroethane	1500	U
98-95-3	Nitrobenzene	1500	U
78-59-1	Isophorone	1500	U
88-75-5	2-Nitrophenol	1500	U
105-67-9	2,4-Dimethylphenol	1500	U
65-85-0	Benzoic Acid	7200	U
111-91-1	bis(2-Chloroethoxy)Methane	1500	U
120-83-2	2,4-Dichlorophenol	1500	U
120-82-1	1,2,4-Trichlorobenzene	1500	U
91-20-3	Naphthalene	27000	E 1
106-47-8	4-Chloroaniline	1500	U
87-68-3	Hexachlorobutadiene	1500	U
59-50-7	4-Chloro-3-Methylphenol	1500	U
91-57-6	2-Methylnaphthalene	27000	E 4
77-47-4	Hexachlorocyclopentadiene	1500	U
88-06-2	2,4,6-Trichlorophenol	1500	U
95-95-4	2,4,5-Trichlorophenol	7200	U
91-58-7	2-Chloronaphthalene	1500	U
88-74-4	2-Nitroaniline	7200	U
131-11-3	Dimethyl Phthalate	1500	U
208-96-8	Acenaphthylene	1500	U
606-20-2	2,6-Dinitrotoluene	1500	U

1C

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BX770

Lab Name: SEIMIC CERF Contract: 68D90029

Lab Code: SEIMIC Case No.: 12359 SAS No.: _____ SDG No.: BX770

Matrix: (soil/water) SOIL Lab Sample ID: 890107-24

Sample wt/vol: 30.2 (g/mL) G Lab File ID: A1291

Level: (low/med) LOW Date Received: 06/12/89

% Moisture: not dec. 11 dec. _____ Date Extracted: 06/13/89

Extraction: (SepF/Cont/Sonc) SONC Date Analyzed: 07/01/89

GPC Cleanup: (Y/N) N pH: 8.9 Dilution Factor: 4.0

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

CAS NO.	COMPOUND		Q
99-09-2	3-Nitroaniline	7200	U
83-32-9	Acenaphthene	1500	U
51-28-5	2,4-Dinitrophenol	7200	U
100-02-7	4-Nitrophenol	7200	U
132-64-9	Dibenzofuran	1500	U
121-14-2	2,4-Dinitrotoluene	1500	U
84-66-2	Diethylphthalate	1500	U
7005-72-3	4-Chlorophenyl-phenylether	1500	U
86-73-7	Fluorene	1100	J
100-10-6	4-Nitroaniline	7200	U
534-52-1	4,6-Dinitro-2-Methylphenol	7200	U
86-30-6	N-Nitrosodiphenylamine (1)	1500	U
101-55-3	4-Bromophenyl-phenylether	1500	U
118-74-1	Hexachlorobenzene	1500	U
87-86-5	Pentachlorophenol	7200	U
85-01-8	Phenanthrene	1100	J
120-12-7	Anthracene	1500	U
84-74-2	Di-n-Butylphthalate	1500	U
206-44-0	Fluoranthene	1500	U
129-00-0	Pyrene	150	J
85-68-7	Butylbenzylphthalate	1500	U
91-94-1	3,3'-Dichlorobenzidine	3000	U
56-55-3	Benzo(a)Anthracene	1500	U
218-01-9	Chrysene	1500	U
117-81-7	bis(2-Ethylhexyl)Phthalate	260	J
117-84-0	Di-n-Octyl Phthalate	1500	U
205-99-2	Benzo(b)Fluoranthene	1500	U
207-08-9	Benzo(k)Fluoranthene	1500	U
50-32-8	Benzo(a)Pyrene	1500	U
193-39-5	Indeno(1,2,3-cd)Pyrene	1500	U
53-70-3	Dibenz(a,h)Anthracene	1500	U
191-24-2	Benzo(g,h,i)Perylene	1500	U

(1) - Cannot be separated from Diphenylamine

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1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

EY771

Lab Name: CEIMIC CORP Contract: 68D90020

Lab Code: CEIMIC Case No.: 12158 SAS No.: SDG No.: 71978

Matrix: (soil/water) SOIL Lab Sample ID: SB9107-05

Sample wt/vol: 30.1 (g/mL) G Lab File ID: 11257

Level: (low/med) LOW Date Received: 06/12/89

% Moisture: not dec. 14 dec. Date Extracted: 06/17/89

Extraction: (SepF/Cont/Sonc) SONC Date Analyzed: 06/20/89

GPC Cleanup: (Y/N) N pH: 8.4 Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
108-95-2	Phenol	380	U
111-44-4	bis(2-Chloroethyl)Ether	380	U
95-57-8	2-Chlorophenol	380	U
541-73-1	1,3-Dichlorobenzene	380	U
106-46-7	1,4-Dichlorobenzene	380	U
100-51-6	Benzyl Alcohol	380	U
95-50-1	1,2-Dichlorobenzene	380	U
95-48-7	2-Methylphenol	380	U
39638-32-9	bis(2-Chloroisopropyl)Ether	380	U
106-44-5	4-Methylphenol	380	U
621-64-7	N-Nitroso-Di-n-Propylamine	380	U
67-72-1	Hexachloroethane	380	U
98-95-3	Nitrobenzene	380	U
78-59-1	Isophorone	380	U
88-75-5	2-Nitrophenol	380	U
105-67-9	2,4-Dimethylphenol	380	U
65-85-0	Benzoic Acid	1900	U
111-91-1	bis(2-Chloroethoxy)Methane	380	U
120-83-2	2,4-Dichlorophenol	380	U
120-82-1	1,2,4-Trichlorobenzene	380	U
91-20-3	Naphthalene	1100	
106-47-8	4-Chloroaniline	380	U
87-68-3	Hexachlorobutadiene	380	U
59-50-7	4-Chloro-3-Methylphenol	380	U
91-57-6	2-Methylnaphthalene	1100	
77-47-4	Hexachlorocyclopentadiene	380	U
88-06-2	2,4,6-Trichlorophenol	380	U
95-95-4	2,4,5-Trichlorophenol	1900	U
91-58-7	2-Chloronaphthalene	380	U
88-74-4	2-Nitroaniline	1900	U
131-11-3	Dimethyl Phthalate	380	U
208-96-8	Acenaphthylene	380	U
606-20-2	2,6-Dinitrotoluene	380	U

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EPA SAMPLE NO.

BY771

Lab Name: CERMIC CORP Contract: 68D50028

Lab Code: CERMIC Case No.: 12053 SAS No.: _____ SDG No.: BY778

Matrix: (soil/water) SOIL Lab Sample ID: 690107-25

Sample wt/vol: 30.1 (g/mL) G Lab File ID: A1257

Level: (low/med) LOW Date Received: 06/12/89

% Moisture: not dec. 14 dec. ____ Date Extracted: 06/13/89

Extraction: (SepF/Cont/Sonc) SONC Date Analyzed: 06/29/89

GPC Cleanup: (Y/N) N pH: 8.4 Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
99-09-2	3-Nitroaniline	1900	U
83-32-9	Acenaphthene	380	U
51-28-5	2,4-Dinitrophenol	1900	U
100-02-7	4-Nitrophenol	1900	U
132-64-9	Dibenzofuran	380	U
121-14-2	2,4-Dinitrotoluene	380	U
84-66-2	Diethylphthalate	380	U
7005-72-3	4-Chlorophenyl-phenylether	380	U
86-73-7	Fluorene	59	J
100-10-6	4-Nitroaniline	1900	U
534-52-1	4,6-Dinitro-2-Methylphenol	1900	U
86-30-6	N-Nitrosodiphenylamine (1)	380	U
101-55-3	4-Bromophenyl-phenylether	380	U
118-74-1	Hexachlorobenzene	380	U
87-86-5	Pentachlorophenol	1900	U
85-01-8	Phenanthrene	380	U
120-12-7	Anthracene	380	U
84-74-2	Di-n-Butylphthalate	380	U
206-44-0	Fluoranthene	380	U
129-00-0	Pyrene	380	U
85-68-7	Butylbenzylphthalate	380	U
91-94-1	3,3'-Dichlorobenzidine	770	U
56-55-3	Benzo(a)Anthracene	380	U
218-01-9	Chrysene	380	U
117-81-7	bis(2-Ethylhexyl)Phthalate	380	U
117-84-0	Di-n-Octyl Phthalate	380	U
205-99-2	Benzo(b)Fluoranthene	380	U
207-08-9	Benzo(k)Fluoranthene	380	U
50-32-8	Benzo(a)Pyrene	380	U
193-39-5	Indeno(1,2,3-cd)Pyrene	380	U
53-70-3	Dibenz(a,h)Anthracene	380	U
191-24-2	Benzo(g,h,i)Perylene	380	U

(1) - Cannot be separated from Diphenylamine

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1C

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

SY772

Lab Name: CERMIC CORP Contract: 68D90028

Lab Code: CERMIC Case No.: 10250 SAS No.: _____ SDG No.: SY979

Matrix: (soil/water) SOIL Lab Sample ID: 890107-26

Sample wt/vol: 30.2 (g/mL) G Lab File ID: A1230

Level: (low/med) LOW Date Received: 06/12/89

% Moisture: not dec. 15 dec. ____ Date Extracted: 06/13/89

Extraction: (SepF/Cont/Sonc) SONC Date Analyzed: 06/27/89

GPC Cleanup: (Y/N) N pH: 8.4 Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
99-09-2	3-Nitroaniline	1900	U
83-32-9	Acenaphthene	390	U
51-28-5	2,4-Dinitrophenol	1900	U
100-02-7	4-Nitrophenol	1900	U
132-64-9	Dibenzofuran	390	U
121-14-2	2,4-Dinitrotoluene	390	U
84-66-2	Diethylphthalate	390	U
7005-72-3	4-Chlorophenyl-phenylether	390	U
86-73-7	Fluorene	390	U
100-10-6	4-Nitroaniline	1900	U
534-52-1	4,6-Dinitro-2-Methylphenol	1900	U
86-30-6	N-Nitrosodiphenylamine (1)	390	U
101-55-3	4-Bromophenyl-phenylether	390	U
118-74-1	Hexachlorobenzene	390	U
87-86-5	Pentachlorophenol	1900	U
85-01-8	Phenanthrene	390	U
120-12-7	Anthracene	390	U
84-74-2	Di-n-Butylphthalate	390	U
206-44-0	Fluoranthene	390	U
129-00-0	Pyrene	390	U
85-68-7	Butylbenzylphthalate	390	U
91-94-1	3,3'-Dichlorobenzidine	780	U
56-55-3	Benzo(a)Anthracene	390	U
218-01-9	Chrysene	390	U
117-81-7	bis(2-Ethylhexyl)Phthalate	45	J
117-84-0	Di-n-Octyl Phthalate	390	U
205-99-2	Benzo(b)Fluoranthene	390	U
207-08-9	Benzo(k)Fluoranthene	390	U
50-32-8	Benzo(a)Pyrene	390	U
193-39-5	Indeno(1,2,3-cd)Pyrene	390	U
53-70-3	Dibenz(a,h)Anthracene	390	U
191-24-2	Benzo(g,h,i)Perylene	390	U

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(1) - Cannot be separated from Diphenylamine

1D

EPA SAMPLE NO.

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

BY773

Lab Name: SEIMIC CORP Contract: 68D90028

Lab Code: SEIMIC Case No.: 12058 SAS No.: _____ SDG No.: BX978

Matrix: (soil/water) SOIL Lab Sample ID: 890107-27

Sample wt/vol: 31.3 (g/mL) G Lab File ID: A1268

Level: (low/med) LOW Date Received: 06/12/89

% Moisture: not dec. 11 dec. _____ Date Extracted: 06/13/89

Extraction: (SepF/Cont/Sonc) SONC Date Analyzed: 06/30/89

GPC Cleanup: (Y/N) N pH: 9.1 Dilution Factor: 1.0

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

CAS NO.	COMPOUND		Q
108-95-2	Phenol	370	U
111-44-4	bis(2-Chloroethyl)Ether	370	U
95-57-8	2-Chlorophenol	370	U
541-73-1	1,3-Dichlorobenzene	370	U
106-46-7	1,4-Dichlorobenzene	370	U
100-51-6	Benzyl Alcohol	370	U
95-50-1	1,2-Dichlorobenzene	370	U
95-48-7	2-Methylphenol	370	U
39638-32-9	bis(2-Chloroisopropyl)Ether	370	U
106-44-5	4-Methylphenol	370	U
621-64-7	N-Nitroso-Di-n-Propylamine	370	U
67-72-1	Hexachloroethane	370	U
98-95-3	Nitrobenzene	370	U
78-59-1	Isophorone	370	U
88-75-5	2-Nitrophenol	370	U
105-67-9	2,4-Dimethylphenol	370	U
65-85-0	Benzoic Acid	1800	U
111-91-1	bis(2-Chloroethoxy)Methane	370	U
120-83-2	2,4-Dichlorophenol	370	U
120-82-1	1,2,4-Trichlorobenzene	370	U
91-20-3	Naphthalene	600	
106-47-8	4-Chloroaniline	370	U
87-68-3	Hexachlorobutadiene	370	U
59-50-7	4-Chloro-3-Methylphenol	370	U
91-57-6	2-Methylnaphthalene	940	
77-47-4	Hexachlorocyclopentadiene	370	U
88-06-2	2,4,6-Trichlorophenol	370	U
95-95-4	2,4,5-Trichlorophenol	1800	U
91-58-7	2-Chloronaphthalene	370	U
88-74-4	2-Nitroaniline	1800	U
131-11-3	Dimethyl Phthalate	370	U
208-96-8	Acenaphthylene	370	U
606-20-2	2,6-Dinitrotoluene	370	U

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:C

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BY773

Lab Name: CEIMIC CORP Contract: 68D90028

Lab Code: CEIMIC Case No.: 12058 SAS No.: _____ SDG No.: BX978

Matrix: (soil/water) SOIL Lab Sample ID: 890107-27

Sample wt/vol: 31.3 (g/mL) G Lab File ID: A1268

Level: (low/med) LOW Date Received: 06/12/89

% Moisture: not dec. 11 dec. ____ Date Extracted: 06/13/89

Extraction: (SepF/Cont/Sonc) SONC Date Analyzed: 06/30/89

GPC Cleanup: (Y/N) N pH: 9.1 Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
99-09-2	3-Nitroaniline	1800	U
83-32-9	Acenaphthene	370	U
51-28-5	2,4-Dinitrophenol	1800	U
100-02-7	4-Nitrophenol	1800	U
132-64-9	Dibenzofuran	370	U
121-14-2	2,4-Dinitrotoluene	370	U
84-66-2	Diethylphthalate	370	U
7005-72-3	4-Chlorophenyl-phenylether	370	U
86-73-7	Fluorene	300	J
100-10-6	4-Nitroaniline	1800	U
534-52-1	4,6-Dinitro-2-Methylphenol	1800	U
86-30-6	N-Nitrosodiphenylamine (1)	370	U
101-55-3	4-Bromophenyl-phenylether	370	U
118-74-1	Hexachlorobenzene	370	U
87-86-5	Pentachlorophenol	1800	U
85-01-8	Phenanthrene	170	J
120-12-7	Anthracene	370	U
84-74-2	Di-n-Butylphthalate	370	U
206-44-0	Fluoranthene	370	U
129-00-0	Pyrene	370	U
85-68-7	Butylbenzylphthalate	370	U
91-94-1	3,3'-Dichlorobenzidine	710	U
56-55-3	Benzo(a)Anthracene	370	U
218-01-9	Chrysene	370	U
117-81-7	bis(2-Ethylhexyl)Phthalate	36	J
117-84-0	Di-n-Octyl Phthalate	370	U
205-99-2	Benzo(b)Fluoranthene	370	U
207-08-9	Benzo(k)Fluoranthene	370	U
50-32-8	Benzo(a)Pyrene	370	U
193-39-5	Indeno(1,2,3-cd)Pyrene	370	U
53-70-3	Dibenz(a,h)Anthracene	370	U
191-24-2	Benzo(g,h,i)Perylene	370	U

(1) - Cannot be separated from Diphenylamine

1C

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BY775

Lab Name: SEMISC CORP Contract: 68D90028

Lab Code: SEMISC Case No.: 12058 SAS No.: _____ SDG No.: BY978

Matrix: (soil/water) SOIL Lab Sample ID: 890107-29

Sample wt/vol: 30.6 (g/mL) G Lab File ID: A1233

Level: (low/med) LOW Date Received: 06/12/89

% Moisture: not dec. 12 dec. _____ Date Extracted: 06/13/89

Extraction: (SepF/Cont/Sonc) SONC Date Analyzed: 06/27/89

GPC Cleanup: (Y/N) N pH: 8.9 Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
99-09-2	3-Nitroaniline	1800	U
83-32-9	Acenaphthene	370	U
51-28-5	2,4-Dinitrophenol	1800	U
100-02-7	4-Nitrophenol	1800	U
132-64-9	Dibenzofuran	370	U
121-14-2	2,4-Dinitrotoluene	370	U
84-66-2	Diethylphthalate	370	U
7005-72-3	4-Chlorophenyl-phenylether	370	U
86-73-7	Fluorene	370	U
100-10-6	4-Nitroaniline	1800	U
534-52-1	4,6-Dinitro-2-Methylphenol	1800	U
86-30-6	N-Nitrosodiphenylamine (1)	370	U
101-55-3	4-Bromophenyl-phenylether	370	U
118-74-1	Hexachlorobenzene	370	U
87-86-5	Pentachlorophenol	1800	U
85-01-8	Phenanthrene	370	U
120-12-7	Anthracene	370	U
84-74-2	Di-n-Butylphthalate	370	U
206-44-0	Fluoranthene	370	U
129-00-0	Pyrene	370	U
85-68-7	Butylbenzylphthalate	370	U
91-94-1	3,3'-Dichlorobenzidine	750	U
56-55-3	Benzo(a)Anthracene	370	U
218-01-9	Chrysene	370	U
117-81-7	bis(2-Ethylhexyl)Phthalate	59	J
117-84-0	Di-n-Octyl Phthalate	370	U
205-99-2	Benzo(b)Fluoranthene	370	U
207-08-9	Benzo(k)Fluoranthene	370	U
50-32-8	Benzo(a)Pyrene	370	U
193-39-5	Indeno(1,2,3-cd)Pyrene	370	U
53-70-3	Dibenz(a,h)Anthracene	370	U
191-24-2	Benzo(g,h,i)Perylene	370	U

(1) - Cannot be separated from Diphenylamine

TUT 001 0409

1C

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BY775MS

Lab Name: [illegible] Contract: [illegible]

Lab Code: [illegible] Case No.: 12058 SAS No.: _____ SDG No.: BX978

Matrix: (soil/water) SOIL Lab Sample ID: 890107-29MS

Sample wt/vol: 30.2 (g/mL) G Lab File ID: A1234

Level: (low/med) LOW Date Received: 06/12/89

% Moisture: not dec. 12 dec. ____ Date Extracted: 06/13/89

Extraction: (SepF/Cont/Sonc) SONC Date Analyzed: 06/27/89

GPC Cleanup: (Y/N) N pH: 8.9 Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
99-09-2	3-Nitroaniline	1800	U
83-32-9	Acenaphthene	370	U
51-28-5	2,4-Dinitrophenol	1800	U
100-02-7	4-Nitrophenol	1800	U
132-64-9	Dibenzofuran	370	U
121-14-2	2,4-Dinitrotoluene	370	U
84-66-2	Diethylphthalate	370	U
7005-72-3	4-Chlorophenyl-phenylether	370	U
86-73-7	Fluorene	370	U
100-10-6	4-Nitroaniline	1800	U
534-52-1	4,6-Dinitro-2-Methylphenol	1800	U
86-30-6	N-Nitrosodiphenylamine (1)	370	U
101-55-3	4-Bromophenyl-phenylether	370	U
118-74-1	Hexachlorobenzene	370	U
87-86-5	Pentachlorophenol	1800	U
85-01-8	Phenanthrene	370	U
120-12-7	Anthracene	370	U
84-74-2	Di-n-Butylphthalate	370	U
206-44-0	Fluoranthene	370	U
129-00-0	Pyrene	370	U
85-68-7	Butylbenzylphthalate	370	U
91-94-1	3,3'-Dichlorobenzidine	750	U
56-55-3	Benzo(a)Anthracene	370	U
218-01-9	Chrysene	370	U
117-81-7	bis(2-Ethylhexyl)Phthalate	54	J
117-84-0	Di-n-Octyl Phthalate	370	U
205-99-2	Benzo(b)Fluoranthene	370	U
207-08-9	Benzo(k)Fluoranthene	370	U
50-32-8	Benzo(a)Pyrene	370	U
193-39-5	Indeno(1,2,3-cd)Pyrene	370	U
53-70-3	Dibenz(a,h)Anthracene	370	U
191-24-2	Benzo(g,h,i)Perylene	370	U

(1) - Cannot be separated from Diphenylamine

826

TUT 001 0410

1C

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BY775MSD

Lab Name: CHEMIC CORP Contract: 68D90028

Lab Code: CHMIC Case No.: 12858 SAS No.: _____ SDG No.: BK978

Matrix: (soil/water) SOIL Lab Sample ID: 890107-25MSD

Sample wt/vol: 30.0 (g/mL) G Lab File ID: A1235

Level: (low/med) LOW Date Received: 06/12/89

% Moisture: not dec. 12 dec. ____ Date Extracted: 06/13/89

Extraction: (SepF/Cont/Sonc) SONC Date Analyzed: 06/27/89

GPC Cleanup: (Y/N) N pH: 8.9 Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
99-09-2	3-Nitroaniline	1800	U
83-32-9	Acenaphthene	370	U
51-28-5	2,4-Dinitrophenol	1800	U
100-02-7	4-Nitrophenol	1800	U
132-64-9	Dibenzofuran	370	U
121-14-2	2,4-Dinitrotoluene	370	U
84-66-2	Diethylphthalate	370	U
7005-72-3	4-Chlorophenyl-phenylether	370	U
86-73-7	Fluorene	370	U
100-10-6	4-Nitroaniline	1800	U
534-52-1	4,6-Dinitro-2-Methylphenol	1800	U
86-30-6	N-Nitrosodiphenylamine (1)	370	U
101-55-3	4-Bromophenyl-phenylether	370	U
118-74-1	Hexachlorobenzene	370	U
87-86-5	Pentachlorophenol	1800	U
85-01-8	Phenanthrene	370	U
120-12-7	Anthracene	370	U
84-74-2	Di-n-Butylphthalate	370	U
206-44-0	Fluoranthene	370	U
129-00-0	Pyrene	370	U
85-68-7	Butylbenzylphthalate	370	U
91-94-1	3,3'-Dichlorobenzidine	750	U
56-55-3	Benzo(a)Anthracene	370	U
218-01-9	Chrysene	370	U
117-81-7	bis(2-Ethylhexyl)Phthalate	67	J
117-84-0	Di-n-Octyl Phthalate	370	U
205-99-2	Benzo(b)Fluoranthene	370	U
207-08-9	Benzo(k)Fluoranthene	370	U
50-32-8	Benzo(a)Pyrene	370	U
193-39-5	Indeno(1,2,3-cd)Pyrene	370	U
53-70-3	Dibenz(a,h)Anthracene	370	U
191-24-2	Benzo(g,h,i)Perylene	370	U

1) - Cannot be separated from Diphenylamine

830

2B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

SBLK01

Lab Name: CERTIC CORP Contract: 68D90028

Lab Code: CERTIC Case No.: 12056 SAS No.: _____ SDG No.: SX978

Matrix: (soil/water) SOIL Lab Sample ID: 90618-51

Sample wt/vol: 30.0 (g/mL) G Lab File ID: A1129

Level: (low/med) LOW Date Received: 06/08/89

% Moisture: not dec. 0 dec. ____ Date Extracted: 06/12/89

Extraction: (SepF/Cont/Sonc) SONC Date Analyzed: 06/19/89

GPC Cleanup: (Y/N) N pH: 7.0 Dilution Factor: 1.00

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
108-95-2	Phenol	330	U
111-44-4	bis(2-Chloroethyl)Ether	330	U
95-57-8	2-Chlorophenol	330	U
541-73-1	1,3-Dichlorobenzene	330	U
106-46-7	1,4-Dichlorobenzene	330	U
100-51-6	Benzyl Alcohol	330	U
95-50-1	1,2-Dichlorobenzene	330	U
95-48-7	2-Methylphenol	330	U
39638-32-9	bis(2-Chloroisopropyl)Ether	330	U
106-44-5	4-Methylphenol	330	U
621-64-7	N-Nitroso-Di-n-Propylamine	330	U
67-72-1	Hexachloroethane	330	U
98-95-3	Nitrobenzene	330	U
78-59-1	Isophorone	330	U
88-75-5	2-Nitrophenol	330	U
105-67-9	2,4-Dimethylphenol	330	U
65-85-0	Benzoic Acid	1600	U
111-91-1	bis(2-Chloroethoxy)Methane	330	U
120-83-2	2,4-Dichlorophenol	330	U
120-82-1	1,2,4-Trichlorobenzene	330	U
91-20-3	Naphthalene	330	U
106-47-8	4-Chloroaniline	330	U
87-68-3	Hexachlorobutadiene	330	U
59-50-7	4-Chloro-3-Methylphenol	330	U
91-57-6	2-Methylnaphthalene	330	U
77-47-4	Hexachlorocyclopentadiene	330	U
88-06-2	2,4,6-Trichlorophenol	330	U
95-95-4	2,4,5-Trichlorophenol	1600	U
91-58-7	2-Chloronaphthalene	330	U
88-74-4	2-Nitroaniline	1600	U
131-11-3	Dimethyl Phthalate	330	U
208-96-8	Acenaphthylene	330	U
606-20-2	2,6-Dinitrotoluene	330	U

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FORM I SV-1

TUT 001 0412

1C

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

SBLK01

Lab Name: CEIMIC CORP Contract: 68D90028

Lab Code: CEIMIC Case No.: 12058 SAS No.: _____ SDG No.: BT747

Matrix: (soil/water) SOIL Lab Sample ID: 80612-B1

Sample wt/vol: 30.0 (g/mL) G Lab File ID: A1129

Level: (low/med) LOW Date Received: 06/08/89

% Moisture: not dec. 0 dec. _____ Date Extracted: 06/12/89

Extraction: (SepF/Cont/Sonc) SONC Date Analyzed: 06/19/89

GPC Cleanup: (Y/N) N pH: 7.0 Dilution Factor: 1.00

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
99-09-2	3-Nitroaniline	1600	U
83-32-9	Acenaphthene	330	U
51-28-5	2,4-Dinitrophenol	1600	U
100-02-7	4-Nitrophenol	1600	U
132-64-9	Dibenzofuran	330	U
121-14-2	2,4-Dinitrotoluene	330	U
84-66-2	Diethylphthalate	330	U
7005-72-3	4-Chlorophenyl-phenylether	330	U
86-73-7	Fluorene	330	U
100-10-6	4-Nitroaniline	1600	U
534-52-1	4,6-Dinitro-2-Methylphenol	1600	U
86-30-6	N-Nitrosodiphenylamine (1)	330	U
101-55-3	4-Bromophenyl-phenylether	330	U
118-74-1	Hexachlorobenzene	330	U
87-86-5	Pentachlorophenol	1600	U
85-01-8	Phenanthrene	330	U
120-12-7	Anthracene	330	U
84-74-2	Di-n-Butylphthalate	330	U
206-44-0	Fluoranthene	330	U
129-00-0	Pyrene	330	U
85-68-7	Butylbenzylphthalate	330	U
91-94-1	3,3'-Dichlorobenzidine	660	U
56-55-3	Benzo(a)Anthracene	330	U
218-01-9	Chrysene	330	U
117-81-7	bis(2-Ethylhexyl)Phthalate	330	U
117-84-0	Di-n-Octyl Phthalate	330	U
205-99-2	Benzo(b)Fluoranthene	330	U
207-08-9	Benzo(k)Fluoranthene	330	U
50-32-8	Benzo(a)Pyrene	330	U
193-39-5	Indeno(1,2,3-cd)Pyrene	330	U
53-70-3	Dibenz(a,h)Anthracene	330	U
191-24-2	Benzo(g,h,i)Perylene	330	U

(1) - Cannot be separated from Diphenylamine

716

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

SBLK01

Lab Name: CEIMIC CORP Contract: 68D90028

Lab Code: CEIMIC Case No.: 12050 SAS No.: SDG No.: BT747

Matrix: (soil/water) SOIL Lab Sample ID: 90612-B1

Sample wt/vol: 30.0 (g/mL) G Lab File ID: A1129

Level: (low/med) LOW Date Received: 06/08/89

% Moisture: not dec. 0 dec. Date Extracted: 06/12/89

Extraction: (SepF/Cont/Sonc) SONC Date Analyzed: 06/19/89

GPC Cleanup: (Y/N) N pH: 7.0 Dilution Factor: 1.00

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
108-95-2	Phenol	330	U
111-44-4	bis(2-Chloroethyl)Ether	330	U
95-57-8	2-Chlorophenol	330	U
541-73-1	1,3-Dichlorobenzene	330	U
106-46-7	1,4-Dichlorobenzene	330	U
100-51-6	Benzyl Alcohol	330	U
95-50-1	1,2-Dichlorobenzene	330	U
95-48-7	2-Methylphenol	330	U
39638-32-9	bis(2-Chloroisopropyl)Ether	330	U
106-44-5	4-Methylphenol	330	U
621-64-7	N-Nitroso-Di-n-Propylamine	330	U
67-72-1	Hexachloroethane	330	U
98-95-3	Nitrobenzene	330	U
78-59-1	Isophorone	330	U
88-75-5	2-Nitrophenol	330	U
105-67-9	2,4-Dimethylphenol	330	U
65-85-0	Benzoic Acid	1600	U
111-91-1	bis(2-Chloroethoxy)Methane	330	U
120-83-2	2,4-Dichlorophenol	330	U
120-82-1	1,2,4-Trichlorobenzene	330	U
91-20-3	Naphthalene	330	U
106-47-8	4-Chloroaniline	330	U
87-68-3	Hexachlorobutadiene	330	U
59-50-7	4-Chloro-3-Methylphenol	330	U
91-57-6	2-Methylnaphthalene	330	U
77-47-4	Hexachlorocyclopentadiene	330	U
88-06-2	2,4,6-Trichlorophenol	330	U
95-95-4	2,4,5-Trichlorophenol	1600	U
91-58-7	2-Chloronaphthalene	330	U
88-74-4	2-Nitroaniline	1600	U
131-11-3	Dimethyl Phthalate	330	U
208-96-8	Acenaphthylene	330	U
606-20-2	2,6-Dinitrotoluene	330	U

715

1C

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

SBLK01

Lab Name: SEIMIC CORP Contract: 68D90020

Lab Code: SEIMIC Case No.: 12058 SAS No.: _____ SDG No.: BX978

Matrix: (soil/water) SOIL Lab Sample ID: 90612-B1

Sample wt/vol: 30.0 (g/mL) G Lab File ID: A1129

Level: (low/med) LOW Date Received: 06/08/89

% Moisture: not dec. 0 dec. _____ Date Extracted: 06/12/89

Extraction: (SepF/Cont/Sonc) SONC Date Analyzed: 06/19/89

GPC Cleanup: (Y/N) N pH: 7.0 Dilution Factor: 1.00

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
99-09-2	3-Nitroaniline	1600	U
83-32-9	Acenaphthene	330	U
51-28-5	2,4-Dinitrophenol	1600	U
100-02-7	4-Nitrophenol	1600	U
132-64-9	Dibenzofuran	330	U
121-14-2	2,4-Dinitrotoluene	330	U
84-66-2	Diethylphthalate	330	U
7005-72-3	4-Chlorophenyl-phenylether	330	U
86-73-7	Fluorene	330	U
100-10-6	4-Nitroaniline	1600	U
534-52-1	4,6-Dinitro-2-Methylphenol	1600	U
86-30-6	N-Nitrosodiphenylamine (1)	330	U
101-55-3	4-Bromophenyl-phenylether	330	U
118-74-1	Hexachlorobenzene	330	U
87-86-5	Pentachlorophenol	1600	U
85-01-8	Phenanthrene	330	U
120-12-7	Anthracene	330	U
84-74-2	Di-n-Butylphthalate	330	U
206-44-0	Fluoranthene	330	U
129-00-0	Pyrene	330	U
85-68-7	Butylbenzylphthalate	330	U
91-94-1	3,3'-Dichlorobenzidine	660	U
56-55-3	Benzo(a)Anthracene	330	U
218-01-9	Chrysene	330	U
117-81-7	bis(2-Ethylhexyl)Phthalate	330	U
117-84-0	Di-n-Octyl Phthalate	330	U
205-99-2	Benzo(b)Fluoranthene	330	U
207-08-9	Benzo(k)Fluoranthene	330	U
50-32-8	Benzo(a)Pyrene	330	U
193-39-5	Indeno(1,2,3-cd)Pyrene	330	U
53-70-3	Dibenz(a,h)Anthracene	330	U
191-24-2	Benzo(g,h,i)Perylene	330	U

(1) - Cannot be separated from Diphenylamine

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

SBLK02

Lab Name: SEDIMIC CORP. Contract: 68D90028

Lab Code: SEDIMIC Case No.: 10059 SAS No.: _____ SDG No.: 3X97F

Matrix: (soil/water) SOIL Lab Sample ID: 90613-B1

Sample wt/vol: 30.0 (g/mL) G Lab File ID: A1191

Level: (low/med) LOW Date Received: 06/08/89

% Moisture: not dec. 0 dec. _____ Date Extracted: 06/13/89

Extraction: (SepF/Cont/Sonc) SONC Date Analyzed: 06/23/89

GPC Cleanup: (Y/N) N pH: 7.0 Dilution Factor: 1.00

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
108-95-2	Phenol	330	U
111-44-4	bis(2-Chloroethyl)Ether	330	U
95-57-8	2-Chlorophenol	330	U
541-73-1	1,3-Dichlorobenzene	330	U
106-46-7	1,4-Dichlorobenzene	330	U
100-51-6	Benzyl Alcohol	330	U
95-50-1	1,2-Dichlorobenzene	330	U
95-48-7	2-Methylphenol	330	U
39638-32-9	bis(2-Chloroisopropyl)Ether	330	U
106-44-5	4-Methylphenol	330	U
621-64-7	N-Nitroso-Di-n-Propylamine	330	U
67-72-1	Hexachloroethane	330	U
98-95-3	Nitrobenzene	330	U
78-59-1	Isophorone	330	U
88-75-5	2-Nitrophenol	330	U
105-67-9	2,4-Dimethylphenol	330	U
65-85-0	Benzoic Acid	1600	U
111-91-1	bis(2-Chloroethoxy)Methane	330	U
120-83-2	2,4-Dichlorophenol	330	U
120-82-1	1,2,4-Trichlorobenzene	330	U
91-20-3	Naphthalene	330	U
106-47-8	4-Chloroaniline	330	U
87-68-3	Hexachlorobutadiene	330	U
59-50-7	4-Chloro-3-Methylphenol	330	U
91-57-6	2-Methylnaphthalene	330	U
77-47-4	Hexachlorocyclopentadiene	330	U
88-06-2	2,4,6-Trichlorophenol	330	U
95-95-4	2,4,5-Trichlorophenol	1600	U
91-58-7	2-Chloronaphthalene	330	U
88-74-4	2-Nitroaniline	1600	U
131-11-3	Dimethyl Phthalate	330	U
208-96-8	Acenaphthylene	330	U
606-20-2	2,6-Dinitrotoluene	330	U

1C

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

SBLK02

Lab Name: CEIMIC CORP Contract: 68D90026

Lab Code: CEIMIC Case No.: 12058 SAS No.: _____ SDG No.: BX078

Matrix: (soil/water) SOIL Lab Sample ID: 80613-B1

Sample wt/vol: 30.0 (g/mL) G Lab File ID: A1181

Level: (low/med) LOW Date Received: 06/08/89

% Moisture: not dec. 0 dec. ____ Date Extracted: 06/13/89

Extraction: (SepF/Cont/Sonc) SONC Date Analyzed: 06/23/89

GPC Cleanup: (Y/N) N pH: 7.0 Dilution Factor: 1.00

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
99-09-2	3-Nitroaniline	1600	U
83-32-9	Acenaphthene	330	U
51-28-5	2,4-Dinitrophenol	1600	U
100-02-7	4-Nitrophenol	1600	U
132-64-9	Dibenzofuran	330	U
121-14-2	2,4-Dinitrotoluene	330	U
84-66-2	Diethylphthalate	330	U
7005-72-3	4-Chlorophenyl-phenylether	330	U
86-73-7	Fluorene	330	U
100-10-6	4-Nitroaniline	1600	U
534-52-1	4,6-Dinitro-2-Methylphenol	1600	U
86-30-6	N-Nitrosodiphenylamine (1)	330	U
101-55-3	4-Bromophenyl-phenylether	330	U
118-74-1	Hexachlorobenzene	330	U
87-86-5	Pentachlorophenol	1600	U
85-01-8	Phenanthrene	330	U
120-12-7	Anthracene	330	U
84-74-2	Di-n-Butylphthalate	330	U
206-44-0	Fluoranthene	330	U
129-00-0	Pyrene	330	U
85-68-7	Butylbenzylphthalate	330	U
91-94-1	3,3'-Dichlorobenzidine	660	U
56-55-3	Benzo(a)Anthracene	330	U
218-01-9	Chrysene	330	U
117-81-7	bis(2-Ethylhexyl)Phthalate	330	U
117-84-0	Di-n-Octyl Phthalate	330	U
205-99-2	Benzo(b)Fluoranthene	330	U
207-08-9	Benzo(k)Fluoranthene	330	U
50-32-8	Benzo(a)Pyrene	330	U
193-39-5	Indeno(1,2,3-cd)Pyrene	330	U
53-70-3	Dibenz(a,h)Anthracene	330	U
191-24-2	Benzo(g,h,i)Perylene	330	U

(1) - Cannot be separated from Diphenylamine

TUT 001 0417

ATTACHMENT 1
SOP NO. HW-6

PAGE OF

TOTAL REVIEW

CLP DATA ASSESSMENT

Functional Guidelines for Evaluating Organic Analysis

Case No. 12058 SDG No. BX258 & BX260 LABORATORY COMPUCHEMN SITE TUTU

DATA ASSESSMENT:

The current functional guidelines (1988) for evaluating organic data have been applied.

All data are valid and acceptable except those analytes which have been qualified with a "J" (estimated), "U" (non-detects), "R" (unusable), or "JN" (presumptive evidence for the presence of the material at an estimated value). All action is detailed on the attached sheets.

Two facts should be noted by all data users. First, the "R" flag means that the associated value is unusable. In other words, due to significant QC problems the analysis is invalid and provides no information as to whether the compound is present or not. "R" values should not appear on data tables because they cannot be relies upon, even as a last resort. The second fact to keep in mind is that no compound concentration, even if it has passed all QC tests, is guaranteed to be accurate. Strict QC serves to increase confidence in data but any value potentially contains error.

Reviewer's Signature: Wendell Buford Date 3/2/1990

Verified By: M Rosato Date 3/2/1990

DATA ASSESSMENT:

4. CALIBRATION:

Satisfactory instrument calibration is established to ensure that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of giving acceptable performance at the beginning of an experimental sequence. The continuing calibration checks document that the instrument is giving satisfactory daily performance.

A) RESPONSE FACTOR:

The response factor measures the instrument's response to specific chemical compounds. The response factor for the Target Compound List (TCL) must be $\geq$ 0.05 in both the initial and continuing calibrations. A value < 0.05 indicates a serious detection and quantitation problem (poor sensitivity). Analytes detected in the sample will be qualified as estimated, "J". All non-detects for that compound will be rejected, "R".

2-Butanone was rejected in samples BY705, BY707, BY709, BY711, BY712, and BY713.

DATA ASSESSMENT:

5. CALIBRATION:

A) PERCENT RELATIVE STANDARD DEVIATION (%RSD) AND PERCENT DIFFERENCE (%D):

Percent RSD is calculated from the initial calibration and is used to indicate the stability of the specific compound response factor over increasing concentration. Percent D compares the response factor of the continuing calibration check to the mean response factor (RRF) from the initial calibration. Percent D is a measure of the instrument's daily performance. Percent RSD must be <30% and %D must be <25%. A value outside of these limits indicates potential detection and quantitation errors. For these reasons, all positive results are flagged as estimated, "J" and non-detects are flagged "UJ" (if %D or RSD >50%). If there is a gross deviation of %RSD and %D, the non-detects may be rejected, "R".

For the PCB/PESTICIDE fraction, %RSD for aldrin, endrin, DDT, and dibutylchlorendate must not exceed 10%. Percent D must be within 15% on the quantitation column and 20% on the confirmation column.

VOA

The following analytes were qualified for high %D results:
1,1,2 Trichloroethane was rejected in sample BX258, and qualified "UJ" in samples BY772, BY773, and BY775.
Chloroethane was qualified "UJ" in samples BY769, BX994, BX979, BX981, and BY774.
Chloromethane was qualified "UJ" in samples BY772, BY773, BY775, BX994, BX979, BX981.
Tetrachloroethene was qualified "J" in sample BX258, and "UJ" in samples BY769, BY774, BY772, BY773, and BY775.
Bromoform was qualified "UJ" in samples BY772, BY773, and BY775.
Acetone was qualified "J" in samples BY772, and BY775; "UJ" in samples BY774, and BY769; and rejected in sample BY773.

Acetone in samples BY701, BY763, BY768, and BX259 were qualified "J" due to high %D results. Acetone in sample BY769 was also qualified "u" for method blank contamination. %D values were high for 4 Methyl 2 Pentanone but this was previously qualified for surrogate recoveries.
Methylene Chloride in sample BX259 was flagged "J" due to RSD values.
Acetone in BY768 did not meet QC requirement for %D but was already qualified due to high RSD results in sample #BX991.

BNA
The following analytes are qualified for high %D results:

3,3 Dichlorobenzidine was flagged "UJ" in samples BX260, BX979, BY758, BY762, and BY261.
4 Nitrophenol was flagged "UJ" in samples BX994, BY758, BY762, and

REFERENCE NO. 8

CONTINUED

BY261.
Diethylphthalate was flagged "UJ" in samples BX995RE, BY763, BY768, and BY761.
Bis(2-Chloroisopropyl)Ether was rejected in samples BY701, BY762, BY758 and BY261.
Benzoic Acid was flagged "UJ" in samples BY701, BY761, BY763, and BY768.
3 Nitroaniline was rejected in sample BX994.
Bis(2-Chloroethyl)Ether was flagged "UJ" in sample BY701.
N-Nitroso Di-n-Propylamine was flagged "UJ" in sample BY701.
Hexachlorobenzene was flagged "UJ" in sample BY758, BY762 and BY261.
Bis(2-Ethylhexyl)Phthalate was flagged "J" in samples BY761, BY768, BY258, and BY259.
Benzoic Acid in sample #BX995RE also failed QC requirements but was previously rejected for surrogate recovery.

DATA ASSESSMENT:

6. SURROGATES:

All samples are spiked with surrogate compounds prior to sample preparation to evaluate overall laboratory performance and efficiency of the analytical technique. If the measured surrogate concentrations were outside contract specifications, qualifications were applied to the samples and analytes as shown below.

BNA

The acid fraction in sample BX995RE was rejected.

VOA

4Methyl-2-Pentanone was qualified as "J" estimated, and all the other analytes qualified as "UJ" in sample BX991.

DATA ASSESSMENT:

7. INTERNAL STANDARDS PERFORMANCE

Internal standard (IS) performance criteria ensure that the GC/MS sensitivity and response are stable during every experimental run. The internal standard area count must not vary by more than a factor of 2 (-50% to +100%) from the associated continuing calibration standard. The retention time of the internal standard must not vary more than ±30 seconds from the associated continuing calibration standard. If the area count is outside the (-50% to +100%) range of the associated standard, all of the positive results for compounds quantitated using that IS are qualified as estimated, "J", and all non-detects as "UJ" or "R" if there is a severe loss of sensitivity.

If an internal standard retention time varies by more than 30 seconds, the reviewer will use professional judgment to determine either partial or total rejection of the data for that sample fraction.

VOA

2 Hexanone, 4 Methyl-2-Pentanone, Tetrachloroethene, 1,1,2,2,Tetrachloroethane, Toluene, Chlorobenzene, Ethylbenzene, Styrene, and Xylene the internal standard area count falls outside the QC range, no action was taken because these analytes were previously qualified for poor surrogate recoveries in sample BX991.

DATA ASSESSMENT:

8. COMPOUND IDENTIFICATION:

A) VOLATILE AND SEMI-VOLATILE FRACTIONS:

TCL compounds are identified on the GC/MS by using the analyte's relative retention time (RRT) and by comparison to the ion spectra obtained from known standards. For the results to be a positive hit, the sample peak must be within ±0.06 RRT units of the standard compound and have an ion spectrum which has a ratio of the primary and secondary m/e intensities within 20% of that in the standard compound. For the tentatively identified compounds (TIC) the ion spectra must match accurately. In the cases in which there is not and adequate ion spectrum match, the laboratory may have provided false positive identification.*

B) PESTICIDE FRACTION:

The retention times of reported compounds must fall within the calculated retention time windows for the two chromatographic columns and a GC/MS confirmation is required if the concentration exceeds 10 ng/ml in the final sample extract.

BNA

Phenol in sample BX258 was flagged "JN" due to inadequate spectral match.
The aldol products (TIC) in samples BX258, BX259, BX261 were rejected.
Two VOA TCL identified as TIC's were rejected in sample BXC761.

*All TIC compound results (VOA and BNA) are flagged "J" (estimated), and also "N" (presumptive evidence of the presence of the compound) if an identification is made, to reflect the qualitative and quantitative error inherent in the analysis of compounds without corresponding calibration standards.

DATA ASSESSMENT:

9. MATRIX SPIKE/SPIKE DUPLICATE, MS/MSD:

The MS/MSD data are generated to determine the long-term precision and accuracy of the analytical method in various matrices. The MS/MSD may be used in conjunction with other QC criteria for some additional qualification of the data.

VOA

Poor matrix spike recoveries were obtained for the VOA fraction. The matrix spike sample (BX259), was diluted by a factor of 6.7.

DATA ASSESSMENT:

2. BLANK CONTAMINATION:

Quality assurance (QA) blanks, i.e., method, trip, field, rinse and water blanks are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Trip blanks measure cross-contamination of samples during shipment. Field blanks measure cross-contamination of samples during field operations. If the concentration of the analyte is less than 5 times the blank contaminant level (10 times for the common contaminants), the analytes in the samples shown were qualified with "U" for these reasons:

A) Method blank contamination

VOA

Acetone in samples BX258, BY702, BY769, BY774.
Chloroform in samples BY769, BY772, BY774, BY775.
Methylene Chloride in samples BY705,BY707, BY709, BY711, BY712, BY713, BY769, BY772, BY773, BY774, BY775, and BX258.
Acetone in sample BY773 was flagged "J" for field blank contamination, this flag was superceded by rejection due to calibration results.

BNA

Two TIC's were rejected in sample BX258 due to method blank contamination.

B) Field or rinse blank contamination ("water blanks" or "distilled water blanks" are validated like any other sample)

VOA

Acetone and Methylene Chloride in sample BY764 was qualified "u".
Acetone in samples BY769, and BY774 were already qualified for method blank contamination. Methylene Chloride in samples BY772, BY773, BY775, and BY774 also failed QC for field blank, but was previously qualified for method blank contamination.

There were several field blanks not associated with any samples.

C) Trip blank contamination

DATA ASSESSMENT:

10. OTHER QC DATA OUT OF SPECIFICATION:

Sample #764 was received but not listed on Chain of Custody or Traffic Report. Sample #BY761 was listed but not received. Sample #775 was received with samples collected on 6/9/89 but not listed on the traffic report. The BNA portion of sample By765 was not received by the lab, therefore the analysis was not performed.

11. SYSTEM PERFORMANCE AND OVERALL ASSESSMENT (continued on next page if necessary):

12. CONTRACT PROBLEMS / NON-COMPLIANCE:

Relative response factors for 2-Butanone were calculated using Bromochloromethane as the internal standard instead of 1,4 Dichlorobenzene. No qualifications were required since the retention time for 2-Butanone was closer to the Bromochloromethane standard.

13. This package contains re-extraction, re-analysis or dilution. Upon reviewing the QA results, the following form I(s) are identified to be used.

SEE FORM I's.

ORGANIC REGIONAL DATA ASSESSMENT SUMMARY

CASE NO. 12058 LABORATORY Combustion

SDG NO. HW58 3X260 DATA USER CMI

SOW _____ REVIEW COMPLETION DATE 2-20-90

NO. OF SAMPLES 17 WATER 20 SOIL _____ OTHER 3 SOILS, 11 H_2O 2 PESTICIDES & Semi-Vol.

REVIEWER [ ] ESD [ ] ESAT [ ] OTHER, CONTRACT/CONTRACTOR _____

	VOA	BNA	PEST	OTHER
1. HOLDING TIMES	O	O	O	N/A
2. GC-MS TUNE/ GC PERFORMANCE				
3. INITIAL CALIBRATIONS				
4. CONTINUING CALIBRATIONS				
5. FIELD BLANKS ("F" = not applicable)				
6. LABORATORY BLANKS	√	√		
7. SURROGATES	O	O		
8. MATRIX SPIKE/DUPLICATES	↓	↓		
9. REGIONAL QC ("F" = not applicable)	F	F		
10. INTERNAL STANDARDS	O	O		
11. COMPOUND IDENTIFICATION				
12. COMPOUND QUANTITATION				
13. SYSTEM PERFORMANCE			√	
14. OVERALL ASSESSMENT	√	√	O	√

O = No problems or minor problems that do not affect data usability.
X = No more than *about* 5% of the data points are qualified as either estimated or unusable.
M = More than *about* 5% of the data points are qualified as estimated.
Z = More than *about* 5% of the data points are qualified as unusable.

DPO ACTION ITEMS: _____

AREAS OF CONCERN: _____

TUT 001 0428

Project: LUTH / SUPERCAT

Lab Name: COMPUCHEM

Reviewer's Initials: JMO

Number of Samples: 37 VOA
14 Semi-Volatiles & Pesticides

Analytes Rejected Due to Exceeding Review Criteria:

	Surrogates	Holding Time	Calibration	Contamination	ID	Other	* Total # Samples	Total # Rejected/ Total # in all Samples
Acids (15)	15						210	15/210
B/N (50)			5				700	5/700
VOA ~~(35)~~ 34			8	22			1258	30/1258
PEST (20)							280	0/280
PCB (7)							98.0	0/98.
TCDD (1)								

Analytes Estimated Due to Exceeding Review Criteria for:

Acids (15)			7				210	7/210
B/N (50)			19				700	19/700
VOA ~~(25)~~ 34	34		32				1258	66/1258
PEST (20)							280	0/280
PCB (7)							98	0/98
TCDD (1)								

* Includes any trip and field blanks, which are not subject to qualification based on some QC criteria (such as method blank contamination)

2774 LUT 001 0429

In Reference to Case No(s):
12059

Contract Laboratory Program
REGIONAL/LABORATORY COMMUNICATION SYSTEM
Telephone Record Log

Date of Call: February 28, 1991

Laboratory Name: Compuchem
Lab Contact: Richard Brom, Alice Evans (919) 248-6478

Region: II
Regional Contact: Marge Rosato - FPC

Call Initiated By: ___ Laboratory ✓ Region

*THIS PAGE WAS TRACED OVER DUE TO POOR COPY. SOME WORDS COULD NOT BE IDENTIFIED
Richard R. Fenn 6/4/91

In reference to data for the following sample number(s):

① BX259 - VOA
BY701 - BNA
BNA 5pt 5/1/89 NST#06

Summary of Questions/Issues Discussed: + raw data

① Package is missing Form II for initial calibration on INSTRUMENT #10. (SOIL 5pt - SDG BX259). - VOA

② MISSING TIC Spectrum for BNA fraction IN Sample BY761 2H 1,3 Dihydro

③ Response factor for BNA 5pt on 5/09/89 do not with Raw data.

Summary of Resolution:

① Resubmitted (inserted in pkg)

② Resubmitted "

③ Resubmitted "

M Rosato
Signature

3/2/90
Date

Distribution: (1) Lab Copy, (2) Region Copy, (3) SMO Copy

TUT 001 0430

COMPUCHEM
LABORATORIES, INC.

03/01/90

Ms. Margo Rezado
CDM Federal Program Office
40 Rector Street 10th Floor
New York, New York 10006

Dear Ms. Rezado;

The attached is missing data you requested for Case 12058.

SDG# BX258

Form VI and missing raw data on Inst. 10 - VOA (PAGES 847A - 847S).

SDG# BX260

TIC missing for Sample BY761 (PAGE 1069A).

Incorrect page in your package for Inst. 06 on 05/01/89 for SSTD160 (PAGE 897) Please replace this page and the response factors will caculate to the ones given on Form VI.

If I can be of further assistance, please call 919-248-6478.

Sincerely;

Alice Evans

Alice Evans
Contract Compliance Coordinator

cc: SMO
Region II
EMSL/LV

SOP NO. HW-6
Revision #6

CLP ORGANICS DATA REVIEW AND PRELIMINARY REVIEW

CONCURRED BY: _____ Date: 4/6/89
Louis Bevilacqua
Monitoring Management Branch

APPROVED BY: _____ Date: 4/14/89
Gerard F. McKenna, Chief
Monitoring Management Branch

TUT 001 0432

PACKAGE COMPLETENESS AND DELIVERABLES

CASE NUMBER: 12058

LAB: COMPUCHEM

SITE: TUTU / SUPERCAT

	YES	NO	N/A
1.0 Data Completeness and Deliverables			
1.1 Have any missing deliverables been received and added to the data package.	☑		
ACTION: Call lab for explanation / resubmittal of any missing deliverables. If lab cannot provide them, note the effect on review of the package under the "Contract Problems/Non-compliance" section of reviewer narrative.			
1.2 SMO CCS checklist included with package?	☑		
2.0 Cover Letter/Case Narrative			
2.1 Is the Narrative or Cover Letter present?	☑		
2.2 Are Case Number and/or SAS number contained in the Narrative or Cover Letter?	☑		
3.0 Data Validation Checklist			
The following checklist is divided into three parts. Part A is filled out if the data package contains any VOA analyses, Part B for any BNA analyses and Part C for Pesticide/PCBs.			
Does this package contain:			
VOA data?	✓		
BNA data?	✓		
Pesticide/PCB data?	✓		
ACTION: Complete corresponding parts of checklist.			

	YES	NO	N/A

PART A: VOA ANALYSES

1.0 Traffic Reports and Laboratory Narrative

1.1 Are the Traffic Report Forms present for all samples? [✓] ___ ___

ACTION: If no, contact lab for replacement of missing or illegible copies.

1.2 Do the Traffic Reports or Lab Narrative indicate any problems with sample receipt, condition of samples, analytical problems or special notations affecting the quality of the data? ✓ [___] ___

ACTION: Use professional judgement to evaluate the effect on the quality of the data.

ACTION: If any sample analyzed as a soil contains more than 50% water, all data should be rejected.

ACTION: If both VOA vials for a sample have air bubbles, flag all positive results "J" and all non-detects "R".

2.0 Holding Times

2.1 Have any VOA holding times, determined from date of collection to date of analysis, been exceeded? ✓ [___] ___

1 DAY GRACE PERIOD NOT FLAGGED.

If unpreserved, aqueous aromatic volatiles must be analyzed within 7 days of collection and non-aromatic volatiles must be analyzed within 14 days. If preserved with hydrochloric acid and stored at 4°C, then both aromatic and non-aromatic volatiles must be analyzed within 14 days. If uncertain about preservation, contact the sampler to determine whether the samples were preserved.

A ten-day holding time for soil samples is recommended.

Table of Holding Time Violations

Sample	Sample Matrix	Preserved ?	(See Traffic Report) Date Sampled	Date Lab Received	Date Analyzed
____	____	____	____	____	____
____	____	____	____	____	____
____	____	____	____	____	____
____	____	____	____	____	____

ACTION: If holding times are exceeded, flag all positive results as estimated ("J") and sample quantitation limits as estimated ("UJ"), and document in the narrative that holding times were exceeded.

	YES	NO	N/A

If analyses were done more than 14 days beyond holding time, either on the first analysis or upon reanalysis, the reviewer must use professional judgement to determine the reliability of the data and the effects of additional storage on the sample results. The reviewer may determine that non-detect data are unusable ("R").

3.0 Surrogate Recovery (Form II)

3.1 Are the VOA Surrogate Recovery Summaries (Form II) present for each of the following matrices:

a. Low Water	[✓]	—	—
b. Med Water	[ ]	—	✓
c. Low Soil	[✓]	—	—
d. Med Soil	[✓]	—	—

3.2 Are all the VOA samples listed on the appropriate Surrogate Recovery Summaries for each of the following matrices:

a. Low Water	[✓]	—	—
b. Med Water	[ ]	—	✓
c. Low Soil	[✓]	—	—
d. Med Soil	[✓]	—	—

ACTION: Call lab for explanation / resubmittals. If missing deliverables are unavailable, document effect on data under "Conclusions" section of reviewer narrative.

3.3 Were outliers marked correctly with an asterisk? [✓] — — (2X99)

ACTION: Circle all outliers in red.

3.4 Was one or more VOA surrogate recovery outside of contract specifications for any sample or method blank? ✓ [ ] —

If yes, were samples reanalyzed? [ ] ✓ —

Were method blanks reanalyzed? [ ] — ✓

ACTION: If surrogate recoveries are > 10% but all do not meet SOW specifications:

1. Flag all positive results as estimated ("J").
2. Flag all non-detects as estimated detection limits ("UJ").

	YES	NO	N/A

If any surrogate has a recovery of <10% :

1. Flag all positive results as estimated ("J").
2. Flag all non-detects as unusable ("R").

Professional judgement should be used to qualify data that have method blank surrogate recoveries out of specification in both original and re-analyses. Check the internal standard areas.

3.5 Are there any transcription/calculation errors between raw data and Form II? — [✓] —

ACTION: If large errors exist, call lab for explanation / resubmittal, make any necessary corrections and note errors under "Conclusions".

4.0 Matrix Spikes (Form III)

4.1 Is the Matrix Spike Duplicate/Recovery Form (Form III) present? [✓] — —

4.2 Were matrix spikes analyzed at the required frequency for each of the following matrices:

a. Low Water [✓] — —

b. Med Water [ ] — ✓

c. Low Soil [✓] — —

d. Med Soil [✓] — —

ACTION: If any matrix spike data are missing, take the action specified in 3.2 above.

4.3 How many VOA spike recoveries are outside QC limits?

Water	Soils	
3 out of 10 (SD260)	0 out of 10 (low SD6253)	10/10 MEDIUM LEVEL

4.4 How many RPD's for matrix spike and matrix spike duplicate recoveries are outside QC limits?

NB SD6258 MEDIUM LEVEL SPIKE RESULTS DILUTED OUT.

Water	Soils	
0 out of 5 (SD6260)	0 out of 5 (low SD6258)	0/5 MEDIUM LEVEL

ACTION: If MS and MSD both have less than 10% recovery for an analyte, negative results for that analyte should be rejected, and positive results should be flagged "J". The above applies only to the sample used for the MS/MSD analysis. Use professional judgement in applying this criterion to other samples in the package

	YES	NO	N/A
5.0 Blanks (Form IV)			
5.1 Is the Method Blank Summary (Form IV) present?	[✓]	___	___
5.2 Frequency of Analysis: for the analysis of VOA TCL compounds, has a reagent/method blank been analyzed for each set of samples or every 20 samples of similar matrix (low water, med water, low soil, medium soil), whichever is more frequent?	[✓]	___	___
5.3 Has a VOA instrument blank been analyzed at least once every twelve hours for each GC/MS system used?	[✓]	___	___
ACTION: If any method blank data are missing, call lab for explanation / resubmittal. If not available, reject all associated positive data ("R").			
5.4 Chromatography: review the blank raw data - chromatograms (RICs), quant reports or data system printouts and spectra.			
Is the chromatographic performance (baseline stability) for each instrument acceptable for VOAs?	[✓]	___	___
ACTION: Use professional judgement to determine the effect on the data.			
6.0 Contamination			
NOTE: "Water blanks" and "distilled water blanks" are validated like any other sample and are not used to qualify data. Do not confuse them with the other QC blanks discussed below.			
6.1 Do any method/instrument/reagent blanks have positive results (TCL and/or TIC) for VOAs? When applied as described below, the contaminant concentration in these blanks are multiplied by the sample Dilution Factor.	✓	[___]	___
6.2 Do any field/trip/rinse blanks have positive VOA results (TCL and/or TIC)?	✓	[___]	___
ACTION: Prepare a list of the samples associated with each of the contaminated blanks. (Attach a separate sheet.)			
NOTE: Only field/rinse blanks taken the same day as the samples are used to qualify data. Trip blanks are used to qualify only those samples with which they were shipped. Blanks may not be qualified because of contamination in another blank. Blanks may be qualified for surrogate, spectral, tuning or calibration QC problems.			

ORGANICS
BLANK CONTAMINATIONS

CASE: 12058 LAB: Compuchem
SITE: Tutu FRACTION: VOA

ANALYTES	METHOD BLANK CONTAMINATIONS				Method RINSE BLANK CONT.		Method TRIP BLANK CONT.	
	ID VBLK29	ID VBLK16	ID [illegible]	ID VBLK27	NO: VBLK29	NO: VBLK31	NO: VBLK24	NO: VBLK17
TCL	AMOUNT	AMOUNT	AMOUNT	AMOUNT	AMOUNT	AMOUNT	AMOUNT	AMOUNT
MeCl	410 ug/kg	200 ug/kg	[illegible] ug/kg	6 ug/kg	6 ug/kg	11 ug/kg	7 ug/kg	1 ug/L
Acetone					15 ug/kg	10 ug/kg	27 ug/kg	
CS2								
Chloroform							2 ug/kg	
TIC								
AFFECTED SAMPLES	BX261	BX265	BY777 779 771 772 773	BX269	BX258	BY772 773 775	BY774 BY769	BY764

ORGANICS
BLANK CONTAMINATIONS

CASE: 12068 SITE: Tutu LAB: Compuchem FRACTION: VOA

ANALYTES	METHOD BLANK CONTAM		FIELD BLANK		RINSE BLANK CONT.		Field TRIP BLANK CONT.	
	ID VBLK52	ID VBLK53	ID BX260	ID BX974	ID: BX996	ID: BX996	ID: BX702	ID: BX772
TCL	AMOUNT	AMOUNT	AMOUNT	AMOUNT	AMOUNT	AMOUNT	AMOUNT	AMOUNT
CH_2Cl_2	7 ug/kg	440 ug/kg						
Acetone	30 ug/kg						3 ug/l	
CS_2								
Chlorobenzene								2 ug/l
TIC								
2,4-dimethyl-Methanol contam.			150 ug/l	150 ug/l	190 ug/l	200 ug/l		
AFFECTED SAMPLES	BX702	BX696L	BX260	BX994	BX991	BX994	BX702	BX991
			259	995		995	703 704	
			259DL				705 707	
			261				709 711	
							712 713	

TUT 001 0436

ORGANICS
BLANK CONTAMINATIONS

CASE: 12058 LAB: Compuchem
SITE: Tutu FRACTION: VOA

ANALYTES	METHOD BLANK CONTAMINATIONS				RINSE BLANK CONT.		TRIP BLANK CONT.	
	ID: BV764	ID: BV768	ID: BX992	ID:	NO: BV761	NO: BV766	NO: BV767	NO: BX993
TCL	AMOUNT	AMOUNT	AMOUNT	AMOUNT	AMOUNT	AMOUNT	AMOUNT	AMOUNT
Methylene Chloride	6 ug/l	3 ug/l			4 ug/l	1 ug/l		
Acetone	320 ug/l	16 ug/l			23 ug/l			
CS_2		21 ug/l						
TIC								
Solvent, suspected laboratory contaminant					180 ug/l			
Unknown Hydrocarbon	4 ug/l	11 ug/l						
2 Unknown Esters/Alcohols						270 ug/l	270 ug/l	
Unknown Oxygenated Hydrocarbon			130 ug/l					20 ug/l
AFFECTED SAMPLES	BV764	B1769 771	BX991		BX994	BV764	BV769 770	BX991
	765	771 772			995	BV765	771 772	
		773 773Re				* BV761	773 773Re	
		774					774	
		775					775	

* sample not received in shipment.

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TUT 001 0440

YES NO N/A

ACTION: Follow the directions in the table below to qualify TCL results due to contamination. Use the largest value from all the associated blanks.

	Sample conc > CRQL but < 10x blank	Sample conc < CRQL & is < 10x blank value	Sample conc > CRQL value & >10x blank value
Methylene chloride Acetone Toluene 2-butanone	Flag sample result with a 'U'; cross out 'B' flag	Reject sample result and report CRQL; cross out 'B' flag	No qualification is needed

	Sample conc > CRQL but < 5x blank	Sample conc < CRQL & is < 5x blank value	Sample conc > CRQL value & > 5 blank value
Other Contaminants	Flag sample result with a 'U'; cross out 'B' flag	Reject sample result and report CRQL; cross out 'B' flag	No qualification is needed

ACTION: For TIC compounds, if the concentration in the sample is less than five times the concentration in the most contaminated associated blank, flag the sample data "R" (unusable).

6.3 Are there field/rinse/equipment blanks associated with every sample? [✓] ___ ___

ACTION: For low level samples, note in data assessment that there is no associated field/rinse/equipment blank. Exception: samples taken from a drinking water tap do not have associated field blanks.

7.0 GC/MS Tuning and Mass Calibration (Form V)

7.1 Are the GC/MS Tuning and Mass Calibration Forms (Form V) present for Bromofluorobenzene (BFB)? [✓] ___ ___

7.2 Are the enhanced bar graph spectrum and mass/charge (m/z) listing for the BFB provided for each twelve hour shift? [✓] ___ ___

7.3 Has a tuning performance compound been analyzed for every twelve hours of sample analysis per instrument? [✓] ___ ___

ACTION: If any tuning data are missing, take action specified in 3.2 above.

ACTION: List date, time, instrument ID, and sample analyses for which no associated GC/MS tuning data are available.

	YES	NO	N/A

DATE	TIME	INSTRUMENT	SAMPLE NUMBERS

ACTION: If lab cannot provide missing data, reject ("R") all data generated outside an acceptable twelve hour calibration interval.

7.4 Have the ion abundance criteria been met for each instrument used? [✓] ___ ___

ACTION: List all data which do not meet ion abundance criteria (attach a separate sheet).

ACTION: If tuning calibration is in error, flag all associated sample data as unusable ("R"). However, if expanded ion criteria are met (See 1988 Functional Guidelines), the data reviewer may accept data with appropriate qualifiers.

7.5 Are there any transcription / calculation errors between mass lists and Form Vs? (Check at least two values but if errors are found, check more.) ___ [✓] ___

7.6 Have the appropriate number of significant figures (two) been reported? (Check at least two values, but if errors are found check more values.) ___ [✓] ___

ACTION: If large errors exist, call lab for explanation / resubmittal, make necessary corrections and note errors under "Conclusions".

7.7 Are the spectra of the mass calibration compound acceptable? [✓] ___ ___

ACTION: Use professional judgement to determine whether associated data should be accepted, qualified, or rejected.

8.0 Target Compound List (TCL) Analytes

8.1 Are the Organic Analysis Data Sheets (Form I VOA) present with required header information on each page, for each of the following:

a. Samples and/or fractions as appropriate [✓] ___ ___

b. Matrix spikes and matrix spike duplicates [✓] ___ ___

c. Blanks [✓] ___ ___

	YES	NO	N/A
8.2 Are the VOA Reconstructed Ion Chromatograms, the mass spectra for the identified compounds, and the data system printouts (Quant Reports) included in the sample package for each of the following?			
a. Samples and/or fractions as appropriate	[✓]	—	—
b. Matrix spikes and matrix spike duplicates (Mass spectra not required)	[✓]	—	—
c. Blanks	[✓]	—	—
ACTION: If any data are missing, take action specified in 3.2 above.			
8.3 Are the response factors shown in the Quant Report?	[✓]	—	—
8.4 Is chromatographic performance acceptable with respect to:			
Baseline stability	[✓]	—	—
Resolution	[✓]	—	—
Peak shape	[✓]	—	—
Full-scale graph (attenuation)	[✓]	—	—
Other:_____	[ ]	—	✓
ACTION: Use professional judgement to determine the acceptability of the data.			
8.5 Are the lab-generated standard mass spectra of the identified VOA compounds present for each sample?	[✓]	—	—
ACTION: If any mass spectra are missing, take action specified in 3.2 above. If Lab does not generate their own standard spectra, make note in "Contract Problems/Non-compliance".			
8.6 Is the RRT of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?	[✓]	—	—
8.7 Are all ions present in the standard mass spectrum at a relative intensity greater than 10% also present in the sample mass spectrum?	[✓]	—	—
8.8 Do sample and standard relative ion intensities agree within 20%?	[✓]	—	—
ACTION: Use professional judgement to determine acceptability of data. If it is determined that incorrect identifications were made, all such data should be rejected, flagged "N" (presumptive evidence of the presence of the compound) or changed to not detected (at the calculated detection limit).			

	YES	NO	N/A
9.0 Tentatively Identified Compounds (TIC)			
9.1 Are all Tentatively Identified Compound Forms (Form I, Part B) present; and do listed TICs include scan number or retention time, estimated concentration and "J" qualifier?	[✓]	—	—
9.2 Are the mass spectra for the tentatively identified compounds and associated "best match" spectra included in the sample package for each of the following:			
a. Samples and/or fractions as appropriate	[✓]	—	—
b. Blanks	[✓]	—	—
ACTION: If any TIC data are missing, take action specified in 3.2 above.			
ACTION: Add "J" qualifier if missing and "N" qualifier to all identified TIC compounds on Form I, Part B.			
9.3 Are any TCL compounds (from any fraction) listed as TIC compounds (example: 1,2-dimethylbenzene is xylene—a VOA TCL—and should not be reported as a TIC)?	—	[✓]	—
ACTION: Flag with "R" any TCL compound listed as a TIC.			
9.4 Are all ions present in the reference mass spectrum with a relative intensity greater than 10% also present in the sample mass spectrum?	[✓]	—	—
9.5 Do TIC and "best match" standard relative ion intensities agree within 20%?	[✓]	—	—
ACTION: Use professional judgement to determine acceptability of TIC identifications. If it is determined that an incorrect identification was made, change identification to "unknown" or to some less specific identification (example: "C3 substituted benzene") as appropriate.			
10.0 Compound Quantitation and Reported Detection Limits			
10.1 Are there any transcription / calculation errors in Form I results? Check at least two positive values. Verify that the correct internal standard, quantitation ion, and RRF were used to calculate Form I result. Were any errors found?	—	[✓]	—
10.2 Are the CRQLs adjusted to reflect sample dilutions and, for soils, sample moisture?	[✓]	[ ]	—

	YES	NO	N/A

ACTION: If errors are large, call lab for explanation / resubmittal, make any necessary corrections and note errors under "Conclusions".

ACTION: When a sample is analyzed at more than one dilution, the lowest CRQLs are used (unless a QC exceedance dictates the use of the higher CRQL data from the diluted sample analysis). Replace concentrations that exceed the calibration range in the original analysis by crossing out the "E" value on the original Form I and substituting it with data from the analysis of diluted sample. Specify which Form I is to be used, then draw a red "X" across the entire page of all Form I's that should not be used, including any in the summary package.

11.0 Standards Data (GC/MS)

11.1 Are the Reconstructed Ion Chromatograms, and data system printouts (Quant. Reports) present for initial and continuing calibration? [✓] ___ ___

ACTION: If any calibration standard data are missing, take action specified in 3.2 above.

12.0 GC/MS Initial Calibration (Form VI)

12.1 Are the Initial Calibration Forms (Form VI) present and complete for the volatile fraction? [ ] ✓ ___

ACTION: If any calibration standard forms are missing, take action specified in 3.2 above.

MISSING Form VI for instrument ID SDG - BX25E

12.2 Are response factors stable for volatiles over the concentration range of the calibration (RSD <30%)? [ ] ✓ ___

ACTION: Circle all outliers in red.

ACTION: When RSD >30%, non-detects may be qualified using professional judgement. Flag all positive results "J". When RSD >90%, flag all non-detects as unusable ("R"). (Region II policy.)

*Only affects sample in BX25A SEE Phone log. - RESUBMITTED 3/2/90

12.3 Do any compounds have a RRF < 0.05? ___ [✓] ___

ACTION: Circle all outliers in red.

ACTION: If any volatile compound has an average RRF < 0.05, flag positive results for that compound as estimated ("J"), and flag non-detects for that compound as unusable ("R").

	YES	NO	N/A
12.4 Are there any transcription / calculation errors in the reporting of average response factors (RRF) or %RSD? (Check at least two values but if errors are found, check more.)	✓*	[ ]	
ACTION: Circle errors in red.	* See Assessment.		
ACTION: If errors are large, call lab for explanation / resubmittal, make any necessary corrections and note errors under "Conclusions".			

13.0 GC/MS Continuing Calibration (Form VII)

13.1 Are the Continuing Calibration Forms (Form VII) present and complete for the volatile fraction?	[✓]		
13.2 Has a continuing calibration standard been analyzed for every twelve hours of sample analysis per instrument?	[✓]		
ACTION: List below all sample analyses that were not within twelve hours of the previous continuing calibration analysis.			

_____

_____

_____

ACTION: If any forms are missing or no continuing calibration standard has been analyzed within twelve hours of every sample analysis, call lab for explanation / resubmittal. If continuing calibration data are not available, flag all associated sample data as unusable ("R").			
13.3 Do any continuing calibration standard compounds have a RRF < 0.05?	✓	[ ]	
ACTION: Circle all outliers in red.			
ACTION: If any volatile compound has a RRF < 0.05, flag positive results for that compound as estimated ("J"), and flag non-detects for that compound as unusable ("R").			
13.4 Do any compounds have a % difference between initial and continuing calibration RRF > 25%?	✓	[ ]	
ACTION: Circle all outliers in red and qualify associated sample data as outlined in the table below:			

YES NO N/A

% DIFFERENCE

25-50	50-90	>90
'J' positive results, no action for non detects	'J' positive results, 'UJ' non detects	'J' positive results, "R" non detects

13.5 Are there any transcription / calculation errors in the reporting of average response factors (RRF) or difference (%D) between initial and continuing RRFs? (Check at least two values but if errors are found, check more.) ___ [✓] ___

ACTION: Circle errors in red.

ACTION: If errors are large, call lab for explanation / resubmittal, make any necessary corrections and note errors under "Conclusions".

Internal Standards (Form VIII)

14.1 Are the internal standard areas (Form VIII) of every sample and blank within the upper and lower limits for each continuing calibration? [___] [✓] ___

ACTION: List all the outliers below.

Sample #	Internal Std	Area	Lower Limit	Upper Limit
BX991	Chlorobenzene	83900	111000	444000
BX991MS	↓	88900	↓	↓
BX991MSD	↓	92400	↓	↓

(Attach additional sheets if necessary.)

ACTION: If the internal standard area count is outside the upper or lower limit, flag with "J" all positive results and non-detects (U values) quantitated with this internal standard. If extremely low area counts are reported, or if performance exhibits a major abrupt drop off, flag all associated non-detects as unusable ("R").

14.2 Are the retention times of the internal standards within 30 seconds of the associated calibration standard? [✓] ___ ___

ACTION: Professional judgement should be used to qualify data if the retention times differ by more than 30 seconds.

	YES	NO	N/A
15.0 Field Duplicates			
15.1 Were any field duplicates submitted for VOA analysis?	[ ]	✓	

ACTION: Compare the reported results for field duplicates and calculate the relative percent difference.

ACTION: Any gross variation between field duplicate results must be addressed in the reviewer narrative. However, if large differences exist, identification of field duplicates should be confirmed by contacting the sampler.

	YES	NO	N/A

PART B: BNA ANALYSES

1.0 Traffic Reports and Laboratory Narrative

1.1 Are the Traffic Report Forms present for all samples? [✓] ___ ___

ACTION: If no, contact lab for replacement of missing or illegible copies.

1.2 Do the Traffic Reports or Lab Narrative indicate any problems with sample receipt, condition of samples, analytical problems or special notations affecting the quality of the data? ___ [✓] ___

BNA analysis of #BY765 was not received by lab, ∴ analysis could not be performed

ACTION: Use professional judgement to evaluate the effect on the quality of the data.

ACTION: If any sample analyzed as a soil contains more than 50% water, all data should be rejected.

2.0 Holding Times

2.1 Have any BNA holding times, determined from date of collection to date of extraction, been exceeded? ___ [✓] ___

Samples for BNA analysis, both soils and waters, must be extracted within seven days of the date of collection. Extracts must be analyzed within 40 days of the date of extraction.

Table of Holding Time Violations

Sample	Sample Matrix	Date Sampled	(See Traffic Report) Date Lab Received	Date Extracted	Date Analyzed

ACTION: If holding times are exceeded, flag all positive results as estimated ("J") and sample quantitation limits as estimated ("UJ"), and document in the narrative that holding times were exceeded.

	YES	NO	N/A

If analyses were done more than 14 days beyond holding time, either on the first analysis or upon reanalysis, the reviewer must use professional judgement to determine the reliability of the data and the effects of additional storage on the sample results. The reviewer may determine that non-detect data are unusable ("R").

3.0 Surrogate Recovery (Form II)

3.1 Are the BNA Surrogate Recovery Summaries (Form II) present for each of the following matrices:

a. Low Water	[✓]	—	—
b. Med Water	[ ]	—	✓
c. Low Soil	[✓]	—	—
d. Med Soil	[ ]	—	✓

3.2 Are all the BNA samples listed on the appropriate Surrogate Recovery Summaries for each of the following matrices:

a. Low Water	[✓]	—	—
b. Med Water	[ ]	—	✓
c. Low Soil	[✓]	—	—
d. Med Soil	[ ]	—	✓

ACTION: Call lab for explanation / resubmittals. If missing deliverables are unavailable, document effect on data under "Conclusions" section of reviewer narrative.

3.3 Were outliers marked correctly with an asterisk?	[✓]	—	—

ACTION: Circle all outliers in red.

3.4 Were two or more base-neutral OR acid surrogate recoveries out of specification for any sample or method blank?	✓	[ ]	—
If yes, were samples reanalyzed?	[✓]	—	—
Were method blanks reanalyzed?	[ ]	—	✓

ACTION: If all BNA surrogate recoveries are > 10% but two within the base-neutral or acid fraction do not meet SOW specifications, for the affected fraction only (i.e. base-neutral OR acid compounds):

995 } <10%
995ee

1. Flag all positive results as estimated ("J").
2. Flag all non-detects as estimated detection limits ("UJ").

	YES	NO	N/A

If any base-neutral or acid surrogate has a recovery of <10% :
1. Flag all positive results for that fraction (i.e. all acid or base-neutral compounds) "J".
2. Flag all non-detects for that fraction "R".

Professional judgement should be used to qualify data that have method blank surrogate recoveries out of specification in both original and re-analyses. Check the internal standard areas.

3.5 Are there any transcription/calculation errors between raw data and Form II? [ ] [✓] [ ]

ACTION: If large errors exist, call lab for explanation / resubmittal, make any necessary corrections and note errors under "Conclusions".

Matrix Spikes (Form III)

4.1 Is the Matrix Spike Duplicate/Recovery Form (Form III) present? [✓] [ ] [ ]

4.2 Were matrix spikes analyzed at the required frequency for each of the following matrices:

a. Low Water [✓] [ ] [ ]

b. Med Water [ ] [ ] [✓]

c. Low Soil [✓] [ ] [ ]

d. Med Soil [ ] [ ] [✓]

ACTION: If any matrix spike data are missing, take the action specified in 3.2 above.

4.3 How many BNA spike recoveries are outside QC limits?

Water	Soils
0 out of 22 (SDG 260)	(0 out of 22 SDG BX258)

4.4 How many RPD's for matrix spike and matrix spike duplicate recoveries are outside QC limits?

Water (SDG 260)	Soils
0 out of 11	(0 out of 11 SDG BX258)

ACTION: If MS and MSD both have less than 10% recovery for an analyte, negative results for that analyte should be rejected, and positive results should be flagged "J". The above applies only to the sample used for MS/MSD analysis. Use professional judgement in applying this criterion to other samples

	YES	NO	N/A
5.0 Blanks (Form IV)			
5.1 Is the Method Blank Summary (Form IV) present?	[✓]		
5.2 Frequency of Analysis: for the analysis of BNA TCL compounds, has a reagent/method blank been analyzed for each set of samples or every 20 samples of similar matrix (low water, med water, low soil, medium soil), whichever is more frequent?	[✓]		
5.3 Chromatography: review the blank raw data - chromatograms (RICs), quant reports or data system printouts and spectra. Is the chromatographic performance (baseline stability) for each instrument acceptable for ~~VOAs~~ BNA?	[✓]		

ACTION: Use professional judgement to determine the effect on the data.

6.0 Contamination

NOTE: "Water blanks" and "distilled water blanks" are validated like any other sample and are not used to qualify data. Do not confuse them with the other QC blanks discussed below.

SBLK83 - 25 TICs (Reported in sample BX25D)

6.1 Do any method/instrument/reagent blanks have positive results (TCL and/or TIC) for BNAs? When applied as described below, the contaminant concentration in these blanks are multiplied by the sample Dilution Factor.

SBLK80 - 2 TICs (natural products - not associated samples (ass. sample is a FB)
SBLK82 - 1 TIC - not found in associated samples.

[✓] [ ] ___

6.2 Do any field/rinse blanks have positive BNA results (TCL and/or TIC)?

[✓] [ ] ___

ACTION: Prepare a list of the samples associated with each of the contaminated blanks. (Attach a separate sheet.)

SD626C - BX768 - No associated samples for this blank

NOTE: Only field/rinse blanks taken the same day as the samples are used to qualify data. Blanks may not be qualified because of contamination in another blank. Blanks may be qualified for surrogate, spectral, tuning or calibration QC problems.

SY762 - 3 unknown TICs - No assoc. samples for this field blank

YES NO N/A

ACTION: Follow the directions in the table below to qualify TCL results due to contamination. Use the largest value from all the associated blanks.

	Sample conc > CRQL but < 10x blank	Sample conc < CRQL & is < 10x blank value	Sample conc > CRQL value & >10x blank value
Common Phthalate Esters	Flag sample result with a 'U'; cross out 'B' flag	Reject sample result and report CRQL; cross out 'B' flag	No qualification is needed

	Sample conc > CRQL but < 5x blank	Sample conc < CRQL & is < 5x blank value	Sample conc > CRQL value & > 5 blank value
Other Contaminants	Flag sample result with a 'U'; cross out 'B' flag	Reject sample result and report CRQL; cross out 'B' flag	No qualification is needed

ACTION: For TIC compounds, if the concentration in the sample is less than five times the concentration in the most contaminated associated blank, flag the sample data "R" (unusable).

6.3 Are there field/rinse/equipment blanks associated with every sample? [✓] ___ ___

ACTION: For low level samples, note in data assessment that there is no associated field/rinse/equipment blank. Exception: samples taken from a drinking water tap do not have associated field blanks.

7.0 GC/MS Tuning and Mass Calibration (Form V)

7.1 Are the GC/MS Tuning and Mass Calibration Forms (Form V) present for Decafluorotriphenylphosphine (DFTPP)? [✓] ___ ___

7.2 Are the enhanced bar graph spectrum and mass/charge (m/z) listing for the DFTPP provided for each twelve hour shift? [✓] ___ ___

7.3 Has a tuning performance compound been analyzed for every twelve hours of sample analysis per instrument? [✓] ___ ___

ACTION: If any tuning data are missing, take action specified in 3.2 above.

ACTION: List date, time, instrument ID, and sample analyses for which no associated GC/MS tuning data are available.

			YES	NO	N/A
DATE	TIME	INSTRUMENT	SAMPLE NUMBERS		

ACTION: If lab cannot provide missing data, reject ("R") all data generated outside an acceptable twelve hour calibration interval.

7.4 Have the ion abundance criteria been met for each instrument used? [✓] ___ ___

ACTION: List all data which do not meet ion abundance criteria (attach a separate sheet).

ACTION: If tuning calibration is in error, flag all associated sample data as unusable ("R"). However, if expanded ion criteria are met (See 1988 Functional Guidelines), the data reviewer may accept data with appropriate qualifiers.

7.5 Are there any transcription / calculation errors between mass lists and Form Vs? (Check at least two values but if errors are found, check more.) ___ [✓] ___

7.6 Have the appropriate number of significant figures (two) been reported? (Check at least two values, but if errors are found check more values.) ✓ [___] ___

ACTION: If large errors exist, call lab for explanation / resubmittal, make necessary corrections and note errors under "Conclusions".

7.7 Are the spectra of the mass calibration compound acceptable? [✓] ___ ___

ACTION: Use professional judgement to determine whether associated data should be accepted, qualified, or rejected.

8.0 Target Compound List (TCL) Analytes

8.1 Are the Organic Analysis Data Sheets (Form I BNA) present with required header information on each page, for each of the following:

a. Samples and/or fractions as appropriate [✓] ___ ___

b. Matrix spikes and matrix spike duplicates [✓] ___ ___

c. Blanks [✓] ___ ___

	YES	NO	N/A
8.2 Are the BNA Reconstructed Ion Chromatograms, the mass spectra for the identified compounds, and the data system printouts (Quant Reports) included in the sample package for each of the following?			
a. Samples and/or fractions as appropriate	[✓]	—	—
b. Matrix spikes and matrix spike duplicates (Mass spectra not required)	[✓]	—	—
c. Blanks	[✓]	—	—
ACTION: If any data are missing, take action specified in 3.2 above.			
8.3 Are the response factors shown in the Quant Report?	[✓]	—	—
8.4 Is chromatographic performance acceptable with respect to:			
Baseline stability (matrix interference)	[—]	✓	—
Resolution (matrix interference)	[—]	✓	—
Peak shape	[✓]	—	—
Full-scale graph (attenuation)	[✓]	—	—
Other:_____	[—]	—	—
ACTION: Use professional judgement to determine the acceptability of the data.			
8.5 Are the lab-generated standard mass spectra of the identified BNA compounds present for each sample? (Not submitted - many skin spectra)	[—]	✓	—
ACTION: If any mass spectra are missing, take action specified in 3.2 above. If Lab does not generate their own standard spectra, make note in "Contract Problems/Non-compliance".			
8.6 Is the RRT of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?	[✓]	—	—
8.7 Are all ions present in the standard mass spectrum at a relative intensity greater than 10% also present in the sample mass spectrum? (PHENOL EXCEPTION)	[—]	✓	—
8.8 Do sample and standard relative ion intensities agree within 20%?	[—]	✓	—
ACTION: Use professional judgement to determine acceptability of data. If it is determined that incorrect identifications were made, all such data should be rejected, flagged "N" (presumptive evidence of the presence of the compound) or changed to not detected (at the calculated detection limit).			

	YES	NO	N/A
9.0 Tentatively Identified Compounds (TIC)			
9.1 Are all Tentatively Identified Compound Forms (Form I, Part B) present; and do listed TICs include scan number or retention time, estimated concentration and "J" qualifier?	[✓]		
9.2 Are the mass spectra for the tentatively identified compounds and associated "best match" spectra included in the sample package for each of the following:			
a. Samples and/or fractions as appropriate	[✓]		
b. Blanks	[ ]		✓
ACTION: If any TIC data are missing, take action specified in 3.2 above.			
ACTION: Add "J" qualifier if missing and "N" qualifier to all identified TIC compounds on Form I, Part B.			
Are any TCL compounds (from any fraction) listed as TIC compounds (example: 1,2-dimethylbenzene is xylene--a VOA TCL--and should not be reported as a TIC)?		✓	
ACTION: Flag with "R" any TCL compound listed as a TIC.			
9.4 Are all ions present in the reference mass spectrum with a relative intensity greater than 10% also present in the sample mass spectrum?	[✓]		
9.5 Do TIC and "best match" standard relative ion intensities agree within 20%?	[✓]		
ACTION: Use professional judgement to determine acceptability of TIC identifications. If it is determined that an incorrect identification was made, change identification to "unknown" or to some less specific identification (example: "C3 substituted benzene") as appropriate.			
10.0 Compound Quantitation and Reported Detection Limits			
10.1 Are there any transcription / calculation errors in Form I results? Check at least two positive values. Verify that the correct internal standard, quantitation ion, and RRF were used to calculate Form I result. Were any errors found?		[✓]	
10.2 Are the CRQLs adjusted to reflect sample dilutions and, for soils, sample moisture?	✓	[ ]	

	YES	NO	N/A

ACTION: If errors are large, call lab for explanation / resubmittal, make any necessary corrections and note errors under "Conclusions".

ACTION: When a sample is analyzed at more than one dilution, the lowest CRQLs are used (unless a QC exceedance dictates the use of the higher CRQL data from the diluted sample analysis). Replace concentrations that exceed the calibration range in the original analysis by crossing out the "E" value on the original Form I and substituting it with data from the analysis of diluted sample. Specify which Form I is to be used, then draw a red "X" across the entire page of all Form I's that should not be used, including any in the summary package.

11.0 Standards Data (GC/MS)

11.1 Are the Reconstructed Ion Chromatograms, and data system printouts (Quant. Reports) present for initial and continuing calibration? [✓] — —

ACTION: If any calibration standard data are missing, take action specified in 3.2 above.

12.0 GC/MS Initial Calibration (Form VI)

12.1 Are the Initial Calibration Forms (Form VI) present and complete for the BNA fraction? [✓] — —

ACTION: If any calibration standard forms are missing, take action specified in 3.2 above.

12.2 Are response factors stable for BNAs over the concentration range of the calibration (RSD <30%)? [—] — ✓

ACTION: Circle all outliers in red.

ACTION: When RSD >30%, non-detects may be qualified using professional judgement. Flag all positive results "J". When RSD >90%, flag all non-detects as unusable ("R"). (Region II policy.)

12.3 Do any compounds have a RRF < 0.05? ✓ [—] —

ACTION: Circle all outliers in red.

Angler-Ac

ACTION: If any BNA compound has an average RRF < 0.05, flag positive results for that compound as estimated ("J"), and flag non-detects for that compound as unusable ("R").

	YES	NO	N/A
12.4 Are there any transcription / calculation errors in the reporting of average response factors (RRF) or %RSD? (Check at least two values but if errors are found, check more.)	___	[✓]	___

ACTION: Circle errors in red.

ACTION: If errors are large, call lab for explanation / resubmittal, make any necessary corrections and note errors under "Conclusions".

13.0 GC/MS Continuing Calibration (Form VII)

13.1 Are the Continuing Calibration Forms (Form VII) present and complete for the BNA fraction?	[✓]	___	___
13.2 Has a continuing calibration standard been analyzed for every twelve hours of sample analysis per instrument?	[✓]	___	___

ACTION List below all sample analyses that were not within twelve hours of the previous continuing calibration analysis.

_____

_____

_____

ACTION: If any forms are missing or no continuing calibration standard has been analyzed within twelve hours of every sample analysis, call lab for explanation / resubmittal. If continuing calibration data are not available, flag all associated sample data as unusable ("R").

13.3 Do any continuing calibration standard compounds have a RRF < 0.05?	___	[✓]	___

ACTION: Circle all outliers in red.

ACTION: If any BNA compound has a RRF < 0.05, flag positive results for that compound as estimated ("J"), and flag non-detects for that compound as unusable ("R").

13.4 Do any compounds have a % difference between initial and continuing calibration RRF > 25%?	[✓]	[___]	___

ACTION: Circle all outliers in red and qualify associated sample data as outlined in the table below:

YES NO N/A

% DIFFERENCE

25-50	50-90	>90
'J' positive results, no action for non detects	'J' positive results, 'UJ' non detects	'J' positive results, "R" non detects

13.5 Are there any transcription / calculation errors in the reporting of average response factors (RRF) or difference (%D) between initial and continuing RRFs? (Check at least two values but if errors are found, check more.) ___ [✓] ___

ACTION: Circle errors in red.

ACTION: If errors are large, call lab for explanation / resubmittal, make any necessary corrections and note errors under "Conclusions".

Internal Standards (Form VIII)

14.1 Are the internal standard areas (Form VIII) of every sample and blank within the upper and lower limits for each continuing calibration? [✓] ___ ___

ACTION: List all the outliers below.

Sample #	Internal Std	Area	Lower Limit	Upper Limit

(Attach additional sheets if necessary.)

ACTION: If the internal standard area count is outside the upper or lower limit, flag with "J" all positive results and non-detects (U values) quantitated with this internal standard. If extremely low area counts are reported, or if performance exhibits a major abrupt drop off, flag all associated non-detects as unusable ("R").

14.2 Are the retention times of the internal standards within 30 seconds of the associated calibration standard? [✓] ___ ___

ACTION: Professional judgement should be used to qualify data if the retention times differ by more than 30 seconds.

	YES	NO	N/A
15.0 Field Duplicates			
15.1 Were any field duplicates submitted for BNA analysis?	[___]	✓	___

ACTION: Compare the reported results for field duplicates and calculate the relative percent difference.

ACTION: Any gross variation between field duplicate results must be addressed in the reviewer narrative. However, if large differences exist, identification of field duplicates should be confirmed by contacting the sampler.

	YES	NO	N/A

PART C: PESTICIDE/PCB ANALYSES

1.0 Traffic Reports and Laboratory Narrative

1.1 Are the Traffic Report Forms present for all samples? [✓] — — —

ACTION: If no, contact lab for replacement of missing or illegible copies.

1.2 Do the Traffic Reports or Lab Narrative indicate any problems with sample receipt, condition of samples, analytical problems or special notations affecting the quality of the data? — [✓] —

#765 - Sample missing - Pesticides not done.

ACTION: Use professional judgement to evaluate the effect on the quality of the data.

ACTION: If any sample analyzed as a soil contains more than 50% water, all data should be rejected.

2.0 Holding Times

2.1 Have any PEST/PCB holding times, determined from date of collection to date of extraction, been exceeded? — [✓] —

Samples for PEST/PCB analysis, both soils and waters, must be extracted within seven days of the date of collection. Extracts must be analyzed within 40 days of the date of extraction.

3.0 Surrogate Recovery (Form II)

3.1 Are the PEST/PCB Surrogate Recovery Summaries (Form II) present for each of the following matrices:

a. Low Water	[✓]	—	—
b. Med Water	[ ]	—	✓
c. Low Soil	[✓]	—	—
d. Med Soil	[ ]	—	✓

3.2 Are all the PEST/PCB samples listed on the appropriate Surrogate Recovery Summaries for each of the following matrices:

a. Low Water	[✓]	—	—
b. Med Water	[ ]	—	✓
c. Low Soil	[✓]	—	—
d. Med Soil	[ ]	—	✓

	YES	NO	N/A
ACTION: Call lab for explanation / resubmittals. If missing deliverables are unavailable, document effect on data under "Conclusions" section of reviewer narrative.			
3.3 Were outliers marked correctly with an asterisk?	[ ]		✓
ACTION: Circle all outliers in red.			
3.4 Was surrogate (DBC) recovery outside of the contract specification for any sample or blank?		[✓]	
ACTION: No qualification is done if surrogates are diluted beyond detection. If recovery is below contract limit (but above zero), flag all results for that sample "J". If recovery is zero, flag positive results "J" and non-detects "R". If recovery for the blank is zero, flag non-detects for all associated samples "R". If recovery is above contract limit, flag all positive results for that sample "J", unless in the reviewers professional judgement the high recovery is due to co-eluting interference (check the associated blank - if recovery is high there also, flag the sample data).			
3.5 Are there any transcription/calculation errors between raw data and Form II?		[✓]	
ACTION: If large errors exist, call lab for explanation / resubmittal, make any necessary corrections and note errors under "Conclusions".			
4.0 Matrix Spikes (Form III)			
4.1 Is the Matrix Spike Duplicate/Recovery Form (Form III) present?	[✓]		
4.2 Were matrix spikes analyzed at the required frequency for each of the following matrices:			
a. Low Water	[✓]		
b. Med Water	[ ]		✓
c. Low Soil	[✓]		
d. Med Soil	[ ]		✓
ACTION: If any matrix spike data are missing, take the action specified in 3.2 above.			

4.3 How many PEST/PCB spike recoveries are outside QC limits?

Water	Soils
3 out of 12	0 out of 12

	YES	NO	N/A

4.4 How many RPD's for matrix spike and matrix spike duplicate recoveries are outside QC limits?

Water	Soils
1 out of 6	0 out of 6

ACTION: If MS and MSD both have less than zero recovery for an analyte, negative results for that analyte should be rejected, and positive results should be flagged "J". The above applies only to the sample used for MS/MSD analysis. Use professional judgement in applying this criterion to other samples.

5.0 Blanks (Form IV)

5.1 Is the Method Blank Summary (Form IV) present? [✓] ___ ___

5.2 Frequency of Analysis: for the analysis of Pesticide TCL compounds, has a reagent/method blank been analyzed for each set of samples or every 20 samples of similar matrix (low water, med water, low soil, medium soil), whichever is more frequent? [✓] ___ ___

5.3 Chromatography: review the blank raw data - chromatograms, quant reports or data system printouts.

Is the chromatographic performance (baseline stability) for each instrument acceptable for PEST/PCBs? [✓] ___ ___

ACTION: Use professional judgement to determine the effect on the data.

6.0 Contamination

NOTE: "Water blanks" and "distilled water blanks" are validated like any other sample and are not used to qualify data. Do not confuse them with the other QC blanks discussed below.

6.1 Do any method/instrument/reagent blanks have positive results for PEST/PCBs? When applied as described below, the contaminant concentration in these blanks are multiplied by the sample Dilution Factor. ___ [✓] ___

6.2 Do any field/rinse blanks have positive PEST/PCB results? ___ [✓] ___

ACTION: Prepare a list of the samples associated with each of the contaminated blanks. (Attach a separate sheet.)

YES NO N/A

NOTE: Only field/rinse blanks taken the same day as the samples are used to qualify data. Blanks may not be qualified because of contamination in another blank. Blanks may be qualified for surrogate, spectral, tuning or calibration QC problems.

ACTION: Follow the directions in the table below to qualify TCL results due to contamination. Use the largest value from all the associated blanks.

Sample conc > CRQL but < 5x blank	Sample conc < CRQL & is < 5x blank value	Sample conc > CRQL & > 5x blank value
Flag sample result with a "U"; cross out "B" flag	Reject sample result and report CRQL; cross out "B" flag	No qualification is needed

6.3 Are there field/rinse/equipment blanks associated with every sample? [✓] ___ ___

ACTION: For low level samples, note in data assessment that there is no associated field/rinse/equipment blank. Exception: samples taken from a drinking water tap do not have associated field blanks.

7.0 Calibration and GC Performance

7.1 Are the following Gas Chromatograms and Data System Printouts for both Primary and Confirmation (confirmation standards not required if there are no positive results above CRQL) column present:

a. Evaluation Standard Mix A [✓] ___ ___

b. Evaluation Standard Mix B [✓] ___ ___

c. Evaluation Standard Mix C [✓] ___ ___

d. Individual Standard Mix A [✓] ___ ___

e. Individual Standard Mix B [✓] ___ ___

f. Multi-component Pesticides Toxaphene & Chlordane [✓] ___ ___

g. Aroclors 1016/1260 (1660) [✓] ___ ___

h. Aroclors 1221, 1232, 1242, 1248, and 1254 [✓] ___ ___

ACTION: If no, take action specified in 3.2 above.

	YES	NO	N/A
7.2 Is Form VIII Pest-1 present and complete for each GC column (primary and confirmation) and each 72 hour sequence of analyses?	[✓]	___	___

ACTION: If no, take action specified in 3.2 above.

7.3 Are there any transcription/calculation errors between raw data and Form VIII?	___	[✓]	___

ACTION: If large errors exist, call lab for explanation / resubmittal, make any necessary corrections and note errors under "Conclusions".

7.4 Has the total breakdown on quantitation or confirmation column exceeded 20% for DDT?	___	[✓]	___
- for Endrin?	___	[✓]	___
or if Endrin aldehyde and 4,4'-DDD co-elute and there is a peak at their retention time, has the combined DDT and Endrin breakdown exceeded 20%?	___	[✓]	___

ACTION:

If DDT breakdown is greater than 20% on quantitation column beginning with the samples following the last in control standard:

1. Flag all positive DDT results "J".
2. If DDT was not detected but DDD and/or DDE are positive, flag the DDT non-detect "R".
3. Flag positive DDD and DDE results "JN".
4. If DDT breakdown is > 20% on confirmation column and DDT is identified on quantitation column but not on confirmation column, use professional judgement to determine whether DDT should be reported on Form I (if reported, flag result "N").

b. If Endrin breakdown is > 20% on quantitation column, beginning with the samples following the last in control standard:

1. Flag all positive Endrin results "J".
2. If Endrin was not detected, but Endrin Aldehyde and/or Endrin Ketone are positive, flag the Endrin non-detect "R".
3. Flag Endrin Ketone positive results "JN".
4. If Endrin breakdown is > 20% on confirmation column and Endrin is identified on quantitation column but not on confirmation column, use professional judgement to determine whether Endrin should be reported on Form I (if reported, flag result "N").

c. If the combined breakdown is used (it can only be used if the conditions in 7.4 above are met) and is > 20% on quantitation column beginning with the last in control standard, take the actions specified in 7.4 a and b above. If the combined breakdown is >20% on confirmation column and Endrin or DDT is identified on quantitation column but not on confirmation column, use professional judgement to determine whether Endrin or DDT should be reported on Form I (if reported, flag result "N").

	YES	NO	N/A
7.5 Is the linearity check RSD of all four calibration factors <10% for the quantitation column?	[✓]	___	___
ACTION: If no, flag positive hits for all pesticide and PCB analytes "J" for all associated samples. Do not flag toxaphene or DDT if they are quantified from a 3-point calibration curve.			
7.6 Is the % difference between the EVAL A and each analysis (quantitation and confirmation) DBC retention time within QC limits (2% for packed column, 0.3% for capillary [I.D. < 0.32 mm], 1% for megabore [0.32 < I.D. < 2 mm]) ?	[✓]	___	___
ACTION: DBC retention time cannot be evaluated if DBC is not detected. If it is present and has a retention time out of QC limits, then use professional judgement to determine the reliability of the analysis and flag results "R", if appropriate.			
Was the proper analytical sequence followed for each 72 hour period of analyses (page PEST D-36 in 8/87 SOW).	[✓]	___	___
ACTION: If no, use professional judgement to determine the severity of the effect on the data and accept or reject it accordingly. Generally, the effect is negligible unless the sequence was grossly altered or the calibration was also out of limits.			
8.0 Pesticide/PCB Standards Summary			
8.1 Is Form IX present and complete for each GC column and 72 hr sequence of analyses?	[✓]	___	___
ACTION: If no, take action specified in 3.2 above.			
8.2 Are there any transcription/calculation errors between raw data and Form IX?	___	[✓]	___
ACTION: If large errors exist, call lab for explanation / resubmittal, make any necessary corrections and note errors under "Conclusions".			
8.3 Is DDT retention time for packed columns > 12 min (except OV-1 and OV-101 columns)?	[✓]	___	___
ACTION: If no, check that there is adequate resolution between individual components. If not, flag results for compounds that interfere with each other (co-elute) "R".			
8.4 Do all standard retention times fall within the windows established for the first IND A and IND B analyses?	SD6260 [✓]	SD6258 ___	___

slight shift

	YES	NO	N/A
ACTION: Beginning with the samples following the last in control standard, check to see if the chromatograms contain peaks within an expanded window surrounding the expected retention times. If no peaks are found and, DBC is visible non-detects are valid. If peaks are present and cannot be identified through "pattern recognition" or a consistent shift in standard retention times, flag all affected compound results "R".			
8.5 Are the continuing calibration standard calibration factors within 15% (for quantitation column) or 20% (for confirmation column) of the initial (at beginning of 72 hr sequence) calibration factors?	[ ]	✓	
ACTION: If no, flag all associated positive results "J". Use professional judgement to determine whether or not to flag non-detects.			
Pesticide/PCB Identification			
9.1 Is Form X complete for every sample in which a pesticide or PCB was detected?	[ ]		✓
ACTION: If no, take action specified in 3.2 above.			
9.2 Are there any transcription errors between raw data and Form X?		[ ]	✓
ACTION: If large errors exist, call lab for explanation / resubmittal, make any necessary corrections and note errors under "Conclusions".			
9.3 Are retention times of sample compounds within the calculated retention time windows for both quantitation and confirmation analyses?	[ ]		✓
Was GC/MS confirmation provided when required (when compound concentration is > 10 ug/ml in final extract)?	[ ]		✓
ACTION: Reject ("R") all positive results (meeting quantitation column criteria, but missing confirmation by a second column or GC/MS (if appropriate). Also, reject ("R") all positive results not meeting retention time window criteria unless associated standard compounds are similarly biased (i.e. base on RRT to DBC).			
9.4 Check chromatograms for false negatives, especially for the multiple peak components toxaphene and PCB's. Were there any false negatives?		[ ]	✓
ACTION: If appropriate PCB standards were not analyzed, or if the lab performed no confirmation analysis, flag the appropriate data with an "R".			

Non Detect Data is used for primary column was only slightly outside QC.

	YES	NO	N/A
10.0 Compound Quantitation and Reported Detection Limits			
10.1 Are there any transcription / calculation errors in Form I results? Check at least two positive values. Were any errors found?	___	[___]	[✓]
NOTE: Simple peak pesticide results can be checked for rough agreement between quantitative results obtained on the two GC columns. The reviewer should use professional judgement to decide whether a much larger concentration obtained on one column versus the other indicates the presence of an interfering compound. If an interfering compound is indicated, the lower of the two values should be reported and qualified as presumptively present at an estimated quantity ("JN"). This necessitates a determination of an estimated concentration on the confirmation column. The narrative should indicate that the presence of interferences has obscured the attempt at a second column confirmation.			
10.2 Are the CRQLs adjusted to reflect sample dilutions and, for soils, sample moisture?	[✓]	[___]	___
ACTION: If errors are large, call lab for explanation / resubmittal, make any necessary corrections and note errors under "Conclusions".			
ACTION: When a sample is analyzed at more than one dilution, the lowest CRQLs are used (unless a QC exceedance dictates the use of the higher CRQL data from the diluted sample analysis). Replace concentrations that exceed the calibration range in the original analysis by crossing out the "E" value on the original Form I and substituting it with data from the analysis of diluted sample. Specify which Form I is to be used, then draw a red "X" across the entire page of all Form I's that should not be used, including any in the summary package.			
11.0 Chromatogram Quality			
11.1 Were baselines stable?	[✓]	___	___
11.2 Were any electropositive displacement (negative peaks) or unusual peaks seen?	___	[✓]	___
11.3 Were early eluting peaks (for early eluting analytes) resolved to baseline?	[___]	___	[✓]
ACTION: For 11.1 and 11.2, comment only. For 11.3, reject ("R") those analytes that are not sufficiently resolved.			

	YES	NO	N/A
12.0 Field Duplicates			
12.1 Were any field duplicates submitted for PEST/PCB analysis?	[ ]	✓	—

ACTION: Compare the reported results for field duplicates and calculate the relative percent difference.

ACTION: Any gross variation between field duplicate results must be addressed in the reviewer narrative. However, if large differences exist, identification of field duplicates should be confirmed by contacting the sampler.

1. CASE NARRATIVE

This document shall be clearly labeled "Case Narrative" and shall contain: laboratory name; case number; sample numbers in the Sample Delivery Group (SDG), differentiating between initial analyses and re-analyses; SDG number; Contract number; and detailed documentation of any quality control, sample, shipment and/or analytical problems encountered in processing the samples reported in the data package.

Whenever data from sample re-analyses are submitted, the Contractor shall state in the Case Narrative for each re-analysis, whether it considers the re-analysis to be billable, and if so, why.

The contactor must also include documentation of any internal quality control processes used, a summary of corrective actions taken, and the resolution.

COMPUCHEM LABORATORIES

EPA CASE NARRATIVE--CASE# 12058
Contract No. 68-D9-0032 SDG# BX260
CompuChem Laboratories, Inc.

Sample Numbers: BX260 BX979 BX981 BX990 BX991 BX993
BX994 BX995 BX996 BY701 BY758 BY761
BY762 BY763 BY764 BY766 BY767 BY768

This portion of Case #12058 consisted of 10 water samples for volatile, semivolatile, and pesticide analysis, 7 water samples for volatile only analysis, and 1 water sample for semivolatile and pesticide only analysis. The samples were received on 6-7-89, 6-9-89, 6-10-89, 6-12-89, and 6-14-89 in properly sealed shipping containers via USPS Express Mail. Several discrepancies were noted during the receipt of the samples. SMO was notified and CompuChem was instructed to proceed with the analysis of the samples and note discrepancies on the traffic reports. The traffic report for sample BX260 did not required a pesticide analysis although one was required. One VOA each for samples BX995 and BX996 were received broken due to poor packaging. Sample BY764 was not listed on the traffic report or chain-of-custody documents; however, two VOAs were received for it on 6-12-89. Sample BY761 was missing two VOAs. Sample BY763 was missing one 80 oz. amber bottle. Sample BY768 was missing one 80 oz. amber bottle. Thirteen of the samples were designated as either field blanks or trip blanks.

VOLATILES:
All volatile fractions were analyzed within holding time requirements. Nine of the seventeen samples requiring volatile analysis contained TCL compounds. Samples BX260, BX979, BX990, BX993, BX996, BY762, and BY767 (all designated as field or trip blanks) did not contain any TCL compounds. Each sample did contain a tentatively identified compound at significant levels. This TIC could not be attributed to laboratory contamination or sample carryover and was considered to be an actual constituent of the samples. A qualifier was included with each sample. Samples BX981, BY701, and BY766 (also designated as field or trip blanks) each contained low levels of methylene chloride and/or acetone along with the tentatively identified compound mentioned above. Qualifiers were also included with these samples. Sample BY758, which was designated as a field blank contained a below CRQL level of chlorobenzene and no tentatively identified compounds. The chlorobenzene could not be attributed to laboratory contamination or sample carryover and was considered to be an actual constituent of the sample. A qualifier was included with the data. Sample BY763, which was designated as a field blank, required a dilution due to the high level of acetone present. It also contained methylene chloride and a tentatively identified compound,

trichlorofluoromethane. The presence of these compounds could not be attributed to laboratory contamination or sample carryover and were considered to be actual constituents of the sample. A qualifier was included with the data. Sample BY768, designated as a field blank, contained methylene chloride, acetone, carbon disulfide, and one tentatively identified compound, trichlorofluoromethane. The presence of these compounds could not be attributed to laboratory contamination or sample carryover and were considered to be actual constituents of the sample. A qualifier was included with the data. Sample BY764 required a dilution due to the high levels of TCL compounds present including benzene, toluene, and xylenes and also contained many tentatively identified compounds. Sample BX994 contained xylenes and three tentatively identified compounds. Sample BX995 did not contain any TCL or tentatively identified compounds. Sample BX991 contained 4-methyl-2-pentanone and many tentatively identified compounds. The D5-chlorobenzene internal standard fell below QC limits in the sample along with the bromofluorobenzene surrogate. The D8-toluene surrogate recovery exceeded QC limits. These failures were attributed to the actual sample matrix and were confirmed when the same trends were seen in BX991MS/MSD. The associated blank spike was reported which met all QC criteria and qualifiers were included with the original and spike data. All surrogate recovery criteria were met except those mentioned above. The matrix spike/matrix spike duplicate results were acceptable. The recovery of trichloroethene exceeded QC limits in the MS and the recoveries of toluene exceeded QC limits in the MS/MSD. These failures may have resulted from the observed sample matrix effect mentioned above.

SEMIVOLATILES:

All semivolatile fractions were extracted and analyzed within holding time requirements. TCL compounds were present in three of the 11 samples requiring semivolatile analysis. Sample BY768 contained only a below CRQL level of bis(2-ethylhexyl)phthalate. Tentatively identified compounds were present in only five of the samples. Two analyses of sample BX995 were reported and billed. In the initial analysis, 2-fluorophenol and D5-phenol surrogate recoveries fell below QC limits. The sample was reextracted and reanalyzed and the same recovery trends for the two surrogates were present. It was concluded that the surrogate failures resulted from the actual sample matrix and both analyses were reported with a qualifier. Two analyses of sample BY761 were reported and billed. In the initial analysis, the levels of naphthalene and 2-methylnaphthalene exceeded QC limits. The sample was reanalyzed at a dilution and both analyses were reported due to the loss of some compounds in the dilution. In sample BY761, the recovery of D5-nitrobenzene exceeded QC limits. In sample BY762, the recovery of 2,4,6-tribromophenol exceeded QC limits. All other surrogate recovery criteria were met. The QC matrix spike/matrix spike duplicate results were acceptable.

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PESTICIDES:
All pesticide fractions were extracted and analyzed within holding time requirements. None of the samples contained any reportable levels of TCL compounds. Only 300ml of sample BX260 were available for extraction due to low volume. This resulted in slightly elevated detection limits. All surrogate recovery criteria were met. The QC matrix spike/matrix spike duplicate results were acceptable. The recoveries of gamma-BHC, endrin, and 4,4'-DDT exceeded QC limits in the MSD. The RPD value for endrin exceeded QC limits in the MS/MSD.

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hardcopy data package and in the computer-readable data submitted on floppy diskette has been authorized by the Laboratory Manager or his designee, as verified by the following signature.

Note: This report was paginated for reference and accountability in decreasing numerical sequence.

Janet C. Garrett 6/26/89
Janet C. Garrett 6-26-89
Technical Reviewer

COMPUCHEM LABORATORIES, INC. P.O. Box 12652 3308 Chapel Hill/Nelson Highway Research Triangle Park, NC 27709 (919) 549-8263

1804

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QUALITY ASSURANCE NOTICE

With the advent of the new organics Statement of Work (SOW 2/88, Revision: 9/88) participants in EPA's Contract Laboratory Program (CLP) are required to provide hard copy and diskette deliverables. CompuChem employs the Finnigan QA Formaster Program (Format A) to generate these requirements using data files from our analytical instrumentation. Currently, and independently, quantitation reports are generated by the instruments and are used with CompuChem-developed software to calculate results. The GC and GC/MS quantitation routines employ the convention of carrying at least one extra significant figure until the mathematical computations are completed. Then, the quantitative results are rounded to the SOW-required number of significant figures for reporting. In addition, the algorithm used by the Formaster Program is slightly different than that employed in Compuchem's software routines. Therefore, results presented in the supportive data supplied with our deliverables packages may be slightly different than those which appear on the hard copy forms generated via Formaster.

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Robert E. Meierer

Robert E. Meierer
Director of Quality Assurance

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LABORATORY NOTICE

On June 15, 1985 CompuChem Laboratories began adding D3-2,4-Dinitrophenol to all standards and samples. The purpose of this addition is to enable the laboratory to have higher and more consistent analytical sensitivity for the native 2,4-Dinitrophenol. The peak corresponding to the deuterated analog is clearly labeled on each RIC as D3#1 and will not be searched and reported as a tentatively identified compound (TIC). This compound is not being used as an internal or surrogate standard.

L. Richard Flynn,
Development Chemist

Bob Meierer,
Director of Quality Assurance

DETECTION LIMIT CALCULATION CLARIFICATION

To protect our GC columns from unnecessary contamination, soil samples prepared according to Caucus Protocol methods are routinely diluted 5:1. Through a series of experiments we have determined that our Instrument Detection Limit for pesticides is 5X lower than the EPA Contract Required Quantitation Limit (CRQL). We, therefore, only adjust our detection limits if the dilution necessary to analyze the sample is greater than 5:1. If the sample is diluted by a factor of X the detection limit is adjusted by $\frac{X}{5}$ instead of X.

Bill DesJardins
Manager, GC Laboratory

Bob Meierer
Director, Quality Assurance

1C

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BX261

Lab Name: COMPUCHEM LABS Contract: 68-D9-0032

Lab Code: COMPU Case No.: 12058 SAS No.: _____ SDG No.: BX258

Matrix: (soil/water) SOIL Lab Sample ID: 266349

Sample wt/vol: 30.0 (g/mL) G Lab File ID: G2J66349A04

Level: (low/med) LOW Date Received: 06/08/89

% Moisture: not dec. 21 dec. ____ Date Extracted: 06/09/89

Extraction: (SepF/Cont/Sonc) SONC Date Analyzed: 06/11/89

GPC Cleanup: (Y/N) N pH: 7.5 Dilution Factor: 1.00

AMO 2/9/90

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
99-09-2	3-Nitroaniline	2000	U
83-32-9	Acenaphthene	420	U
51-28-5	2,4-Dinitrophenol	2000	U
100-02-7	4-Nitrophenol	2000	~~U~~ UJ
132-64-9	Dibenzofuran	420	U
121-14-2	2,4-Dinitrotoluene	420	U
84-66-2	Diethylphthalate	420	U
7005-72-3	4-Chlorophenyl-phenylether	420	U
86-73-7	Fluorene	420	U
100-01-6	4-Nitroaniline	2000	U
534-52-1	4,6-Dinitro-2-Methylphenol	2000	U
86-30-6	N-Nitrosodiphenylamine (1)	420	U
101-55-3	4-Bromophenyl-phenylether	420	U
118-74-1	Hexachlorobenzene	420	~~U~~ UJ
87-86-5	Pentachlorophenol	2000	U
85-01-8	Phenanthrene	420	U
120-12-7	Anthracene	420	U
84-74-2	Di-n-Butylphthalate	420	U
206-44-0	Fluoranthene	420	U
129-00-0	Pyrene	420	U
85-68-7	Butylbenzylphthalate	420	U
91-94-1	3,3'-Dichlorobenzidine	840	~~U~~ UJ
56-55-3	Benzo(a)Anthracene	420	U
218-01-9	Chrysene	420	U
117-81-7	bis(2-Ethylhexyl)Phthalate	510	
117-84-0	Di-n-Octyl Phthalate	420	U
205-99-2	Benzo(b)Fluoranthene	420	U
207-08-9	Benzo(k)Fluoranthene	420	U
50-32-8	Benzo(a)Pyrene	420	U
193-39-5	Indeno(1,2,3-cd)Pyrene	420	U
53-70-3	Dibenzo(a,h)Anthracene	420	U
191-24-2	Benzo(g,h,i)Perylene	420	U

(1) - Cannot be separated from Diphenylamine

QUALITY ASSURANCE NOTICE

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Linda Fowler 4/10/89

Linda Fowler
Sr. Quality Assurance Specialist

Robert E. Meierer 4/12/89

Robert E. Meierer
Vice President, Quality Assurance

2. TRAFFIC REPORTS

A copy of the Sample Traffic Reports in Item A for all of the samples in the SDG. The Traffic Reports shall be arranged in increasing EPA number order, considering both letters and numbering in ordering samples.

TUT 001 0479

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Linda Fowler 4/10/89
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Vice President, Quality Assurance

COMPUCHEM LABORATORIES

EPA CASE NARRATIVE -- CASE 12058
SDG NO. BX258
Contract No. 68-D9-0032
Compuchem Laboratories, Inc.

Samples: BX258, BX259, BX261

PESTICIDES
The pesticide fractions were extracted and analyzed within the proper holding time requirements. There were no reportable levels of EPA Target Compound Lists (TCL) compounds present in any of the samples. There were several outliers present in the %D column of the Form VIIIs of the sequences included in this SDG. All outliers were associated with either hexane blanks or samples not included in this SDG.

In the pesticide fractions, all recovery and RPD values passed QC limits. There were no reportable levels of TCL compounds found in the matrix spike, BX261MS, the matrix spike duplicate, BX261MSD, or the associated method blanks. Surrogate recovery values for the samples, blanks, and the MS/MSD passed contract required QC limits. All other data generated from the MS/MSD met QC acceptance criteria.

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hardcopy data package and in the computer readable data submitted on floppy diskette has been authorized by the Laboratory Manager or his designee, as verified by the following signature:

Cynthia E. Edwards June 21 1989
Cynthia E. Edwards
Technical Reviewer
21 June 1989

Note: This report is paginated for reference and accountability in decreasing numerical sequence.

COMPUCHEM LABORATORIES

dilution requirement that one analyte must be in the upper half of its analytical range. To protect the instrumentation and/or prevent detector saturation, the sample was not reanalyzed at a lesser dilution. A qualifier was included with the data. Two analyses of sample BX259 were reported and billed. In the initial low level 1 gram analysis, the level of tetrachloroethene exceeded the multipoint range. The sample was reanalyzed as a medium level at a 6.7:1 dilution which met dilution requirements. Both analyses were reported due to the loss of some compounds in the dilution. Surrogate recovery data were not available for BX259DL due to the dilution. Two analyses of sample BY773 were reported and billed. In the initial 5 gram low level analysis, the levels of ethylbenzene and xylenes exceeded the multipoint range and indicated that a medium level analysis was required. The sample was reanalyzed as a medium level which was an acceptable dilution; however, the xylene levels did not compare well between the two analyses. It was concluded that the differences were due to a combination of sample inhomogeneity and the difference between the low level purge and trap and the medium level extraction procedure. Both analyses were reported with a qualifier. Surrogate and spike recovery data were not available for the medium level spikes, BX259DLMS/MSD due to the required dilution. The associated blank spike was reported which met all QC criteria. All surrogate recovery criteria were met except those mentioned above. The low level MS/MSD results were acceptable. All method blanks met QC criteria.

SEMIVOLATILES:
All semivolatile fractions were extracted and analyzed within holding time requirements. Each sample contained low levels of bis(2-ethylhexyl)phthalate. Sample BX258 also contained a low level of phenol. Each sample contained several tentatively identified compounds, some of which were attributable to blank contaminants or aldol condensation. All surrogate recovery criteria were met. The QC matrix spike/matrix spike duplicate results were acceptable.

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hardcopy data package and in the computer-readable data submitted on floppy diskette has been authorized by the Laboratory Manager or his designee, as verified by the following signature.

Note: This report was paginated for reference and accountability in decreasing numerical sequence.

Janet C. Garrett 6/29/89
Janet C. Garrett 6-29-89
Technical Reviewer

COMPUCHEM LABORATORIES

EPA CASE NARRATIVE--CASE# 12058
Contract No. 68-D9-0032 SDG# BX258
CompuChem Laboratories, Inc.

Sample Numbers:	BX258	BX259	BX261	BY702	BY703	BY704
	BY705	BY707	BY709	BY711	BY712	BY713
	BY765	BY769	BY770	BY771	BY772	BY773
	BY774	BY775				

This portion of Case #12058 consisted of 3 soil samples for volatile, semivolatile, and pesticide analysis and 17 soil samples for volatile only analysis. The samples were received on 6-7-89, 6-12-89, and 6-14-89 via USPS Express Mail in properly sealed shipping containers with traffic reports. Several discrepancies were noted upon receipt of the samples. Samples BX258, BX259, and BX261 did not require full analysis according to the traffic reports. SMO was contacted and the samples were put on hold until 6-8-89 when CompuChem was notified that the samples required full analysis; therefore, the receipt date on Forms I for these three samples was 6-8-89. Two soil VOAs were received for sample BY775 which were not listed on the traffic report or chain-of-custody document. Sample BY765 was missing 2-80oz. amber liters. CompuChem was instructed by SMO to note the discrepancies on the traffic reports and proceed with the analysis of the samples, volume permitting. The pH values of the samples were within the range specified in EPA protocols. Moisture content of the samples ranged from 11% to 24%. The remaining portion of this narrative pertains only to the volatile and semivolatile sections of the case.

VOLATILES:
All volatile fractions were analyzed within holding time requirements. All samples contained TCL compounds at various levels. Tentatively identified compounds were present in most of the samples at very high levels. Samples BY703, BY704, BY705, BY707, BY709, BY711, BY712, BY713, BY765, and BY771 each were analyzed as medium level soils, some at dilutions. None of these analyses met the dilution requirement that at least one analyte be present in the upper half of its analytical range. To protect the instrumentation and/or prevent detector saturation, the samples were not reanalyzed at a lesser dilution. Qualifiers were included with each sample. Sample BX261 required a medium level analysis at a dilution due to the high level of tetrachloroethene present. Surrogate recovery data were not available due to the dilution. Sample BY770 required a medium level analysis at a dilution due to the high level of xylenes present. Surrogate recovery data were not available due to the dilution. Sample BY702 was analyzed as a low level using only 1 gram. This analysis did not meet the

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BX258

Lab Name: COMPUCHEM LABS Contract: 68-D9-0032

Lab Code: COMPU Case No.: 12058 SAS No.: _____ SDG No.: BX258

Matrix: (soil/water) SOIL Lab Sample ID: 266347

Sample wt/vol: 5.0 (g/mL) G Lab File ID: GH066347A18

Level: (low/med) LOW Date Received: 06/08/89

% Moisture: not dec. 11 Date Analyzed: 06/10/89

Column: (pack/cap) CAP Dilution Factor: 1.0

JMW 2-12-91

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	11	U
74-83-9	Bromomethane	11	U
75-01-4	Vinyl Chloride	11	U
75-00-3	Chloroethane	11	U
75-09-2	Methylene Chloride	27	B U
67-64-1	Acetone	80	B U
75-15-0	Carbon Disulfide	6	U
75-35-4	1,1-Dichloroethene	6	U
75-34-3	1,1-Dichloroethane	6	U
540-59-0	1,2-Dichloroethene (total)	6	U
67-66-3	Chloroform	2	J
107-06-2	1,2-Dichloroethane	6	U
78-93-3	2-Butanone	11	U
71-55-6	1,1,1-Trichloroethane	6	U
56-23-5	Carbon Tetrachloride	6	U
108-05-4	Vinyl Acetate	11	U
75-27-4	Bromodichloromethane	6	U
78-87-5	1,2-Dichloropropane	6	U
10061-01-5	cis-1,3-Dichloropropene	6	U
79-01-6	Trichloroethene	6	U
124-48-1	Dibromochloromethane	6	U
79-00-5	1,1,2-Trichloroethane	6	U R
71-43-2	Benzene	6	U
10061-02-6	Trans-1,3-Dichloropropene	6	U
75-25-2	Bromoform	6	U
108-10-1	4-Methyl-2-Pentanone	11	U
591-78-6	2-Hexanone	11	U
127-18-4	Tetrachloroethene	58	J
79-34-5	1,1,2,2-Tetrachloroethane	6	U
108-88-3	Toluene	6	U
108-90-7	Chlorobenzene	6	U
100-41-4	Ethylbenzene	6	U
100-42-5	Styrene	6	U
1330-20-7	Total Xylenes	6	U

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BX258

Lab Name: COMPUCHEM LABS Contract: 68-D9-0032

Lab Code: COMPU Case No.: 12058 SAS No.: _____ SDG No.: BX258

Matrix: (soil/water) SOIL Lab Sample ID: 266347

Sample wt/vol: 30.0 (g/mL) G Lab File ID: GH066347B04

Level: (low/med) LOW Date Received: 06/08/89

% Moisture: not dec. 11 dec. ____ Date Extracted: 06/09/89

Extraction: (SepF/Cont/Sonc) SONC Date Analyzed: 06/09/89

GPC Cleanup: (Y/N) N pH: 8.3 Dilution Factor: 1.00

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

Q

gmo 2/9/90

CAS NO.	COMPOUND		Q
108-95-2	Phenol	39	U NJ
111-44-4	bis(2-Chloroethyl)Ether	370	U
95-57-8	2-Chlorophenol	370	U
541-73-1	1,3-Dichlorobenzene	370	U
106-46-7	1,4-Dichlorobenzene	370	U
100-51-6	Benzyl Alcohol	370	U
95-50-1	1,2-Dichlorobenzene	370	U
95-48-7	2-Methylphenol	370	U
39638-32-9	bis(2-Chloroisopropyl)Ether	370	U
106-44-5	4-Methylphenol	370	U
621-64-7	N-Nitroso-Di-n-Propylamine	370	U
67-72-1	Hexachloroethane	370	U
98-95-3	Nitrobenzene	370	U
78-59-1	Isophorone	370	U
88-75-5	2-Nitrophenol	370	U
105-67-9	2,4-Dimethylphenol	370	U
65-85-0	Benzoic Acid	1800	U
111-91-1	bis(2-Chloroethoxy)Methane	370	U
120-83-2	2,4-Dichlorophenol	370	U
120-82-1	1,2,4-Trichlorobenzene	370	U
91-20-3	Naphthalene	370	U
106-47-8	4-Chloroaniline	370	U
87-68-3	Hexachlorobutadiene	370	U
59-50-7	4-Chloro-3-Methylphenol	370	U
91-57-6	2-Methylnaphthalene	370	U
77-47-4	Hexachlorocyclopentadiene	370	U
88-06-2	2,4,6-Trichlorophenol	370	U
95-95-4	2,4,5-Trichlorophenol	1800	U
91-58-7	2-Chloronaphthalene	370	U
88-74-4	2-Nitroaniline	1800	U
131-11-3	Dimethyl Phthalate	370	U
208-96-8	Acenaphthylene	370	U
606-20-2	2,6-Dinitrotoluene	370	U

1C

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BX258

Lab Name: COMPUCHEM LABS Contract: 68-D9-0032

Lab Code: COMPU Case No.: 12058 SAS No.: _____ SDG No.: BX258

Matrix: (soil/water) SOIL Lab Sample ID: 266347

Sample wt/vol: 30.0 (g/mL) G Lab File ID: GH066347B04

Level: (low/med) LOW Date Received: 06/08/89

% Moisture: not dec. 11 dec. ____ Date Extracted: 06/09/89

Extraction: (SepF/Cont/Sonc) SONC Date Analyzed: 06/09/89

GPC Cleanup: (Y/N) N pH: 8.3 Dilution Factor: 1.00

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
99-09-2	3-Nitroaniline	1800	U
83-32-9	Acenaphthene	370	U
51-28-5	2,4-Dinitrophenol	1800	U
100-02-7	4-Nitrophenol	1800	U
132-64-9	Dibenzofuran	370	U
121-14-2	2,4-Dinitrotoluene	370	U
84-66-2	Diethylphthalate	370	U
7005-72-3	4-Chlorophenyl-phenylether	370	U
86-73-7	Fluorene	370	U
100-01-6	4-Nitroaniline	1800	U
534-52-1	4,6-Dinitro-2-Methylphenol	1800	U
86-30-6	N-Nitrosodiphenylamine (1)	370	U
101-55-3	4-Bromophenyl-phenylether	370	U
118-74-1	Hexachlorobenzene	370	U
87-86-5	Pentachlorophenol	1800	U
85-01-8	Phenanthrene	370	U
120-12-7	Anthracene	370	U
84-74-2	Di-n-Butylphthalate	370	U
206-44-0	Fluoranthene	370	U
129-00-0	Pyrene	370	U
85-68-7	Butylbenzylphthalate	370	U
91-94-1	3,3'-Dichlorobenzidine	740	U
56-55-3	Benzo(a)Anthracene	370	U
218-01-9	Chrysene	370	U
117-81-7	bis(2-Ethylhexyl)Phthalate	280	JJ
117-84-0	Di-n-Octyl Phthalate	370	U
205-99-2	Benzo(b)Fluoranthene	370	U
207-08-9	Benzo(k)Fluoranthene	370	U
50-32-8	Benzo(a)Pyrene	370	U
193-39-5	Indeno(1,2,3-cd)Pyrene	370	U
53-70-3	Dibenzo(a,h)Anthracene	370	U
191-24-2	Benzo(g,h,i)Perylene	370	U

(1) - Cannot be separated from Diphenylamine

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BX258MS

Lab Name: COMPUCHEM LABS Contract: 68-D9-0032

Lab Code: COMPU Case No.: 12058 SAS No.: _____ SDG No.: BX258

Matrix: (soil/water) SOIL Lab Sample ID: 266437

Sample wt/vol: 5.0 (g/mL) G Lab File ID: GR066437C10

Level: (low/med) LOW Date Received: 06/08/89

% Moisture: not dec. 11 Date Analyzed: 06/13/89

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	11	U
74-83-9	Bromomethane	11	U
75-01-4	Vinyl Chloride	11	U
75-00-3	Chloroethane	11	U
75-09-2	Methylene Chloride	19	B
67-64-1	Acetone	11	U
75-15-0	Carbon Disulfide	6	U
75-35-4	1,1-Dichloroethene	6	U
75-34-3	1,1-Dichloroethane	6	U
540-59-0	1,2-Dichloroethene (total)	6	U
67-66-3	Chloroform	2	J
107-06-2	1,2-Dichloroethane	6	U
78-93-3	2-Butanone	11	U
71-55-6	1,1,1-Trichloroethane	6	U
56-23-5	Carbon Tetrachloride	6	U
108-05-4	Vinyl Acetate	11	U
75-27-4	Bromodichloromethane	6	U
78-87-5	1,2-Dichloropropane	6	U
10061-01-5	cis-1,3-Dichloropropene	6	U
79-01-6	Trichloroethene	6	U
124-48-1	Dibromochloromethane	6	U
79-00-5	1,1,2-Trichloroethane	6	U
71-43-2	Benzene	6	U
10061-02-6	Trans-1,3-Dichloropropene	6	U
75-25-2	Bromoform	6	U
108-10-1	4-Methyl-2-Pentanone	11	U
591-78-6	2-Hexanone	11	U
127-18-4	Tetrachloroethene	17	
79-34-5	1,1,2,2-Tetrachloroethane	6	U
108-88-3	Toluene	6	U
108-90-7	Chlorobenzene	6	U
100-41-4	Ethylbenzene	6	U
100-42-5	Styrene	6	U
1330-20-7	Total Xylenes	6	U

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BX258MSD

Lab Name: COMPUCHEM LABS Contract: 68-D9-0032

Lab Code: COMPU Case No.: 12058 SAS No.: _____ SDG No.: BX258

Matrix: (soil/water) SOIL Lab Sample ID: 266438

Sample wt/vol: 5.0 (g/mL) G Lab File ID: GR066438C10

Level: (low/med) LOW Date Received: 06/08/89

% Moisture: not dec. 11 Date Analyzed: 06/13/89

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	11	U
74-83-9	Bromomethane	11	U
75-01-4	Vinyl Chloride	11	U
75-00-3	Chloroethane	11	U
75-09-2	Methylene Chloride	12	B
67-64-1	Acetone	11	U
75-15-0	Carbon Disulfide	6	U
75-35-4	1,1-Dichloroethene	6	U
75-34-3	1,1-Dichloroethane	6	U
540-59-0	1,2-Dichloroethene (total)	6	U
67-66-3	Chloroform	6	U
107-06-2	1,2-Dichloroethane	6	U
78-93-3	2-Butanone	11	U
71-55-6	1,1,1-Trichloroethane	6	U
56-23-5	Carbon Tetrachloride	6	U
108-05-4	Vinyl Acetate	11	U
75-27-4	Bromodichloromethane	6	U
78-87-5	1,2-Dichloropropane	6	U
10061-01-5	cis-1,3-Dichloropropene	6	U
79-01-6	Trichloroethene	6	U
124-48-1	Dibromochloromethane	6	U
79-00-5	1,1,2-Trichloroethane	6	U
71-43-2	Benzene	6	U
10061-02-6	Trans-1,3-Dichloropropene	6	U
75-25-2	Bromoform	6	U
108-10-1	4-Methyl-2-Pentanone	11	U
591-78-6	2-Hexanone	11	U
127-18-4	Tetrachloroethene	19	
79-34-5	1,1,2,2-Tetrachloroethane	6	U
108-88-3	Toluene	6	U
108-90-7	Chlorobenzene	6	U
100-41-4	Ethylbenzene	6	U
100-42-5	Styrene	6	U
1330-20-7	Total Xylenes	6	U

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BX259

Lab Name: COMPUCHEM LABS Contract: 68-D9-0032

Lab Code: COMPU Case No.: 12058 SAS No.: _____ SDG No.: BX258

Matrix: (soil/water) SOIL Lab Sample ID: 266348

Sample wt/vol: 1.0 (g/mL) G Lab File ID: GR066348C10

Level: (low/med) LOW Date Received: 06/08/89

% Moisture: not dec. 19 Date Analyzed: 06/13/89

Column: (pack/cap) CAP Dilution Factor: 1.0

jmw 2-12-9

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	62	U
74-83-9	Bromomethane	62	U
75-01-4	Vinyl Chloride	62	U
75-00-3	Chloroethane	62	U
75-09-2	Methylene Chloride	150	~~B~~ J
67-64-1	Acetone	84	J
75-15-0	Carbon Disulfide	31	U
75-35-4	1,1-Dichloroethene	31	U
75-34-3	1,1-Dichloroethane	31	U
540-59-0	1,2-Dichloroethene (total)	20	J
67-66-3	Chloroform	12	J
107-06-2	1,2-Dichloroethane	31	U
78-93-3	2-Butanone	62	U
71-55-6	1,1,1-Trichloroethane	31	U
56-23-5	Carbon Tetrachloride	31	U
108-05-4	Vinyl Acetate	62	U
75-27-4	Bromodichloromethane	31	U
78-87-5	1,2-Dichloropropane	31	U
10061-01-5	cis-1,3-Dichloropropene	31	U
79-01-6	Trichloroethene	75	
124-48-1	Dibromochloromethane	31	U
79-00-5	1,1,2-Trichloroethane	31	U
71-43-2	Benzene	31	U
10061-02-6	Trans-1,3-Dichloropropene	31	U
75-25-2	Bromoform	31	U
108-10-1	4-Methyl-2-Pentanone	62	U
591-78-6	2-Hexanone	62	U
127-18-4	Tetrachloroethene	*150, 000 ~~9000~~	~~E~~D
79-34-5	1,1,2,2-Tetrachloroethane	31	U
108-88-3	Toluene	31	U
108-90-7	Chlorobenzene	31	U
100-41-4	Ethylbenzene	31	U
100-42-5	Styrene	31	U
1330-20-7	Total Xylenes	31	U

* VALUE FROM DILUTED SAMPLE ANALYSIS!

1C

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BX259

Lab Name: COMPUCHEM LABS Contract: 68-D9-0032

Lab Code: COMPU Case No.: 12058 SAS No.: _____ SDG No.: BX258

Matrix: (soil/water) SOIL Lab Sample ID: 266348

Sample wt/vol: 30.0 (g/mL) G Lab File ID: GJ066348B04

Level: (low/med) LOW Date Received: 06/08/89

% Moisture: not dec. 19 dec. ____ Date Extracted: 06/09/89

Extraction: (SepF/Cont/Sonc) SONC Date Analyzed: 06/09/89

GPC Cleanup: (Y/N) N pH: 8.4 Dilution Factor: 1.00

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
99-09-2	3-Nitroaniline	2000	U
83-32-9	Acenaphthene	410	U
51-28-5	2,4-Dinitrophenol	2000	U
100-02-7	4-Nitrophenol	2000	U
132-64-9	Dibenzofuran	410	U
121-14-2	2,4-Dinitrotoluene	410	U
84-66-2	Diethylphthalate	410	U
7005-72-3	4-Chlorophenyl-phenylether	410	U
86-73-7	Fluorene	410	U
100-01-6	4-Nitroaniline	2000	U
534-52-1	4,6-Dinitro-2-Methylphenol	2000	U
86-30-6	N-Nitrosodiphenylamine (1)	410	U
101-55-3	4-Bromophenyl-phenylether	410	U
118-74-1	Hexachlorobenzene	410	U
87-86-5	Pentachlorophenol	2000	U
85-01-8	Phenanthrene	410	U
120-12-7	Anthracene	410	U
84-74-2	Di-n-Butylphthalate	410	U
206-44-0	Fluoranthene	410	U
129-00-0	Pyrene	410	U
85-68-7	Butylbenzylphthalate	410	U
91-94-1	3,3'-Dichlorobenzidine	820	U
56-55-3	Benzo(a)Anthracene	410	U
218-01-9	Chrysene	410	U
117-81-7	bis(2-Ethylhexyl)Phthalate	390	J
117-84-0	Di-n-Octyl Phthalate	410	U
205-99-2	Benzo(b)Fluoranthene	410	U
207-08-9	Benzo(k)Fluoranthene	410	U
50-32-8	Benzo(a)Pyrene	410	U
193-39-5	Indeno(1,2,3-cd)Pyrene	410	U
53-70-3	Dibenzo(a,h)Anthracene	410	U
191-24-2	Benzo(g,h,i)Perylene	410	U

(1) - Cannot be separated from Diphenylamine

GMW 2/19/90

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BX259MS

Lab Name: COMPUCHEM LABS Contract: 68-D9-0032

Lab Code: COMPU Case No.: 12058 SAS No.: _____ SDG No.: BX258

Matrix: (soil/water) SOIL Lab Sample ID: 266434

Sample wt/vol: 30.0 (g/mL) G Lab File ID: GJ066434A04

Level: (low/med) LOW Date Received: 06/08/89

% Moisture: not dec. 19 dec. ____ Date Extracted: 06/09/89

Extraction: (SepF/Cont/Sonc) SONC Date Analyzed: 06/10/89

GPC Cleanup: (Y/N) N pH: 8.4 Dilution Factor: 1.00

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
108-95-2	Phenol	410	U
111-44-4	bis(2-Chloroethyl)Ether	410	U
95-57-8	2-Chlorophenol	410	U
541-73-1	1,3-Dichlorobenzene	410	U
106-46-7	1,4-Dichlorobenzene	410	U
100-51-6	Benzyl Alcohol	410	U
95-50-1	1,2-Dichlorobenzene	410	U
95-48-7	2-Methylphenol	410	U
39638-32-9	bis(2-Chloroisopropyl)Ether	410	U
106-44-5	4-Methylphenol	410	U
621-64-7	N-Nitroso-Di-n-Propylamine	410	U
67-72-1	Hexachloroethane	410	U
98-95-3	Nitrobenzene	410	U
78-59-1	Isophorone	410	U
88-75-5	2-Nitrophenol	410	U
105-67-9	2,4-Dimethylphenol	410	U
65-85-0	Benzoic Acid	43	J
111-91-1	bis(2-Chloroethoxy)Methane	410	U
120-83-2	2,4-Dichlorophenol	410	U
120-82-1	1,2,4-Trichlorobenzene	410	U
91-20-3	Naphthalene	410	U
106-47-8	4-Chloroaniline	410	U
87-68-3	Hexachlorobutadiene	410	U
59-50-7	4-Chloro-3-Methylphenol	410	U
91-57-6	2-Methylnaphthalene	410	U
77-47-4	Hexachlorocyclopentadiene	410	U
88-06-2	2,4,6-Trichlorophenol	410	U
95-95-4	2,4,5-Trichlorophenol	2000	U
91-58-7	2-Chloronaphthalene	410	U
88-74-4	2-Nitroaniline	2000	U
131-11-3	Dimethyl Phthalate	410	U
208-96-8	Acenaphthylene	410	U
606-20-2	2,6-Dinitrotoluene	410	U

1C

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BX259MS

Lab Name: COMPUCHEM LABS Contract: 68-D9-0032

Lab Code: COMPU Case No.: 12058 SAS No.: _____ SDG No.: BX258

Matrix: (soil/water) SOIL Lab Sample ID: 266434

Sample wt/vol: 30.0 (g/mL) G Lab File ID: GJ066434A04

Level: (low/med) LOW Date Received: 06/08/89

% Moisture: not dec. 19 dec. ____ Date Extracted: 06/09/89

Extraction: (SepF/Cont/Sonc) SONC Date Analyzed: 06/10/89

GPC Cleanup: (Y/N) N pH: 8.4 Dilution Factor: 1.00

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
99-09-2	3-Nitroaniline	2000	U
83-32-9	Acenaphthene	410	U
51-28-5	2,4-Dinitrophenol	2000	U
100-02-7	4-Nitrophenol	2000	U
132-64-9	Dibenzofuran	410	U
121-14-2	2,4-Dinitrotoluene	410	U
84-66-2	Diethylphthalate	410	U
7005-72-3	4-Chlorophenyl-phenylether	410	U
86-73-7	Fluorene	410	U
100-01-6	4-Nitroaniline	2000	U
534-52-1	4,6-Dinitro-2-Methylphenol	2000	U
86-30-6	N-Nitrosodiphenylamine (1)	410	U
101-55-3	4-Bromophenyl-phenylether	410	U
118-74-1	Hexachlorobenzene	410	U
87-86-5	Pentachlorophenol	2000	U
85-01-8	Phenanthrene	410	U
120-12-7	Anthracene	410	U
84-74-2	Di-n-Butylphthalate	49	J
206-44-0	Fluoranthene	410	U
129-00-0	Pyrene	410	U
85-68-7	Butylbenzylphthalate	410	U
91-94-1	3,3'-Dichlorobenzidine	820	U
56-55-3	Benzo(a)Anthracene	410	U
218-01-9	Chrysene	410	U
117-81-7	bis(2-Ethylhexyl)Phthalate	420	
117-84-0	Di-n-Octyl Phthalate	410	U
205-99-2	Benzo(b)Fluoranthene	410	U
207-08-9	Benzo(k)Fluoranthene	410	U
50-32-8	Benzo(a)Pyrene	410	U
193-39-5	Indeno(1,2,3-cd)Pyrene	410	U
53-70-3	Dibenzo(a,h)Anthracene	410	U
191-24-2	Benzo(g,h,i)Perylene	86	J

(1) - Cannot be separated from Diphenylamine

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BX259MSD

Lab Name: COMPUCHEM LABS Contract: 68-D9-0032

Lab Code: COMPU Case No.: 12058 SAS No.: _____ SDG No.: BX258

Matrix: (soil/water) SOIL Lab Sample ID: 266435

Sample wt/vol: 30.0 (g/mL) G Lab File ID: G3J66435A04

Level: (low/med) LOW Date Received: 06/08/89

% Moisture: not dec. 19 dec. ____ Date Extracted: 06/09/89

Extraction: (SepF/Cont/Sonc) SONC Date Analyzed: 06/11/89

GPC Cleanup: (Y/N) N pH: 8.4 Dilution Factor: 1.00

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
108-95-2	Phenol	410	U
111-44-4	bis(2-Chloroethyl)Ether	410	U
95-57-8	2-Chlorophenol	410	U
541-73-1	1,3-Dichlorobenzene	410	U
106-46-7	1,4-Dichlorobenzene	410	U
100-51-6	Benzyl Alcohol	410	U
95-50-1	1,2-Dichlorobenzene	410	U
95-48-7	2-Methylphenol	410	U
39638-32-9	bis(2-Chloroisopropyl)Ether	410	U
106-44-5	4-Methylphenol	410	U
621-64-7	N-Nitroso-Di-n-Propylamine	410	U
67-72-1	Hexachloroethane	410	U
98-95-3	Nitrobenzene	410	U
78-59-1	Isophorone	410	U
88-75-5	2-Nitrophenol	410	U
105-67-9	2,4-Dimethylphenol	410	U
65-85-0	Benzoic Acid	2000	U
111-91-1	bis(2-Chloroethoxy)Methane	410	U
120-83-2	2,4-Dichlorophenol	410	U
120-82-1	1,2,4-Trichlorobenzene	410	U
91-20-3	Naphthalene	410	U
106-47-8	4-Chloroaniline	410	U
87-68-3	Hexachlorobutadiene	410	U
59-50-7	4-Chloro-3-Methylphenol	410	U
91-57-6	2-Methylnaphthalene	410	U
77-47-4	Hexachlorocyclopentadiene	410	U
88-06-2	2,4,6-Trichlorophenol	410	U
95-95-4	2,4,5-Trichlorophenol	2000	U
91-58-7	2-Chloronaphthalene	410	U
88-74-4	2-Nitroaniline	2000	U
131-11-3	Dimethyl Phthalate	410	U
208-96-8	Acenaphthylene	410	U
606-20-2	2,6-Dinitrotoluene	410	U

1C

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BX259MSD

Lab Name: COMPUCHEM LABS Contract: 68-D9-0032

Lab Code: COMPU Case No.: 12058 SAS No.: _____ SDG No.: BX258

Matrix: (soil/water) SOIL Lab Sample ID: 266435

Sample wt/vol: 30.0 (g/mL) G Lab File ID: G3J66435A04

Level: (low/med) LOW Date Received: 06/08/89

% Moisture: not dec. 19 dec. ____ Date Extracted: 06/09/89

Extraction: (SepF/Cont/Sonc) SONC Date Analyzed: 06/11/89

GPC Cleanup: (Y/N) N pH: 8.4 Dilution Factor: 1.00

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
99-09-2	3-Nitroaniline	2000	U
83-32-9	Acenaphthene	410	U
51-28-5	2,4-Dinitrophenol	2000	U
100-02-7	4-Nitrophenol	2000	U
132-64-9	Dibenzofuran	410	U
121-14-2	2,4-Dinitrotoluene	410	U
84-66-2	Diethylphthalate	410	U
7005-72-3	4-Chlorophenyl-phenylether	410	U
86-73-7	Fluorene	410	U
100-01-6	4-Nitroaniline	2000	U
534-52-1	4,6-Dinitro-2-Methylphenol	2000	U
86-30-6	N-Nitrosodiphenylamine (1)	410	U
101-55-3	4-Bromophenyl-phenylether	410	U
118-74-1	Hexachlorobenzene	410	U
87-86-5	Pentachlorophenol	2000	U
85-01-8	Phenanthrene	410	U
120-12-7	Anthracene	410	U
84-74-2	Di-n-Butylphthalate	83	J
206-44-0	Fluoranthene	410	U
129-00-0	Pyrene	410	U
85-68-7	Butylbenzylphthalate	410	U
91-94-1	3,3'-Dichlorobenzidine	820	U
56-55-3	Benzo(a)Anthracene	410	U
218-01-9	Chrysene	410	U
117-81-7	bis(2-Ethylhexyl)Phthalate	510	
117-84-0	Di-n-Octyl Phthalate	410	U
205-99-2	Benzo(b)Fluoranthene	410	U
207-08-9	Benzo(k)Fluoranthene	410	U
50-32-8	Benzo(a)Pyrene	410	U
193-39-5	Indeno(1,2,3-cd)Pyrene	410	U
53-70-3	Dibenzo(a,h)Anthracene	410	U
191-24-2	Benzo(g,h,i)Perylene	82	J

(1) - Cannot be separated from Diphenylamine

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
BX259DLMS

Lab Name: COMPUCHEM LABS Contract: 68-D9-0032

Lab Code: COMPU Case No.: 12058 SAS No.: _____ SDG No.: BX258

Matrix: (soil/water) SOIL Lab Sample ID: 266883

Sample wt/vol: 4.0 (g/mL) G Lab File ID: CR066883C23

Level: (low/med) MED Date Received: 06/08/89

% Moisture: not dec. 19 Date Analyzed: 06/14/89

Column: (pack/cap) CAP Dilution Factor: 6.7

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	10000	U
74-83-9	Bromomethane	10000	U
75-01-4	Vinyl Chloride	10000	U
75-00-3	Chloroethane	10000	U
75-09-2	Methylene Chloride	2300	BDJ
67-64-1	Acetone	10000	U
75-15-0	Carbon Disulfide	5100	U
75-35-4	1,1-Dichloroethene	5100	U
75-34-3	1,1-Dichloroethane	5100	U
540-59-0	1,2-Dichloroethene (total)	5100	U
67-66-3	Chloroform	5100	U
107-06-2	1,2-Dichloroethane	5100	U
78-93-3	2-Butanone	10000	U
71-55-6	1,1,1-Trichloroethane	5100	U
56-23-5	Carbon Tetrachloride	5100	U
108-05-4	Vinyl Acetate	10000	U
75-27-4	Bromodichloromethane	5100	U
78-87-5	1,2-Dichloropropane	5100	U
10061-01-5	cis-1,3-Dichloropropene	5100	U
79-01-6	Trichloroethene	5100	U
124-48-1	Dibromochloromethane	5100	U
79-00-5	1,1,2-Trichloroethane	5100	U
71-43-2	Benzene	5100	U
10061-02-6	Trans-1,3-Dichloropropene	5100	U
75-25-2	Bromoform	5100	U
108-10-1	4-Methyl-2-Pentanone	10000	U
591-78-6	2-Hexanone	10000	U
127-18-4	Tetrachloroethene	180000	D
79-34-5	1,1,2,2-Tetrachloroethane	5100	U
108-88-3	Toluene	5100	U
108-90-7	Chlorobenzene	5100	U
100-41-4	Ethylbenzene	5100	U
100-42-5	Styrene	5100	U
1330-20-7	Total Xylenes	5100	U

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BX259DLMSD

Lab Name: COMPUCHEM LABS Contract: 68-D9-0032

Lab Code: COMPU Case No.: 12058 SAS No.: _____ SDG No.: BX258

Matrix: (soil/water) SOIL Lab Sample ID: 266884

Sample wt/vol: 4.0 (g/mL) G Lab File ID: CR066884C23

Level: (low/med) MED Date Received: 06/08/89

% Moisture: not dec. 19 Date Analyzed: 06/14/89

Column: (pack/cap) CAP Dilution Factor: 6.7

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	10000	U
74-83-9	Bromomethane	10000	U
75-01-4	Vinyl Chloride	10000	U
75-00-3	Chloroethane	10000	U
75-09-2	Methylene Chloride	2500	BDJ
67-64-1	Acetone	10000	U
75-15-0	Carbon Disulfide	5100	U
75-35-4	1,1-Dichloroethene	5100	U
75-34-3	1,1-Dichloroethane	5100	U
540-59-0	1,2-Dichloroethene (total)	5100	U
67-66-3	Chloroform	5100	U
107-06-2	1,2-Dichloroethane	5100	U
78-93-3	2-Butanone	10000	U
71-55-6	1,1,1-Trichloroethane	5100	U
56-23-5	Carbon Tetrachloride	5100	U
108-05-4	Vinyl Acetate	10000	U
75-27-4	Bromodichloromethane	5100	U
78-87-5	1,2-Dichloropropane	5100	U
10061-01-5	cis-1,3-Dichloropropene	5100	U
79-01-6	Trichloroethene	5100	U
124-48-1	Dibromochloromethane	5100	U
79-00-5	1,1,2-Trichloroethane	5100	U
71-43-2	Benzene	5100	U
10061-02-6	Trans-1,3-Dichloropropene	5100	U
75-25-2	Bromoform	5100	U
108-10-1	4-Methyl-2-Pentanone	10000	U
591-78-6	2-Hexanone	10000	U
127-18-4	Tetrachloroethene	170000	D
79-34-5	1,1,2,2-Tetrachloroethane	5100	U
108-88-3	Toluene	5100	U
108-90-7	Chlorobenzene	5100	U
100-41-4	Ethylbenzene	5100	U
100-42-5	Styrene	5100	U
1330-20-7	Total Xylenes	5100	U

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE N

BX260

Lab Name: COMPUCHEM LABS Contract: 68-D9-0032

Lab Code: COMPU Case No.: 12058 SAS No.: _____ SDG No.: BX260

Matrix: (soil/water) WATER Lab Sample ID: 266346

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: CN066346A10

Level: (low/med) LOW Date Received: 06/07/89

% Moisture: not dec. ____ Date Analyzed: 06/11/89

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	5	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	5	U
540-59-0	1,2-Dichloroethene (total)	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone	10	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon Tetrachloride	5	U
108-05-4	Vinyl Acetate	10	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	5	U
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	Trans-1,3-Dichloropropene	5	U
75-25-2	Bromoform	5	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Total Xylenes	5	U

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BX260

Lab Name: COMPUCHEM LABS Contract: 68-D9-0032

Lab Code: COMPU Case No.: 12058 SAS No.: _____ SDG No.: BX260

Matrix: (soil/water) WATER Lab Sample ID: 266346

Sample wt/vol: 1000 (g/mL) ML Lab File ID: GH066346A20

Level: (low/med) LOW Date Received: 06/07/89

% Moisture: not dec. ____ dec. ____ Date Extracted: 06/09/89

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 06/11/89

GPC Cleanup: (Y/N) N pH: _____ Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
108-95-2	Phenol	10	U
111-44-4	bis(2-Chloroethyl)Ether	10	U
95-57-8	2-Chlorophenol	10	U
541-73-1	1,3-Dichlorobenzene	10	U
106-46-7	1,4-Dichlorobenzene	10	U
100-51-6	Benzyl Alcohol	10	U
95-50-1	1,2-Dichlorobenzene	10	U
95-48-7	2-Methylphenol	10	U
39638-32-9	bis(2-Chloroisopropyl)Ether	10	U
106-44-5	4-Methylphenol	10	U
621-64-7	N-Nitroso-Di-n-Propylamine	10	U
67-72-1	Hexachloroethane	10	U
98-95-3	Nitrobenzene	10	U
78-59-1	Isophorone	10	U
88-75-5	2-Nitrophenol	10	U
105-67-9	2,4-Dimethylphenol	10	U
65-85-0	Benzoic Acid	50	U
111-91-1	bis(2-Chloroethoxy)Methane	10	U
120-83-2	2,4-Dichlorophenol	10	U
120-82-1	1,2,4-Trichlorobenzene	10	U
91-20-3	Naphthalene	10	U
106-47-8	4-Chloroaniline	10	U
87-68-3	Hexachlorobutadiene	10	U
59-50-7	4-Chloro-3-Methylphenol	10	U
91-57-6	2-Methylnaphthalene	10	U
77-47-4	Hexachlorocyclopentadiene	10	U
88-06-2	2,4,6-Trichlorophenol	10	U
95-95-4	2,4,5-Trichlorophenol	50	U
91-58-7	2-Chloronaphthalene	10	U
88-74-4	2-Nitroaniline	50	U
131-11-3	Dimethyl Phthalate	10	U
208-96-8	Acenaphthylene	10	U
606-20-2	2,6-Dinitrotoluene	10	U

1C

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BX260

Lab Name: COMPUCHEM LABS Contract: 68-D9-0032

Lab Code: COMPU Case No.: 12058 SAS No.: _____ SDG No.: BX260

Matrix: (soil/water) WATER Lab Sample ID: 266346

Sample wt/vol: 1000 (g/mL) ML Lab File ID: GH066346A20

Level: (low/med) LOW Date Received: 06/07/89

% Moisture: not dec. ____ dec. ____ Date Extracted: 06/09/89

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 06/11/89

GPC Cleanup: (Y/N) N pH: _____ Dilution Factor: 1.0

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND	Q
99-09-2	3-Nitroaniline	50 U
83-32-9	Acenaphthene	10 U
51-28-5	2,4-Dinitrophenol	50 U
100-02-7	4-Nitrophenol	50 U
132-64-9	Dibenzofuran	10 U
121-14-2	2,4-Dinitrotoluene	10 U
84-66-2	Diethylphthalate	10 U
7005-72-3	4-Chlorophenyl-phenylether	10 U
86-73-7	Fluorene	10 U
100-01-6	4-Nitroaniline	50 U
534-52-1	4,6-Dinitro-2-Methylphenol	50 U
86-30-6	N-Nitrosodiphenylamine (1)	10 U
101-55-3	4-Bromophenyl-phenylether	10 U
118-74-1	Hexachlorobenzene	10 U
87-86-5	Pentachlorophenol	50 U
85-01-8	Phenanthrene	10 U
120-12-7	Anthracene	10 U
84-74-2	Di-n-Butylphthalate	10 U
206-44-0	Fluoranthene	10 U
129-00-0	Pyrene	10 U
85-68-7	Butylbenzylphthalate	10 U
91-94-1	3,3'-Dichlorobenzidine	20 ~~U~~ UJ
56-55-3	Benzo(a)Anthracene	10 U
218-01-9	Chrysene	10 U
117-81-7	bis(2-Ethylhexyl)Phthalate	10 U
117-84-0	Di-n-Octyl Phthalate	10 U
205-99-2	Benzo(b)Fluoranthene	10 U
207-08-9	Benzo(k)Fluoranthene	10 U
50-32-8	Benzo(a)Pyrene	10 U
193-39-5	Indeno(1,2,3-cd)Pyrene	10 U
53-70-3	Dibenzo(a,h)Anthracene	10 U
191-24-2	Benzo(g,h,i)Perylene	10 U

(1) - Cannot be separated from Diphenylamine

GW 2/9/90

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BX261

Lab Name: COMPUCHEM LABS Contract: 68-D9-0032

Lab Code: COMPU Case No.: 12058 SAS No.: _____ SDG No.: BX258

Matrix: (soil/water) SOIL Lab Sample ID: 266349

Sample wt/vol: 4.0 (g/mL) G Lab File ID: C2R66349C23

Level: (low/med) MED Date Received: 06/08/89

% Moisture: not dec. 21 Date Analyzed: 06/14/89

Column: (pack/cap) CAP Dilution Factor: 6.7

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	11000	U
74-83-9	Bromomethane	11000	U
75-01-4	Vinyl Chloride	11000	U
75-00-3	Chloroethane	11000	U
75-09-2	Methylene Chloride	5300	U
67-64-1	Acetone	11000	U
75-15-0	Carbon Disulfide	5300	U
75-35-4	1,1-Dichloroethene	5300	U
75-34-3	1,1-Dichloroethane	5300	U
540-59-0	1,2-Dichloroethene (total)	5300	U
67-66-3	Chloroform	5300	U
107-06-2	1,2-Dichloroethane	5300	U
78-93-3	2-Butanone	11000	U
71-55-6	1,1,1-Trichloroethane	5300	U
56-23-5	Carbon Tetrachloride	5300	U
108-05-4	Vinyl Acetate	11000	U
75-27-4	Bromodichloromethane	5300	U
78-87-5	1,2-Dichloropropane	5300	U
10061-01-5	cis-1,3-Dichloropropene	5300	U
79-01-6	Trichloroethene	5300	U
124-48-1	Dibromochloromethane	5300	U
79-00-5	1,1,2-Trichloroethane	5300	U
71-43-2	Benzene	5300	U
10061-02-6	Trans-1,3-Dichloropropene	5300	U
75-25-2	Bromoform	5300	U
108-10-1	4-Methyl-2-Pentanone	11000	U
591-78-6	2-Hexanone	11000	U
127-18-4	Tetrachloroethene	170000	
79-34-5	1,1,2,2-Tetrachloroethane	5300	U
108-88-3	Toluene	5300	U
108-90-7	Chlorobenzene	5300	U
100-41-4	Ethylbenzene	5300	U
100-42-5	Styrene	5300	U
1330-20-7	Total Xylenes	5300	U

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BX991MSD

Lab Name: COMPUCHEM LABS Contract: 68-D9-0032

Lab Code: COMPU Case No.: 12058 SAS No.: _____ SDG No.: BX260

Matrix: (soil/water) WATER Lab Sample ID: 266429

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: CN066429A10

Level: (low/med) LOW Date Received: 06/09/89

% Moisture: not dec. ____ Date Analyzed: 06/12/89

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	3	J
67-64-1	Acetone	31	
75-15-0	Carbon Disulfide	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	5	U
540-59-0	1,2-Dichloroethene (total)	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone	10	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon Tetrachloride	5	U
108-05-4	Vinyl Acetate	10	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	5	U
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	Trans-1,3-Dichloropropene	5	U
75-25-2	Bromoform	5	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Total Xylenes	5	U

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BX991MS

Lab Name: COMPUCHEM LABS Contract: 68-D9-0032

Lab Code: COMPU Case No.: 12058 SAS No.: _____ SDG No.: BX260

Matrix: (soil/water) WATER Lab Sample ID: 266428

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: CN066428A10

Level: (low/med) LOW Date Received: 06/09/89

% Moisture: not dec. ____ Date Analyzed: 06/12/89

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	2	J
67-64-1	Acetone	29	
75-15-0	Carbon Disulfide	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	5	U
540-59-0	1,2-Dichloroethene (total)	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone	10	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon Tetrachloride	5	U
108-05-4	Vinyl Acetate	10	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	5	U
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	Trans-1,3-Dichloropropene	5	U
75-25-2	Bromoform	5	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Total Xylenes	5	U

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BX994MS

Lab Name: COMPUCHEM LABS Contract: 68-D9-0032

Lab Code: COMPU Case No.: 12058 SAS No.: _____ SDG No.: BX260

Matrix: (soil/water) WATER Lab Sample ID: 266722

Sample wt/vol: 500 (g/mL) ML Lab File ID: GH066722B06

Level: (low/med) LOW Date Received: 06/10/89

% Moisture: not dec. ____ dec. ____ Date Extracted: 06/12/89

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 06/12/89

GPC Cleanup: (Y/N) N pH: _____ Dilution Factor: 0.50

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
108-95-2	Phenol	10	U
111-44-4	bis(2-Chloroethyl)Ether	10	U
95-57-8	2-Chlorophenol	10	U
541-73-1	1,3-Dichlorobenzene	10	U
106-46-7	1,4-Dichlorobenzene	10	U
100-51-6	Benzyl Alcohol	10	U
95-50-1	1,2-Dichlorobenzene	10	U
95-48-7	2-Methylphenol	10	U
39638-32-9	bis(2-Chloroisopropyl)Ether	10	U
106-44-5	4-Methylphenol	10	U
621-64-7	N-Nitroso-Di-n-Propylamine	10	U
67-72-1	Hexachloroethane	10	U
98-95-3	Nitrobenzene	10	U
78-59-1	Isophorone	10	U
88-75-5	2-Nitrophenol	10	U
105-67-9	2,4-Dimethylphenol	4	J
65-85-0	Benzoic Acid	50	U
111-91-1	bis(2-Chloroethoxy)Methane	10	U
120-83-2	2,4-Dichlorophenol	10	U
120-82-1	1,2,4-Trichlorobenzene	10	U
91-20-3	Naphthalene	10	U
106-47-8	4-Chloroaniline	10	U
87-68-3	Hexachlorobutadiene	10	U
59-50-7	4-Chloro-3-Methylphenol	10	U
91-57-6	2-Methylnaphthalene	10	U
77-47-4	Hexachlorocyclopentadiene	10	U
88-06-2	2,4,6-Trichlorophenol	10	U
95-95-4	2,4,5-Trichlorophenol	50	U
91-58-7	2-Chloronaphthalene	10	U
88-74-4	2-Nitroaniline	50	U
131-11-3	Dimethyl Phthalate	10	U
208-96-8	Acenaphthylene	10	U
606-20-2	2,6-Dinitrotoluene	10	U

1C

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE

BX994MS

Lab Name: COMPUCHEM LABS Contract: 68-D9-0032

Lab Code: COMPU Case No.: 12058 SAS No.: _____ SDG No.: BX260

Matrix: (soil/water) WATER Lab Sample ID: 266722

Sample wt/vol: 500 (g/mL) ML Lab File ID: GH066722B06

Level: (low/med) LOW Date Received: 06/10/89

% Moisture: not dec. ____ dec. ____ Date Extracted: 06/12/89

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 06/12/89

GPC Cleanup: (Y/N) N pH: _____ Dilution Factor: 0.50

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
99-09-2	3-Nitroaniline	50	U
83-32-9	Acenaphthene	10	U
51-28-5	2,4-Dinitrophenol	50	U
100-02-7	4-Nitrophenol	50	U
132-64-9	Dibenzofuran	10	U
121-14-2	2,4-Dinitrotoluene	10	U
84-66-2	Diethylphthalate	10	U
7005-72-3	4-Chlorophenyl-phenylether	10	U
86-73-7	Fluorene	10	U
100-01-6	4-Nitroaniline	50	U
534-52-1	4,6-Dinitro-2-Methylphenol	50	U
86-30-6	N-Nitrosodiphenylamine (1)	10	U
101-55-3	4-Bromophenyl-phenylether	10	U
118-74-1	Hexachlorobenzene	10	U
87-86-5	Pentachlorophenol	50	U
85-01-8	Phenanthrene	10	U
120-12-7	Anthracene	10	U
84-74-2	Di-n-Butylphthalate	10	U
206-44-0	Fluoranthene	10	U
129-00-0	Pyrene	10	U
85-68-7	Butylbenzylphthalate	10	U
91-94-1	3,3'-Dichlorobenzidine	20	U
56-55-3	Benzo(a)Anthracene	10	U
218-01-9	Chrysene	10	U
117-81-7	bis(2-Ethylhexyl)Phthalate	10	U
117-84-0	Di-n-Octyl Phthalate	10	U
205-99-2	Benzo(b)Fluoranthene	10	U
207-08-9	Benzo(k)Fluoranthene	10	U
50-32-8	Benzo(a)Pyrene	10	U
193-39-5	Indeno(1,2,3-cd)Pyrene	10	U
53-70-3	Dibenzo(a,h)Anthracene	10	U
191-24-2	Benzo(g,h,i)Perylene	10	U

(1) - Cannot be separated from Diphenylamine

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NC: BX994MSD

Lab Name: COMPUCHEM LABS Contract: 68-D9-0032

Lab Code: COMPU Case No.: 12058 SAS No.: _____ SDG No.: BX260

Matrix: (soil/water) WATER Lab Sample ID: 266723

Sample wt/vol: 500 (g/mL) ML Lab File ID: GH066723B06

Level: (low/med) LOW Date Received: 06/10/89

% Moisture: not dec. ____ dec. ____ Date Extracted: 06/12/89

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 06/12/89

GPC Cleanup: (Y/N) N pH: _____ Dilution Factor: 0.50

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
108-95-2	Phenol	10	U
111-44-4	bis(2-Chloroethyl)Ether	10	U
95-57-8	2-Chlorophenol	10	U
541-73-1	1,3-Dichlorobenzene	10	U
106-46-7	1,4-Dichlorobenzene	10	U
100-51-6	Benzyl Alcohol	10	U
95-50-1	1,2-Dichlorobenzene	10	U
95-48-7	2-Methylphenol	10	U
39638-32-9	bis(2-Chloroisopropyl)Ether	10	U
106-44-5	4-Methylphenol	10	U
621-64-7	N-Nitroso-Di-n-Propylamine	10	U
67-72-1	Hexachloroethane	10	U
98-95-3	Nitrobenzene	10	U
78-59-1	Isophorone	10	U
88-75-5	2-Nitrophenol	10	U
105-67-9	2,4-Dimethylphenol	4	J
65-85-0	Benzoic Acid	50	U
111-91-1	bis(2-Chloroethoxy)Methane	10	U
120-83-2	2,4-Dichlorophenol	10	U
120-82-1	1,2,4-Trichlorobenzene	10	U
91-20-3	Naphthalene	10	U
106-47-8	4-Chloroaniline	10	U
87-68-3	Hexachlorobutadiene	10	U
59-50-7	4-Chloro-3-Methylphenol	10	U
91-57-6	2-Methylnaphthalene	10	U
77-47-4	Hexachlorocyclopentadiene	10	U
88-06-2	2,4,6-Trichlorophenol	10	U
95-95-4	2,4,5-Trichlorophenol	50	U
91-58-7	2-Chloronaphthalene	10	U
88-74-4	2-Nitroaniline	50	U
131-11-3	Dimethyl Phthalate	10	U
208-96-8	Acenaphthylene	10	U
606-20-2	2,6-Dinitrotoluene	10	U

1C

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BX994MSD

Lab Name: COMPUCHEM LABS Contract: 68-D9-0032

Lab Code: COMPU Case No.: 12058 SAS No.: _____ SDG No.: BX260

Matrix: (soil/water) WATER Lab Sample ID: 266723

Sample wt/vol: 500 (g/mL) ML Lab File ID: GH066723B06

Level: (low/med) LOW Date Received: 06/10/89

% Moisture: not dec. ____ dec. ____ Date Extracted: 06/12/89

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 06/12/89

GPC Cleanup: (Y/N) N pH: _____ Dilution Factor: 0.50

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
99-09-2	3-Nitroaniline	50	U
83-32-9	Acenaphthene	10	U
51-28-5	2,4-Dinitrophenol	50	U
100-02-7	4-Nitrophenol	50	U
132-64-9	Dibenzofuran	10	U
121-14-2	2,4-Dinitrotoluene	10	U
84-66-2	Diethylphthalate	10	U
7005-72-3	4-Chlorophenyl-phenylether	10	U
86-73-7	Fluorene	10	U
100-01-6	4-Nitroaniline	50	U
534-52-1	4,6-Dinitro-2-Methylphenol	50	U
86-30-6	N-Nitrosodiphenylamine (1)	10	U
101-55-3	4-Bromophenyl-phenylether	10	U
118-74-1	Hexachlorobenzene	10	U
87-86-5	Pentachlorophenol	50	U
85-01-8	Phenanthrene	10	U
120-12-7	Anthracene	10	U
84-74-2	Di-n-Butylphthalate	10	U
206-44-0	Fluoranthene	10	U
129-00-0	Pyrene	10	U
85-68-7	Butylbenzylphthalate	10	U
91-94-1	3,3'-Dichlorobenzidine	20	U
56-55-3	Benzo(a)Anthracene	10	U
218-01-9	Chrysene	10	U
117-81-7	bis(2-Ethylhexyl)Phthalate	10	U
117-84-0	Di-n-Octyl Phthalate	10	U
205-99-2	Benzo(b)Fluoranthene	10	U
207-08-9	Benzo(k)Fluoranthene	10	U
50-32-8	Benzo(a)Pyrene	10	U
193-39-5	Indeno(1,2,3-cd)Pyrene	10	U
53-70-3	Dibenzo(a,h)Anthracene	10	U
191-24-2	Benzo(g,h,i)Perylene	10	U

(1) - Cannot be separated from Diphenylamine

1C

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BX994

Lab Name: COMPUCHEM LABS Contract: 68-D9-0032

Lab Code: COMPU Case No.: 12058 SAS No.: _____ SDG No.: BX260

Matrix: (soil/water) WATER Lab Sample ID: 266725

Sample wt/vol: 1000 (g/mL) ML Lab File ID: GJ066725A22

Level: (low/med) LOW Date Received: 06/10/89

% Moisture: not dec. ____ dec. ____ Date Extracted: 06/12/89

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 06/18/89

GPC Cleanup: (Y/N) N pH: _____ Dilution Factor: 1.0

gmo 2/9/90

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
99-09-2	3-Nitroaniline	50	~~U~~ R
83-32-9	Acenaphthene	10	U
51-28-5	2,4-Dinitrophenol	50	U
100-02-7	4-Nitrophenol	50	~~U~~ UJ
132-64-9	Dibenzofuran	10	U
121-14-2	2,4-Dinitrotoluene	10	U
84-66-2	Diethylphthalate	10	U
7005-72-3	4-Chlorophenyl-phenylether	10	U
86-73-7	Fluorene	10	U
100-01-6	4-Nitroaniline	50	U
534-52-1	4,6-Dinitro-2-Methylphenol	50	U
86-30-6	N-Nitrosodiphenylamine (1)	10	U
101-55-3	4-Bromophenyl-phenylether	10	U
118-74-1	Hexachlorobenzene	10	U
87-86-5	Pentachlorophenol	50	U
85-01-8	Phenanthrene	10	U
120-12-7	Anthracene	10	U
84-74-2	Di-n-Butylphthalate	10	U
206-44-0	Fluoranthene	10	U
129-00-0	Pyrene	10	U
85-68-7	Butylbenzylphthalate	10	U
91-94-1	3,3'-Dichlorobenzidine	20	U
56-55-3	Benzo(a)Anthracene	10	U
218-01-9	Chrysene	10	U
117-81-7	bis(2-Ethylhexyl)Phthalate	10	U
117-84-0	Di-n-Octyl Phthalate	10	U
205-99-2	Benzo(b)Fluoranthene	10	U
207-08-9	Benzo(k)Fluoranthene	10	U
50-32-8	Benzo(a)Pyrene	10	U
193-39-5	Indeno(1,2,3-cd)Pyrene	10	U
53-70-3	Dibenzo(a,h)Anthracene	10	U
191-24-2	Benzo(g,h,i)Perylene	10	U

(1) - Cannot be separated from Diphenylamine

1C

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BX995RE

Lab Name: COMPUCHEM LABS Contract: 68-D9-0032

Lab Code: COMPU Case No.: 12058 SAS No.: _____ SDG No.: BX260

Matrix: (soil/water) WATER Lab Sample ID: 266726

Sample wt/vol: 1000 (g/mL) ML Lab File ID: GRJ66726C16

Level: (low/med) LOW Date Received: 06/10/89

% Moisture: not dec. ____ dec. ____ Date Extracted: 06/14/89

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 06/16/89

GPC Cleanup: (Y/N) N pH: _____ Dilution Factor: 1.0

jmw 2-9-90

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND		Q
99-09-2	3-Nitroaniline	50	U
83-32-9	Acenaphthene	10	U
51-28-5	2,4-Dinitrophenol	50	~~U~~ R
100-02-7	4-Nitrophenol	50	~~U~~ R
132-64-9	Dibenzofuran	10	U
121-14-2	2,4-Dinitrotoluene	10	U
84-66-2	Diethylphthalate	10	~~U~~ U J
7005-72-3	4-Chlorophenyl-phenylether	10	U
86-73-7	Fluorene	10	U
100-01-6	4-Nitroaniline	50	U
534-52-1	4,6-Dinitro-2-Methylphenol	50	~~U~~ R
86-30-6	N-Nitrosodiphenylamine (1)	10	U
101-55-3	4-Bromophenyl-phenylether	10	U
118-74-1	Hexachlorobenzene	10	U
87-86-5	Pentachlorophenol	50	~~U~~ R
85-01-8	Phenanthrene	10	U
120-12-7	Anthracene	10	U
84-74-2	Di-n-Butylphthalate	10	U
206-44-0	Fluoranthene	10	U
129-00-0	Pyrene	10	U
85-68-7	Butylbenzylphthalate	10	U
91-94-1	3,3'-Dichlorobenzidine	20	U
56-55-3	Benzo(a)Anthracene	10	U
218-01-9	Chrysene	10	U
117-81-7	bis(2-Ethylhexyl)Phthalate	10	U
117-84-0	Di-n-Octyl Phthalate	10	U
205-99-2	Benzo(b)Fluoranthene	10	U
207-08-9	Benzo(k)Fluoranthene	10	U
50-32-8	Benzo(a)Pyrene	10	U
193-39-5	Indeno(1,2,3-cd)Pyrene	10	U
53-70-3	Dibenzo(a,h)Anthracene	10	U
191-24-2	Benzo(g,h,i)Perylene	10	U

(1) - Cannot be separated from Diphenylamine

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1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BX996

Lab Name: COMPUCHEM LABS Contract: 68-D9-0032

Lab Code: COMPU Case No.: 12058 SAS No.: _____ SDG No.: BX260

Matrix: (soil/water) WATER Lab Sample ID: 266781

Sample wt/vol: 1000 (g/mL) ML Lab File ID: GJ066781A06

Level: (low/med) LOW Date Received: 06/10/89

% Moisture: not dec. ____ dec. ____ Date Extracted: 06/13/89

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 06/13/89

GPC Cleanup: (Y/N) N pH: _____ Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
108-95-2	Phenol	10	U
111-44-4	bis(2-Chloroethyl)Ether	10	U
95-57-8	2-Chlorophenol	10	U
541-73-1	1,3-Dichlorobenzene	10	U
106-46-7	1,4-Dichlorobenzene	10	U
100-51-6	Benzyl Alcohol	10	U
95-50-1	1,2-Dichlorobenzene	10	U
95-48-7	2-Methylphenol	10	U
39638-32-9	bis(2-Chloroisopropyl)Ether	10	U
106-44-5	4-Methylphenol	10	U
621-64-7	N-Nitroso-Di-n-Propylamine	10	U
67-72-1	Hexachloroethane	10	U
98-95-3	Nitrobenzene	10	U
78-59-1	Isophorone	10	U
88-75-5	2-Nitrophenol	10	U
105-67-9	2,4-Dimethylphenol	10	U
65-85-0	Benzoic Acid	50	U
111-91-1	bis(2-Chloroethoxy)Methane	10	U
120-83-2	2,4-Dichlorophenol	10	U
120-82-1	1,2,4-Trichlorobenzene	10	U
91-20-3	Naphthalene	10	U
106-47-8	4-Chloroaniline	10	U
87-68-3	Hexachlorobutadiene	10	U
59-50-7	4-Chloro-3-Methylphenol	10	U
91-57-6	2-Methylnaphthalene	10	U
77-47-4	Hexachlorocyclopentadiene	10	U
88-06-2	2,4,6-Trichlorophenol	10	U
95-95-4	2,4,5-Trichlorophenol	50	U
91-58-7	2-Chloronaphthalene	10	U
88-74-4	2-Nitroaniline	50	U
131-11-3	Dimethyl Phthalate	10	U
208-96-8	Acenaphthylene	10	U
606-20-2	2,6-Dinitrotoluene	10	U

FORM I SV-1 1/87 Rev.

300 & 493

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE N

BX979

Lab Name: COMPUCHEM LABS Contract: 68-D9-0032

Lab Code: COMPU Case No.: 12058 SAS No.: _____ SDG No.: BX260

Matrix: (soil/water) WATER Lab Sample ID: 266721

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: CN066721A19

Level: (low/med) LOW Date Received: 06/10/89

% Moisture: not dec. ____ Date Analyzed: 06/13/89

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	5	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	5	U
540-59-0	1,2-Dichloroethene (total)	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone	10	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon Tetrachloride	5	U
108-05-4	Vinyl Acetate	10	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	5	U
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	Trans-1,3-Dichloropropene	5	U
75-25-2	Bromoform	5	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Total Xylenes	5	U

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BX979

Lab Name: COMPUCHEM LABS Contract: 68-D9-0032

Lab Code: COMPU Case No.: 12058 SAS No.: _____ SDG No.: BX260

Matrix: (soil/water) WATER Lab Sample ID: 266721

Sample wt/vol: 1000 (g/mL) ML Lab File ID: GH066721B06

Level: (low/med) LOW Date Received: 06/10/89

% Moisture: not dec. ____ dec. ____ Date Extracted: 06/12/89

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 06/12/89

GPC Cleanup: (Y/N) N pH: _____ Dilution Factor: 1.0

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND		Q
108-95-2	Phenol	10	U
111-44-4	bis(2-Chloroethyl)Ether	10	U
95-57-8	2-Chlorophenol	10	U
541-73-1	1,3-Dichlorobenzene	10	U
106-46-7	1,4-Dichlorobenzene	10	U
100-51-6	Benzyl Alcohol	10	U
95-50-1	1,2-Dichlorobenzene	10	U
95-48-7	2-Methylphenol	10	U
39638-32-9	bis(2-Chloroisopropyl)Ether	10	U
106-44-5	4-Methylphenol	10	U
621-64-7	N-Nitroso-Di-n-Propylamine	10	U
67-72-1	Hexachloroethane	10	U
98-95-3	Nitrobenzene	10	U
78-59-1	Isophorone	10	U
88-75-5	2-Nitrophenol	10	U
105-67-9	2,4-Dimethylphenol	10	U
65-85-0	Benzoic Acid	50	U
111-91-1	bis(2-Chloroethoxy)Methane	10	U
120-83-2	2,4-Dichlorophenol	10	U
120-82-1	1,2,4-Trichlorobenzene	10	U
91-20-3	Naphthalene	10	U
106-47-8	4-Chloroaniline	10	U
87-68-3	Hexachlorobutadiene	10	U
59-50-7	4-Chloro-3-Methylphenol	10	U
91-57-6	2-Methylnaphthalene	10	U
77-47-4	Hexachlorocyclopentadiene	10	U
88-06-2	2,4,6-Trichlorophenol	10	U
95-95-4	2,4,5-Trichlorophenol	50	U
91-58-7	2-Chloronaphthalene	10	U
88-74-4	2-Nitroaniline	50	U
131-11-3	Dimethyl Phthalate	10	U
208-96-8	Acenaphthylene	10	U
606-20-2	2,6-Dinitrotoluene	10	U

1C

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BX979

Lab Name: COMPUCHEM LABS Contract: 68-D9-0032

Lab Code: COMPU Case No.: 12058 SAS No.: _____ SDG No.: BX260

Matrix: (soil/water) WATER Lab Sample ID: 266721

Sample wt/vol: 1000 (g/mL) ML Lab File ID: GH066721B06

Level: (low/med) LOW Date Received: 06/10/89

% Moisture: not dec. ____ dec. ____ Date Extracted: 06/12/89

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 06/12/89

GPC Cleanup: (Y/N) N pH: _____ Dilution Factor: 1.0

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND	Q
99-09-2	3-Nitroaniline	50 U
83-32-9	Acenaphthene	10 U
51-28-5	2,4-Dinitrophenol	50 U
100-02-7	4-Nitrophenol	50 U
132-64-9	Dibenzofuran	10 U
121-14-2	2,4-Dinitrotoluene	10 U
84-66-2	Diethylphthalate	10 U
7005-72-3	4-Chlorophenyl-phenylether	10 U
86-73-7	Fluorene	10 U
100-01-6	4-Nitroaniline	50 U
534-52-1	4,6-Dinitro-2-Methylphenol	50 U
86-30-6	N-Nitrosodiphenylamine (1)	10 U
101-55-3	4-Bromophenyl-phenylether	10 U
118-74-1	Hexachlorobenzene	10 U
87-86-5	Pentachlorophenol	50 U
85-01-8	Phenanthrene	10 U
120-12-7	Anthracene	10 U
84-74-2	Di-n-Butylphthalate	10 U
206-44-0	Fluoranthene	10 U
129-00-0	Pyrene	10 U
85-68-7	Butylbenzylphthalate	10 U
91-94-1	3,3'-Dichlorobenzidine	20 ~~UUJ~~
56-55-3	Benzo(a)Anthracene	10 U
218-01-9	Chrysene	10 U
117-81-7	bis(2-Ethylhexyl)Phthalate	10 U
117-84-0	Di-n-Octyl Phthalate	10 U
205-99-2	Benzo(b)Fluoranthene	10 U
207-08-9	Benzo(k)Fluoranthene	10 U
50-32-8	Benzo(a)Pyrene	10 U
193-39-5	Indeno(1,2,3-cd)Pyrene	10 U
53-70-3	Dibenzo(a,h)Anthracene	10 U
191-24-2	Benzo(g,h,i)Perylene	10 U

(1) - Cannot be separated from Diphenylamine

1A Trip blank

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE BX981

Lab Name: COMPUCHEM LABS Contract: 68-D9-0032

Lab Code: COMPU Case No.: 12058 SAS No.: _____ SDG No.: BX260

Matrix: (soil/water) WATER Lab Sample ID: 266720

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: CN066720A19

Level: (low/med) LOW Date Received: 06/10/89

% Moisture: not dec. ____ Date Analyzed: 06/13/89

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	~~U~~ UJ
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	~~U~~ UJ
75-09-2	Methylene Chloride	4	J
67-64-1	Acetone	2	J
75-15-0	Carbon Disulfide	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	5	U
540-59-0	1,2-Dichloroethene (total)	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone	10	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon Tetrachloride	5	U
108-05-4	Vinyl Acetate	10	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	5	U
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	Trans-1,3-Dichloropropene	5	U
75-25-2	Bromoform	5	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Total Xylenes	5	U

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.: BX990

Lab Name: COMPUCHEM LABS Contract: 68-D9-0032

Lab Code: COMPU Case No.: 12058 SAS No.: _____ SDG No.: BX260

Matrix: (soil/water) WATER Lab Sample ID: 266497

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: CN066497A10

Level: (low/med) LOW Date Received: 06/09/89

% Moisture: not dec. ____ Date Analyzed: 06/11/89

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	5	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	5	U
540-59-0	1,2-Dichloroethene (total)	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone	10	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon Tetrachloride	5	U
108-05-4	Vinyl Acetate	10	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	5	U
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	Trans-1,3-Dichloropropene	5	U
75-25-2	Bromoform	5	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Total Xylenes	5	U

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE : BX991

Lab Name: COMPUCHEM LABS Contract: 68-D9-0032

Lab Code: COMPU Case No.: 12058 SAS No.: _____ SDG No.: BX260

Matrix: (soil/water) WATER Lab Sample ID: 266498

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: C4R66498C10

Level: (low/med) LOW Date Received: 06/09/89

% Moisture: not dec. ____ Date Analyzed: 06/12/89

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L		Q
74-87-3	Chloromethane		10	U UJ
74-83-9	Bromomethane		10	U UJ
75-01-4	Vinyl Chloride		10	U UJ
75-00-3	Chloroethane		10	U UJ
75-09-2	Methylene Chloride		5	U UJ
67-64-1	Acetone		10	U UJ
75-15-0	Carbon Disulfide		5	U UJ
75-35-4	1,1-Dichloroethene		5	U UJ
75-34-3	1,1-Dichloroethane		5	U UJ
540-59-0	1,2-Dichloroethene (total)		5	U UJ
67-66-3	Chloroform		5	U UJ
107-06-2	1,2-Dichloroethane		5	U UJ
78-93-3	2-Butanone		10	U UJ
71-55-6	1,1,1-Trichloroethane		5	U UJ
56-23-5	Carbon Tetrachloride		5	U UJ
108-05-4	Vinyl Acetate		10	U UJ
75-27-4	Bromodichloromethane		5	U UJ
78-87-5	1,2-Dichloropropane		5	U UJ
10061-01-5	cis-1,3-Dichloropropene		5	U UJ
79-01-6	Trichloroethene		5	U UJ
124-48-1	Dibromochloromethane		5	U UJ
79-00-5	1,1,2-Trichloroethane		5	U UJ
71-43-2	Benzene		5	U UJ
10061-02-6	Trans-1,3-Dichloropropene		5	U UJ
75-25-2	Bromoform		5	U UJ
108-10-1	4-Methyl-2-Pentanone		32	U UJ
591-78-6	2-Hexanone		10	U UJ
127-18-4	Tetrachloroethene		5	U UJ
79-34-5	1,1,2,2-Tetrachloroethane		5	U UJ
108-88-3	Toluene		5	U UJ
108-90-7	Chlorobenzene		5	U UJ
100-41-4	Ethylbenzene		5	U UJ
100-42-5	Styrene		5	U UJ
1330-20-7	Total Xylenes		5	U UJ

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BX993

Lab Name: COMPUCHEM LABS Contract: 68-D9-0032

Lab Code: COMPU Case No.: 12058 SAS No.: _____ SDG No.: BX260

Matrix: (soil/water) WATER Lab Sample ID: 266499

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: CN066499A10

Level: (low/med) LOW Date Received: 06/09/89

% Moisture: not dec. ____ Date Analyzed: 06/11/89

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	5	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	5	U
540-59-0	1,2-Dichloroethene (total)	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone	10	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon Tetrachloride	5	U
108-05-4	Vinyl Acetate	10	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	5	U
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	Trans-1,3-Dichloropropene	5	U
75-25-2	Bromoform	5	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Total Xylenes	5	U

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BX994

Lab Name: COMPUCHEM LABS Contract: 68-D9-0032

Lab Code: COMPU Case No.: 12058 SAS No.: _____ SDG No.: BX260

Matrix: (soil/water) WATER Lab Sample ID: 266725

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: CR066725B19

Level: (low/med) LOW Date Received: 06/10/89

% Moisture: not dec. ____ Date Analyzed: 06/13/89

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L		Q
74-87-3	Chloromethane		10	~~U~~ UJ
74-83-9	Bromomethane		10	U
75-01-4	Vinyl Chloride		10	U
75-00-3	Chloroethane		10	~~U~~ UJ
75-09-2	Methylene Chloride		5	U
67-64-1	Acetone		10	U
75-15-0	Carbon Disulfide		5	U
75-35-4	1,1-Dichloroethene		5	U
75-34-3	1,1-Dichloroethane		5	U
540-59-0	1,2-Dichloroethene (total)		5	U
67-66-3	Chloroform		5	U
107-06-2	1,2-Dichloroethane		5	U
78-93-3	2-Butanone		10	U
71-55-6	1,1,1-Trichloroethane		5	U
56-23-5	Carbon Tetrachloride		5	U
108-05-4	Vinyl Acetate		10	U
75-27-4	Bromodichloromethane		5	U
78-87-5	1,2-Dichloropropane		5	U
10061-01-5	cis-1,3-Dichloropropene		5	U
79-01-6	Trichloroethene		5	U
124-48-1	Dibromochloromethane		5	U
79-00-5	1,1,2-Trichloroethane		5	U
71-43-2	Benzene		5	U
10061-02-6	Trans-1,3-Dichloropropene		5	U
75-25-2	Bromoform		5	U
108-10-1	4-Methyl-2-Pentanone		10	U
591-78-6	2-Hexanone		10	U
127-18-4	Tetrachloroethene		5	U
79-34-5	1,1,2,2-Tetrachloroethane		5	U
108-88-3	Toluene		5	U
108-90-7	Chlorobenzene		5	U
100-41-4	Ethylbenzene		5	U
100-42-5	Styrene		5	U
1330-20-7	Total Xylenes		110	

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO: BX996

Lab Name: COMPUCHEM LABS Contract: 68-D9-0032

Lab Code: COMPU Case No.: 12058 SAS No.: _____ SDG No.: BX260

Matrix: (soil/water) WATER Lab Sample ID: 266781

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: CN066781B19

Level: (low/med) LOW Date Received: 06/10/89

% Moisture: not dec. ____ Date Analyzed: 06/13/89

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	5	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	5	U
540-59-0	1,2-Dichloroethene (total)	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone	10	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon Tetrachloride	5	U
108-05-4	Vinyl Acetate	10	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	5	U
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	Trans-1,3-Dichloropropene	5	U
75-25-2	Bromoform	5	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Total Xylenes	5	U

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BY702

Lab Name: COMPUCHEM LABS Contract: 68-D9-0032

Lab Code: COMPU Case No.: 12058 SAS No.: _____ SDG No.: BX258

Matrix: (soil/water) SOIL Lab Sample ID: 267195

Sample wt/vol: 1.0 (g/mL) G Lab File ID: G3R67195A19

Level: (low/med) LOW Date Received: 06/14/89

% Moisture: not dec. 15 Date Analyzed: 06/21/89

Column: (pack/cap) CAP Dilution Factor: 1.0

MW 8/12/89

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	59	U
74-83-9	Bromomethane	59	U
75-01-4	Vinyl Chloride	59	U
75-00-3	Chloroethane	59	U
75-09-2	Methylene Chloride	190	B
67-64-1	Acetone	89	BU
75-15-0	Carbon Disulfide	29	U
75-35-4	1,1-Dichloroethene	29	U
75-34-3	1,1-Dichloroethane	29	U
540-59-0	1,2-Dichloroethene (total)	29	U
67-66-3	Chloroform	7	J
107-06-2	1,2-Dichloroethane	29	U
78-93-3	2-Butanone	59	U
71-55-6	1,1,1-Trichloroethane	29	U
56-23-5	Carbon Tetrachloride	29	U
108-05-4	Vinyl Acetate	59	U
75-27-4	Bromodichloromethane	29	U
78-87-5	1,2-Dichloropropane	29	U
10061-01-5	cis-1,3-Dichloropropene	29	U
79-01-6	Trichloroethene	29	U
124-48-1	Dibromochloromethane	29	U
79-00-5	1,1,2-Trichloroethane	29	U
71-43-2	Benzene	29	U
10061-02-6	Trans-1,3-Dichloropropene	29	U
75-25-2	Bromoform	29	U
108-10-1	4-Methyl-2-Pentanone	59	U
591-78-6	2-Hexanone	59	U
127-18-4	Tetrachloroethene	29	U
79-34-5	1,1,2,2-Tetrachloroethane	29	U
108-88-3	Toluene	29	U
108-90-7	Chlorobenzene	29	U
100-41-4	Ethylbenzene	29	U
100-42-5	Styrene	29	U
1330-20-7	Total Xylenes	270	

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BY703

Lab Name: COMPUCHEM LABS Contract: 68-D9-0032

Lab Code: COMPU Case No.: 12058 SAS No.: _____ SDG No.: BX258

Matrix: (soil/water) SOIL Lab Sample ID: 267196

Sample wt/vol: 4.0 (g/mL) G Lab File ID: CR067196B23

Level: (low/med) MED Date Received: 06/14/89

% Moisture: not dec. 11 Date Analyzed: 06/19/89

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	1400	U
74-83-9	Bromomethane	1400	U
75-01-4	Vinyl Chloride	1400	U
75-00-3	Chloroethane	1400	U
75-09-2	Methylene Chloride	280	J
67-64-1	Acetone	1400	U
75-15-0	Carbon Disulfide	700	U
75-35-4	1,1-Dichloroethene	700	U
75-34-3	1,1-Dichloroethane	700	U
540-59-0	1,2-Dichloroethene (total)	700	U
67-66-3	Chloroform	700	U
107-06-2	1,2-Dichloroethane	700	U
78-93-3	2-Butanone	1400	U
71-55-6	1,1,1-Trichloroethane	700	U
56-23-5	Carbon Tetrachloride	700	U
108-05-4	Vinyl Acetate	1400	U
75-27-4	Bromodichloromethane	700	U
78-87-5	1,2-Dichloropropane	700	U
10061-01-5	cis-1,3-Dichloropropene	700	U
79-01-6	Trichloroethene	700	U
124-48-1	Dibromochloromethane	700	U
79-00-5	1,1,2-Trichloroethane	700	U
71-43-2	Benzene	700	U
10061-02-6	Trans-1,3-Dichloropropene	700	U
75-25-2	Bromoform	700	U
108-10-1	4-Methyl-2-Pentanone	1400	U
591-78-6	2-Hexanone	1400	U
127-18-4	Tetrachloroethene	700	U
79-34-5	1,1,2,2-Tetrachloroethane	700	U
108-88-3	Toluene	700	U
108-90-7	Chlorobenzene	700	U
100-41-4	Ethylbenzene	3300	
100-42-5	Styrene	700	U
1330-20-7	Total Xylenes	5100	

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BY704

Lab Name: COMPUCHEM LABS Contract: 68-D9-0032

Lab Code: COMPU Case No.: 12058 SAS No.: _____ SDG No.: BX258

Matrix: (soil/water) SOIL Lab Sample ID: 267197

Sample wt/vol: 4.0 (g/mL) G Lab File ID: CR067197B23

Level: (low/med) MED Date Received: 06/14/89

% Moisture: not dec. 18 Date Analyzed: 06/19/89

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	1500	U
74-83-9	Bromomethane	1500	U
75-01-4	Vinyl Chloride	1500	U
75-00-3	Chloroethane	1500	U
75-09-2	Methylene Chloride	460	J
67-64-1	Acetone	1500	U
75-15-0	Carbon Disulfide	760	U
75-35-4	1,1-Dichloroethene	760	U
75-34-3	1,1-Dichloroethane	760	U
540-59-0	1,2-Dichloroethene (total)	760	U
67-66-3	Chloroform	760	U
107-06-2	1,2-Dichloroethane	760	U
78-93-3	2-Butanone	1500	U
71-55-6	1,1,1-Trichloroethane	760	U
56-23-5	Carbon Tetrachloride	760	U
108-05-4	Vinyl Acetate	1500	U
75-27-4	Bromodichloromethane	760	U
78-87-5	1,2-Dichloropropane	760	U
10061-01-5	cis-1,3-Dichloropropene	760	U
79-01-6	Trichloroethene	760	U
124-48-1	Dibromochloromethane	760	U
79-00-5	1,1,2-Trichloroethane	760	U
71-43-2	Benzene	760	U
10061-02-6	Trans-1,3-Dichloropropene	760	U
75-25-2	Bromoform	760	U
108-10-1	4-Methyl-2-Pentanone	1500	U
591-78-6	2-Hexanone	1500	U
127-18-4	Tetrachloroethene	760	U
79-34-5	1,1,2,2-Tetrachloroethane	760	U
108-88-3	Toluene	780	
108-90-7	Chlorobenzene	760	U
100-41-4	Ethylbenzene	2500	
100-42-5	Styrene	760	U
1330-20-7	Total Xylenes	8500	

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BY705

Lab Name: COMPUCHEM LABS Contract: 68-D9-0032

Lab Code: COMPU Case No.: 12058 SAS No.: _____ SDG No.: BX258

Matrix: (soil/water) SOIL Lab Sample ID: 267198

Sample wt/vol: 4.0 (g/mL) G Lab File ID: C2R67198C23

Level: (low/med) MED Date Received: 06/14/89

% Moisture: not dec. 24 Date Analyzed: 06/20/89

Column: (pack/cap) CAP Dilution Factor: 1.0

MW 2/12/90

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	1600	U
74-83-9	Bromomethane	1600	U
75-01-4	Vinyl Chloride	1600	U
75-00-3	Chloroethane	1600	U
75-09-2	Methylene Chloride	520 ~~180~~	~~B~~ U
67-64-1	Acetone	1600	U
75-15-0	Carbon Disulfide	820	U
75-35-4	1,1-Dichloroethene	820	U
75-34-3	1,1-Dichloroethane	820	U
540-59-0	1,2-Dichloroethene (total)	820	U
67-66-3	Chloroform	820	U
107-06-2	1,2-Dichloroethane	820	U
78-93-3	2-Butanone	1600	~~U~~ R
71-55-6	1,1,1-Trichloroethane	820	U
56-23-5	Carbon Tetrachloride	820	U
108-05-4	Vinyl Acetate	1600	U
75-27-4	Bromodichloromethane	820	U
78-87-5	1,2-Dichloropropane	820	U
10061-01-5	cis-1,3-Dichloropropene	820	U
79-01-6	Trichloroethene	820	U
124-48-1	Dibromochloromethane	820	U
79-00-5	1,1,2-Trichloroethane	820	U
71-43-2	Benzene	820	U
10061-02-6	Trans-1,3-Dichloropropene	820	U
75-25-2	Bromoform	820	U
108-10-1	4-Methyl-2-Pentanone	1600	U
591-78-6	2-Hexanone	1600	U
127-18-4	Tetrachloroethene	820	U
79-34-5	1,1,2,2-Tetrachloroethane	820	U
108-88-3	Toluene	820	U
108-90-7	Chlorobenzene	820	U
100-41-4	Ethylbenzene	240	J
100-42-5	Styrene	820	U
1330-20-7	Total Xylenes	3600	

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VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BY707

Lab Name: COMPUCHEM LABS Contract: 68-D9-0032

Lab Code: COMPU Case No.: 12058 SAS No.: _____ SDG No.: BX258

Matrix: (soil/water) SOIL Lab Sample ID: 267199

Sample wt/vol: 4.0 (g/mL) G Lab File ID: C2R67199C23

Level: (low/med) MED Date Received: 06/14/89

% Moisture: not dec. 21 Date Analyzed: 06/21/89

Column: (pack/cap) CAP Dilution Factor: 1.0

gmw 2/12/90

CONCENTRATION UNITS:

CAS NO.	COMPOUND	(ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	1600	U
74-83-9	Bromomethane	1600	U
75-01-4	Vinyl Chloride	1600	U
75-00-3	Chloroethane	1600	U
75-09-2	Methylene Chloride	790 ~~270~~	BU
67-64-1	Acetone	1600	U
75-15-0	Carbon Disulfide	790	U
75-35-4	1,1-Dichloroethene	790	U
75-34-3	1,1-Dichloroethane	790	U
540-59-0	1,2-Dichloroethene (total)	790	U
67-66-3	Chloroform	790	U
107-06-2	1,2-Dichloroethane	790	U
78-93-3	2-Butanone	1600	UR
71-55-6	1,1,1-Trichloroethane	790	U
56-23-5	Carbon Tetrachloride	790	U
108-05-4	Vinyl Acetate	1600	U
75-27-4	Bromodichloromethane	790	U
78-87-5	1,2-Dichloropropane	790	U
10061-01-5	cis-1,3-Dichloropropene	790	U
79-01-6	Trichloroethene	790	U
124-48-1	Dibromochloromethane	790	U
79-00-5	1,1,2-Trichloroethane	790	U
71-43-2	Benzene	790	U
10061-02-6	Trans-1,3-Dichloropropene	790	U
75-25-2	Bromoform	790	U
108-10-1	4-Methyl-2-Pentanone	1600	U
591-78-6	2-Hexanone	1600	U
127-18-4	Tetrachloroethene	790	U
79-34-5	1,1,2,2-Tetrachloroethane	790	U
108-88-3	Toluene	550	J
108-90-7	Chlorobenzene	790	U
100-41-4	Ethylbenzene	750	J
100-42-5	Styrene	790	U
1330-20-7	Total Xylenes	13000	T

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VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BY709

Lab Name: COMPUCHEM LABS Contract: 68-D9-0032

Lab Code: COMPU Case No.: 12058 SAS No.: _____ SDG No.: BX258

Matrix: (soil/water) SOIL Lab Sample ID: 267201

Sample wt/vol: 4.0 (g/mL) G Lab File ID: C2R67201C23

Level: (low/med) MED Date Received: 06/14/89

% Moisture: not dec. 16 Date Analyzed: 06/21/89

Column: (pack/cap) CAP Dilution Factor: 1.0

JMW 2/12/90

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	1500	U
74-83-9	Bromomethane	1500	U
75-01-4	Vinyl Chloride	1500	U
75-00-3	Chloroethane	1500	U
75-09-2	Methylene Chloride	740 ~~430~~	~~B~~ U
67-64-1	Acetone	1500	U
75-15-0	Carbon Disulfide	740	U
75-35-4	1,1-Dichloroethene	740	U
75-34-3	1,1-Dichloroethane	740	U
540-59-0	1,2-Dichloroethene (total)	740	U
67-66-3	Chloroform	740	U
107-06-2	1,2-Dichloroethane	740	U
78-93-3	2-Butanone	1500	~~U~~ R
71-55-6	1,1,1-Trichloroethane	740	U
56-23-5	Carbon Tetrachloride	740	U
108-05-4	Vinyl Acetate	1500	U
75-27-4	Bromodichloromethane	740	U
78-87-5	1,2-Dichloropropane	740	U
10061-01-5	cis-1,3-Dichloropropene	740	U
79-01-6	Trichloroethene	740	U
124-48-1	Dibromochloromethane	740	U
79-00-5	1,1,2-Trichloroethane	740	U
71-43-2	Benzene	740	U
10061-02-6	Trans-1,3-Dichloropropene	740	U
75-25-2	Bromoform	740	U
108-10-1	4-Methyl-2-Pentanone	1500	U
591-78-6	2-Hexanone	1500	U
127-18-4	Tetrachloroethene	740	U
79-34-5	1,1,2,2-Tetrachloroethane	740	U
108-88-3	Toluene	740	U
108-90-7	Chlorobenzene	740	U
100-41-4	Ethylbenzene	360	J
100-42-5	Styrene	740	U
1330-20-7	Total Xylenes	15000	

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VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BY711

Lab Name: COMPUCHEM LABS Contract: 68-D9-0032

Lab Code: COMPU Case No.: 12058 SAS No.: _____ SDG No.: BX258

Matrix: (soil/water) SOIL Lab Sample ID: 267202

Sample wt/vol: 4.0 (g/mL) G Lab File ID: CR067202C23

Level: (low/med) MED Date Received: 06/14/89

% Moisture: not dec. 16 Date Analyzed: 06/21/89

Column: (pack/cap) CAP Dilution Factor: 1.0

JMW 2/12/90

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	1500	U
74-83-9	Bromomethane	1500	U
75-01-4	Vinyl Chloride	1500	U
75-00-3	Chloroethane	1500	U
75-09-2	Methylene Chloride	740 ~~730~~	~~B~~ U
67-64-1	Acetone	1500	U
75-15-0	Carbon Disulfide	740	U
75-35-4	1,1-Dichloroethene	740	U
75-34-3	1,1-Dichloroethane	740	U
540-59-0	1,2-Dichloroethene (total)	740	U
67-66-3	Chloroform	740	U
107-06-2	1,2-Dichloroethane	740	U
78-93-3	2-Butanone	1500	~~U~~ R
71-55-6	1,1,1-Trichloroethane	740	U
56-23-5	Carbon Tetrachloride	740	U
108-05-4	Vinyl Acetate	1500	U
75-27-4	Bromodichloromethane	740	U
78-87-5	1,2-Dichloropropane	740	U
10061-01-5	cis-1,3-Dichloropropene	740	U
79-01-6	Trichloroethene	740	U
124-48-1	Dibromochloromethane	740	U
79-00-5	1,1,2-Trichloroethane	740	U
71-43-2	Benzene	740	U
10061-02-6	Trans-1,3-Dichloropropene	740	U
75-25-2	Bromoform	740	U
108-10-1	4-Methyl-2-Pentanone	1500	U
591-78-6	2-Hexanone	1500	U
127-18-4	Tetrachloroethene	740	U
79-34-5	1,1,2,2-Tetrachloroethane	740	U
108-88-3	Toluene	740	U
108-90-7	Chlorobenzene	740	U
100-41-4	Ethylbenzene	740	U
100-42-5	Styrene	740	U
1330-20-7	Total Xylenes	2100	

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VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BY712

Lab Name: COMPUCHEM LABS Contract: 68-D9-0032

Lab Code: COMPU Case No.: 12058 SAS No.: _____ SDG No.: BX258

Matrix: (soil/water) SOIL Lab Sample ID: 267203

Sample wt/vol: 4.0 (g/mL) G Lab File ID: CR067203A23

Level: (low/med) MED Date Received: 06/14/89

% Moisture: not dec. 13 Date Analyzed: 06/21/89

Column: (pack/cap) CAP Dilution Factor: 1.0

gmo 2/12/90

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	1400	U
74-83-9	Bromomethane	1400	U
75-01-4	Vinyl Chloride	1400	U
75-00-3	Chloroethane	1400	U
75-09-2	Methylene Chloride	720 ~~290~~	~~BJ~~ U
67-64-1	Acetone	1400	U
75-15-0	Carbon Disulfide	720	U
75-35-4	1,1-Dichloroethene	720	U
75-34-3	1,1-Dichloroethane	720	U
540-59-0	1,2-Dichloroethene (total)	720	U
67-66-3	Chloroform	720	U
107-06-2	1,2-Dichloroethane	720	U
78-93-3	2-Butanone	1400	~~U~~ R
71-55-6	1,1,1-Trichloroethane	720	U
56-23-5	Carbon Tetrachloride	720	U
108-05-4	Vinyl Acetate	1400	U
75-27-4	Bromodichloromethane	720	U
78-87-5	1,2-Dichloropropane	720	U
10061-01-5	cis-1,3-Dichloropropene	720	U
79-01-6	Trichloroethene	720	U
124-48-1	Dibromochloromethane	720	U
79-00-5	1,1,2-Trichloroethane	720	U
71-43-2	Benzene	720	U
10061-02-6	Trans-1,3-Dichloropropene	720	U
75-25-2	Bromoform	720	U
108-10-1	4-Methyl-2-Pentanone	1400	U
591-78-6	2-Hexanone	1400	U
127-18-4	Tetrachloroethene	720	U
79-34-5	1,1,2,2-Tetrachloroethane	720	U
108-88-3	Toluene	720	U
108-90-7	Chlorobenzene	720	U
100-41-4	Ethylbenzene	720	U
100-42-5	Styrene	720	U
1330-20-7	Total Xylenes	4800	

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VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
BY713

Lab Name: COMPUCHEM LABS Contract: 68-D9-0032

Lab Code: COMPU Case No.: 12058 SAS No.: _____ SDG No.: BX258

Matrix: (soil/water) SOIL Lab Sample ID: 267204

Sample wt/vol: 4.0 (g/mL) G Lab File ID: CR067204A23

Level: (low/med) MED Date Received: 06/14/89

% Moisture: not dec. 15 Date Analyzed: 06/21/89

Column: (pack/cap) CAP Dilution Factor: 1.0

9m.0 12/12/90

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	1500	U
74-83-9	Bromomethane	1500	U
75-01-4	Vinyl Chloride	1500	U
75-00-3	Chloroethane	1500	U
75-09-2	Methylene Chloride	740 ~~350~~	~~U~~
67-64-1	Acetone	1500	U
75-15-0	Carbon Disulfide	740	U
75-35-4	1,1-Dichloroethene	740	U
75-34-3	1,1-Dichloroethane	740	U
540-59-0	1,2-Dichloroethene (total)	740	U
67-66-3	Chloroform	740	U
107-06-2	1,2-Dichloroethane	740	U
78-93-3	2-Butanone	1500	UR
71-55-6	1,1,1-Trichloroethane	740	U
56-23-5	Carbon Tetrachloride	740	U
108-05-4	Vinyl Acetate	1500	U
75-27-4	Bromodichloromethane	740	U
78-87-5	1,2-Dichloropropane	740	U
10061-01-5	cis-1,3-Dichloropropene	740	U
79-01-6	Trichloroethene	740	U
124-48-1	Dibromochloromethane	740	U
79-00-5	1,1,2-Trichloroethane	740	U
71-43-2	Benzene	740	U
10061-02-6	Trans-1,3-Dichloropropene	740	U
75-25-2	Bromoform	740	U
108-10-1	4-Methyl-2-Pentanone	1500	U
591-78-6	2-Hexanone	1500	U
127-18-4	Tetrachloroethene	740	U
79-34-5	1,1,2,2-Tetrachloroethane	740	U
108-88-3	Toluene	740	U
108-90-7	Chlorobenzene	740	U
100-41-4	Ethylbenzene	740	U
100-42-5	Styrene	740	U
1330-20-7	Total Xylenes	1300	

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BY701

Lab Name: COMPUCHEM LABS Contract: 68-D9-0032

Lab Code: COMPU Case No.: 12058 SAS No.: _____ SDG No.: BX260

Matrix: (soil/water) WATER Lab Sample ID: 267194

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: CN067194B12

Level: (low/med) LOW Date Received: 06/14/89

% Moisture: not dec. ____ Date Analyzed: 06/14/89

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	5	U
67-64-1	Acetone	8	J
75-15-0	Carbon Disulfide	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	5	U
540-59-0	1,2-Dichloroethene (total)	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone	10	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon Tetrachloride	5	U
108-05-4	Vinyl Acetate	10	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	5	U
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	Trans-1,3-Dichloropropene	5	U
75-25-2	Bromoform	5	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Total Xylenes	5	U

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SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET mdr

EPA SAMPLE NO.

BY701

Lab Name: COMPUCHEM LABS Contract: 68-D9-0032

Lab Code: COMPU Case No.: 12058 SAS No.: _____ SDG No.: BX260

Matrix: (soil/water) WATER Lab Sample ID: 267194

Sample wt/vol: 1000 (g/mL) ML Lab File ID: GH067194A15

Level: (low/med) LOW Date Received: 06/14/89

% Moisture: not dec. ____ dec. ____ Date Extracted: 06/14/89

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 06/15/89

GPC Cleanup: (Y/N) N pH: _____ Dilution Factor: 1.0

JMW 2/9/90

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND		Q
108-95-2	Phenol	10	U
111-44-4	bis(2-Chloroethyl)Ether	10	~~U~~ UJ
95-57-8	2-Chlorophenol	10	U
541-73-1	1,3-Dichlorobenzene	10	U
106-46-7	1,4-Dichlorobenzene	10	U
100-51-6	Benzyl Alcohol	10	U
95-50-1	1,2-Dichlorobenzene	10	U
95-48-7	2-Methylphenol	10	U
39638-32-9	bis(2-Chloroisopropyl)Ether	10	~~U~~ R
106-44-5	4-Methylphenol	10	U
621-64-7	N-Nitroso-Di-n-Propylamine	10	~~U~~ UJ
67-72-1	Hexachloroethane	10	U
98-95-3	Nitrobenzene	10	U
78-59-1	Isophorone	10	U
88-75-5	2-Nitrophenol	10	U
105-67-9	2,4-Dimethylphenol	10	U
65-85-0	Benzoic Acid	50	~~U~~ UJ
111-91-1	bis(2-Chloroethoxy)Methane	10	U
120-83-2	2,4-Dichlorophenol	10	U
120-82-1	1,2,4-Trichlorobenzene	10	U
91-20-3	Naphthalene	10	U
106-47-8	4-Chloroaniline	10	U
87-68-3	Hexachlorobutadiene	10	U
59-50-7	4-Chloro-3-Methylphenol	10	U
91-57-6	2-Methylnaphthalene	10	U
77-47-4	Hexachlorocyclopentadiene	10	U
88-06-2	2,4,6-Trichlorophenol	10	U
95-95-4	2,4,5-Trichlorophenol	50	U
91-58-7	2-Chloronaphthalene	10	U
88-74-4	2-Nitroaniline	50	U
131-11-3	Dimethyl Phthalate	10	U
208-96-8	Acenaphthylene	10	U
606-20-2	2,6-Dinitrotoluene	10	U

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BY758

Lab Name: COMPUCHEM LABS Contract: 68-D9-0032

Lab Code: COMPU Case No.: 12058 SAS No.: _____ SDG No.: BX260

Matrix: (soil/water) WATER Lab Sample ID: 266500

Sample wt/vol: 1000 (g/mL) ML Lab File ID: GH066500A04

Level: (low/med) LOW Date Received: 06/09/89

% Moisture: not dec. ____ dec. ____ Date Extracted: 06/09/89

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 06/11/89

GPC Cleanup: (Y/N) N pH: _____ Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
108-95-2	Phenol	10	U
111-44-4	bis(2-Chloroethyl)Ether	10	U
95-57-8	2-Chlorophenol	10	U
541-73-1	1,3-Dichlorobenzene	10	U
106-46-7	1,4-Dichlorobenzene	10	U
100-51-6	Benzyl Alcohol	10	U
95-50-1	1,2-Dichlorobenzene	10	U
95-48-7	2-Methylphenol	10	U
39638-32-9	bis(2-Chloroisopropyl)Ether	10	~~U~~ R
106-44-5	4-Methylphenol	10	U
621-64-7	N-Nitroso-Di-n-Propylamine	10	U
67-72-1	Hexachloroethane	10	U
98-95-3	Nitrobenzene	10	U
78-59-1	Isophorone	10	U
88-75-5	2-Nitrophenol	10	U
105-67-9	2,4-Dimethylphenol	10	U
65-85-0	Benzoic Acid	50	U
111-91-1	bis(2-Chloroethoxy)Methane	10	U
120-83-2	2,4-Dichlorophenol	10	U
120-82-1	1,2,4-Trichlorobenzene	10	U
91-20-3	Naphthalene	10	U
106-47-8	4-Chloroaniline	10	U
87-68-3	Hexachlorobutadiene	10	U
59-50-7	4-Chloro-3-Methylphenol	10	U
91-57-6	2-Methylnaphthalene	10	U
77-47-4	Hexachlorocyclopentadiene	10	U
88-06-2	2,4,6-Trichlorophenol	10	U
95-95-4	2,4,5-Trichlorophenol	50	U
91-58-7	2-Chloronaphthalene	10	U
88-74-4	2-Nitroaniline	50	U
131-11-3	Dimethyl Phthalate	10	U
208-96-8	Acenaphthylene	10	U
606-20-2	2,6-Dinitrotoluene	10	U

2/9/90 jmw

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BY758

Lab Name: COMPUCHEM LABS Contract: 68-D9-0032

Lab Code: COMPU Case No.: 12058 SAS No.: _____ SDG No.: BX260

Matrix: (soil/water) WATER Lab Sample ID: 266500

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: CN066500B10

Level: (low/med) LOW Date Received: 06/09/89

% Moisture: not dec. ____ Date Analyzed: 06/11/89

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	5	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	5	U
540-59-0	1,2-Dichloroethene (total)	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone	10	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon Tetrachloride	5	U
108-05-4	Vinyl Acetate	10	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	5	U
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	Trans-1,3-Dichloropropene	5	U
75-25-2	Bromoform	5	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	2	J
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Total Xylenes	5	U

SAMPLE DATA PACKAGE

TUT 001 0534

382-433

1C

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BY758

Lab Name: COMPUCHEM LABS Contract: 68-D9-0032

Lab Code: COMPU Case No.: 12058 SAS No.: _____ SDG No.: BX260

Matrix: (soil/water) WATER Lab Sample ID: 266500

Sample wt/vol: 1000 (g/mL) ML Lab File ID: GH066500A04

Level: (low/med) LOW Date Received: 06/09/89

% Moisture: not dec. ____ dec. ____ Date Extracted: 06/09/89

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 06/11/89

GPC Cleanup: (Y/N) N pH: _____ Dilution Factor: 1.0

JMO 2/9/90

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND		Q
99-09-2	3-Nitroaniline	50	U
83-32-9	Acenaphthene	10	U
51-28-5	2,4-Dinitrophenol	50	U
100-02-7	4-Nitrophenol	50	~~U~~ UJ
132-64-9	Dibenzofuran	10	U
121-14-2	2,4-Dinitrotoluene	10	U
84-66-2	Diethylphthalate	10	U
7005-72-3	4-Chlorophenyl-phenylether	10	U
86-73-7	Fluorene	10	U
100-01-6	4-Nitroaniline	50	U
534-52-1	4,6-Dinitro-2-Methylphenol	50	U
86-30-6	N-Nitrosodiphenylamine (1)	10	U
101-55-3	4-Bromophenyl-phenylether	10	U
118-74-1	Hexachlorobenzene	10	~~U~~ UJ
87-86-5	Pentachlorophenol	50	U
85-01-8	Phenanthrene	10	U
120-12-7	Anthracene	10	U
84-74-2	Di-n-Butylphthalate	10	U
206-44-0	Fluoranthene	10	U
129-00-0	Pyrene	10	U
85-68-7	Butylbenzylphthalate	10	U
91-94-1	3,3'-Dichlorobenzidine	20	~~U~~ UJ
56-55-3	Benzo(a)Anthracene	10	U
218-01-9	Chrysene	10	U
117-81-7	bis(2-Ethylhexyl)Phthalate	10	U
117-84-0	Di-n-Octyl Phthalate	10	U
205-99-2	Benzo(b)Fluoranthene	10	U
207-08-9	Benzo(k)Fluoranthene	10	U
50-32-8	Benzo(a)Pyrene	10	U
193-39-5	Indeno(1,2,3-cd)Pyrene	10	U
53-70-3	Dibenzo(a,h)Anthracene	10	U
191-24-2	Benzo(g,h,i)Perylene	10	U

(1) - Cannot be separated from Diphenylamine

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BY761

Lab Name: COMPUCHEM LABS Contract: 68-D9-0032

Lab Code: COMPU Case No.: 12058 SAS No.: _____ SDG No.: BX260

Matrix: (soil/water) WATER Lab Sample ID: 267127

Sample wt/vol: 1000 (g/mL) ML Lab File ID: GH067127B16

Level: (low/med) LOW Date Received: 06/12/89

% Moisture: not dec. ____ dec. ____ Date Extracted: 06/14/89

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 06/15/89

GPC Cleanup: (Y/N) N pH: _____ Dilution Factor: 1.0

GMW 2/9/90

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L		Q
108-95-2	Phenol		10	U
111-44-4	bis(2-Chloroethyl)Ether		10	U
95-57-8	2-Chlorophenol		10	U
541-73-1	1,3-Dichlorobenzene		10	U
106-46-7	1,4-Dichlorobenzene		10	U
100-51-6	Benzyl Alcohol		17	
95-50-1	1,2-Dichlorobenzene		10	U
95-48-7	2-Methylphenol		27	
39638-32-9	bis(2-Chloroisopropyl)Ether		10	U
106-44-5	4-Methylphenol		41	
621-64-7	N-Nitroso-Di-n-Propylamine		10	U
67-72-1	Hexachloroethane		10	U
98-95-3	Nitrobenzene		10	U
78-59-1	Isophorone		10	U
88-75-5	2-Nitrophenol		10	U
105-67-9	2,4-Dimethylphenol		31	
65-85-0	Benzoic Acid		50	~~U~~ UJ
111-91-1	bis(2-Chloroethoxy)Methane		10	U
120-83-2	2,4-Dichlorophenol		10	U
120-82-1	1,2,4-Trichlorobenzene		10	U
91-20-3	Naphthalene	* 1000	~~980~~	~~E~~ D
106-47-8	4-Chloroaniline		10	U
87-68-3	Hexachlorobutadiene		10	U
59-50-7	4-Chloro-3-Methylphenol		10	U
91-57-6	2-Methylnaphthalene	* 450	~~580~~	~~E~~ D
77-47-4	Hexachlorocyclopentadiene		10	U
88-06-2	2,4,6-Trichlorophenol		10	U
95-95-4	2,4,5-Trichlorophenol		50	U
91-58-7	2-Chloronaphthalene		10	U
88-74-4	2-Nitroaniline		50	U
131-11-3	Dimethyl Phthalate		10	U
208-96-8	Acenaphthylene		10	U
606-20-2	2,6-Dinitrotoluene		10	U

*Value taken from diluted analysis

1C

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BY761

Lab Name: COMPUCHEM LABS Contract: 68-D9-0032

Lab Code: COMPU Case No.: 12058 SAS No.: _____ SDG No.: BX260

Matrix: (soil/water) WATER Lab Sample ID: 267127

Sample wt/vol: 1000 (g/mL) ML Lab File ID: GH067127B16

Level: (low/med) LOW Date Received: 06/12/89

% Moisture: not dec. ____ dec. ____ Date Extracted: 06/14/89

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 06/15/89

GPC Cleanup: (Y/N) N pH: _____ Dilution Factor: 1.0

JMD 2/14/90.

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
99-09-2	3-Nitroaniline	50	U
83-32-9	Acenaphthene	10	U
51-28-5	2,4-Dinitrophenol	50	U
100-02-7	4-Nitrophenol	50	U
132-64-9	Dibenzofuran	10	U
121-14-2	2,4-Dinitrotoluene	10	U
84-66-2	Diethylphthalate	10	~~U~~ UJ
7005-72-3	4-Chlorophenyl-phenylether	10	U
86-73-7	Fluorene	21	
100-01-6	4-Nitroaniline	50	U
534-52-1	4,6-Dinitro-2-Methylphenol	50	U
86-30-6	N-Nitrosodiphenylamine (1)	10	U
101-55-3	4-Bromophenyl-phenylether	10	U
118-74-1	Hexachlorobenzene	10	U
87-86-5	Pentachlorophenol	17	J
85-01-8	Phenanthrene	13	
120-12-7	Anthracene	3	J
84-74-2	Di-n-Butylphthalate	10	U
206-44-0	Fluoranthene	10	U
129-00-0	Pyrene	10	U
85-68-7	Butylbenzylphthalate	10	U
91-94-1	3,3'-Dichlorobenzidine	20	U
56-55-3	Benzo(a)Anthracene	10	U
218-01-9	Chrysene	10	U
117-81-7	bis(2-Ethylhexyl)Phthalate	80	J
117-84-0	Di-n-Octyl Phthalate	10	U
205-99-2	Benzo(b)Fluoranthene	10	U
207-08-9	Benzo(k)Fluoranthene	10	U
50-32-8	Benzo(a)Pyrene	10	U
193-39-5	Indeno(1,2,3-cd)Pyrene	10	U
53-70-3	Dibenzo(a,h)Anthracene	10	U
191-24-2	Benzo(g,h,i)Perylene	10	U

(1) - Cannot be separated from Diphenylamine

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BY762

Lab Name: COMPUCHEM LABS Contract: 68-D9-0032

Lab Code: COMPU Case No.: 12058 SAS No.: _____ SDG No.: BX260

Matrix: (soil/water) WATER Lab Sample ID: 266501

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: CN066501B10

Level: (low/med) LOW Date Received: 06/09/89

% Moisture: not dec. ____ Date Analyzed: 06/11/89

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	5	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	5	U
540-59-0	1,2-Dichloroethene (total)	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone	10	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon Tetrachloride	5	U
108-05-4	Vinyl Acetate	10	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	5	U
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	Trans-1,3-Dichloropropene	5	U
75-25-2	Bromoform	5	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Total Xylenes	5	U

SAMPLE DATA PACKAGE

TUT 001 0538

1B Field Blank

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BY762

Lab Name: COMPUCHEM LABS Contract: 68-D9-0032

Lab Code: COMPU Case No.: 12058 SAS No.: _____ SDG No.: BX260

Matrix: (soil/water) WATER Lab Sample ID: 266501

Sample wt/vol: 1000 (g/mL) ML Lab File ID: GH066501A04

Level: (low/med) LOW Date Received: 06/09/89

% Moisture: not dec. ____ dec. ____ Date Extracted: 06/09/89

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 06/11/89

GPC Cleanup: (Y/N) N pH: _____ Dilution Factor: 1.0

CONCENTRATION UNITS:

CAS NO.	COMPOUND	(ug/L or ug/Kg) UG/L	Q
108-95-2	Phenol	10	U
111-44-4	bis(2-Chloroethyl)Ether	10	U
95-57-8	2-Chlorophenol	10	U
541-73-1	1,3-Dichlorobenzene	10	U
106-46-7	1,4-Dichlorobenzene	10	U
100-51-6	Benzyl Alcohol	10	U
95-50-1	1,2-Dichlorobenzene	10	U
95-48-7	2-Methylphenol	10	U
39638-32-9	bis(2-Chloroisopropyl)Ether	10	U R
106-44-5	4-Methylphenol	10	U
621-64-7	N-Nitroso-Di-n-Propylamine	10	U
67-72-1	Hexachloroethane	10	U
98-95-3	Nitrobenzene	10	U
78-59-1	Isophorone	10	U
88-75-5	2-Nitrophenol	10	U
105-67-9	2,4-Dimethylphenol	10	U
65-85-0	Benzoic Acid	50	U
111-91-1	bis(2-Chloroethoxy)Methane	10	U
120-83-2	2,4-Dichlorophenol	10	U
120-82-1	1,2,4-Trichlorobenzene	10	U
91-20-3	Naphthalene	10	U
106-47-8	4-Chloroaniline	10	U
87-68-3	Hexachlorobutadiene	10	U
59-50-7	4-Chloro-3-Methylphenol	10	U
91-57-6	2-Methylnaphthalene	10	U
77-47-4	Hexachlorocyclopentadiene	10	U
88-06-2	2,4,6-Trichlorophenol	10	U
95-95-4	2,4,5-Trichlorophenol	50	U
91-58-7	2-Chloronaphthalene	10	U
88-74-4	2-Nitroaniline	50	U
131-11-3	Dimethyl Phthalate	10	U
208-96-8	Acenaphthylene	10	U
606-20-2	2,6-Dinitrotoluene	10	U

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO: BY762

Lab Name: COMPUCHEM LABS Contract: 68-D9-0032

Lab Code: COMPU Case No.: 12058 SAS No.: _____ SDG No.: BX260

Matrix: (soil/water) WATER Lab Sample ID: 266501

Sample wt/vol: 1000 (g/mL) ML Lab File ID: GH066501A04

Level: (low/med) LOW Date Received: 06/09/89

% Moisture: not dec. ____ dec. ____ Date Extracted: 06/09/89

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 06/11/89

GPC Cleanup: (Y/N) N pH: _____ Dilution Factor: 1.0

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND		Q
99-09-2	3-Nitroaniline	50	U
83-32-9	Acenaphthene	10	U
51-28-5	2,4-Dinitrophenol	50	U
100-02-7	4-Nitrophenol	50	~~U~~ UJ
132-64-9	Dibenzofuran	10	U
121-14-2	2,4-Dinitrotoluene	10	U
84-66-2	Diethylphthalate	10	U
7005-72-3	4-Chlorophenyl-phenylether	10	U
86-73-7	Fluorene	10	U
100-01-6	4-Nitroaniline	50	U
534-52-1	4,6-Dinitro-2-Methylphenol	50	U
86-30-6	N-Nitrosodiphenylamine (1)	10	U
101-55-3	4-Bromophenyl-phenylether	10	U
118-74-1	Hexachlorobenzene	10	~~U~~ UJ
87-86-5	Pentachlorophenol	50	U
85-01-8	Phenanthrene	10	U
120-12-7	Anthracene	10	U
84-74-2	Di-n-Butylphthalate	10	U
206-44-0	Fluoranthene	10	U
129-00-0	Pyrene	10	U
85-68-7	Butylbenzylphthalate	10	U
91-94-1	3,3'-Dichlorobenzidine	20	~~U~~ UJ
56-55-3	Benzo(a)Anthracene	10	U
218-01-9	Chrysene	10	U
117-81-7	bis(2-Ethylhexyl)Phthalate	10	U
117-84-0	Di-n-Octyl Phthalate	10	U
205-99-2	Benzo(b)Fluoranthene	10	U
207-08-9	Benzo(k)Fluoranthene	10	U
50-32-8	Benzo(a)Pyrene	10	U
193-39-5	Indeno(1,2,3-cd)Pyrene	10	U
53-70-3	Dibenzo(a,h)Anthracene	10	U
191-24-2	Benzo(g,h,i)Perylene	10	U

(1) - Cannot be separated from Diphenylamine

gmo 7/91

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BY763

Lab Name: COMPUCHEM LABS Contract: 68-D9-0032

Lab Code: COMPU Case No.: 12058 SAS No.: _____ SDG No.: BX260

Matrix: (soil/water) WATER Lab Sample ID: 267128

Sample wt/vol: 2.5 (g/mL) ML Lab File ID: CR067128B12

Level: (low/med) LOW Date Received: 06/12/89

% Moisture: not dec. ____ Date Analyzed: 06/14/89

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	20	U
74-83-9	Bromomethane	20	U
75-01-4	Vinyl Chloride	20	U
75-00-3	Chloroethane	20	U
75-09-2	Methylene Chloride	6	BJ
67-64-1	Acetone	320	J
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	10	U
75-34-3	1,1-Dichloroethane	10	U
540-59-0	1,2-Dichloroethene (total)	10	U
67-66-3	Chloroform	10	U
107-06-2	1,2-Dichloroethane	10	U
78-93-3	2-Butanone	20	U
71-55-6	1,1,1-Trichloroethane	10	U
56-23-5	Carbon Tetrachloride	10	U
108-05-4	Vinyl Acetate	20	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	10	U
124-48-1	Dibromochloromethane	10	U
79-00-5	1,1,2-Trichloroethane	10	U
71-43-2	Benzene	10	U
10061-02-6	Trans-1,3-Dichloropropene	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-Pentanone	20	U
591-78-6	2-Hexanone	20	U
127-18-4	Tetrachloroethene	10	U
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Total Xylenes	10	U

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

Field Blank

EPA SAMPLE NO.: BY763

Lab Name: COMPUCHEM LABS Contract: 68-D9-0032

Lab Code: COMPU Case No.: 12058 SAS No.: _____ SDG No.: BX260

Matrix: (soil/water) WATER Lab Sample ID: 267128

Sample wt/vol: 1000 (g/mL) ML Lab File ID: GH067128B16

Level: (low/med) LOW Date Received: 06/12/89

% Moisture: not dec. ____ dec. ____ Date Extracted: 06/14/89

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 06/15/89

GPC Cleanup: (Y/N) N pH: _____ Dilution Factor: 1.0

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND		Q
108-95-2	Phenol	10	U
111-44-4	bis(2-Chloroethyl)Ether	10	U
95-57-8	2-Chlorophenol	10	U
541-73-1	1,3-Dichlorobenzene	10	U
106-46-7	1,4-Dichlorobenzene	10	U
100-51-6	Benzyl Alcohol	10	U
95-50-1	1,2-Dichlorobenzene	10	U
95-48-7	2-Methylphenol	10	U
39638-32-9	bis(2-Chloroisopropyl)Ether	10	U
106-44-5	4-Methylphenol	10	U
621-64-7	N-Nitroso-Di-n-Propylamine	10	U
67-72-1	Hexachloroethane	10	U
98-95-3	Nitrobenzene	10	U
78-59-1	Isophorone	10	U
88-75-5	2-Nitrophenol	10	U
105-67-9	2,4-Dimethylphenol	10	U
65-85-0	Benzoic Acid	50	UJ
111-91-1	bis(2-Chloroethoxy)Methane	10	U
120-83-2	2,4-Dichlorophenol	10	U
120-82-1	1,2,4-Trichlorobenzene	10	U
91-20-3	Naphthalene	10	U
106-47-8	4-Chloroaniline	10	U
87-68-3	Hexachlorobutadiene	10	U
59-50-7	4-Chloro-3-Methylphenol	10	U
91-57-6	2-Methylnaphthalene	10	U
77-47-4	Hexachlorocyclopentadiene	10	U
88-06-2	2,4,6-Trichlorophenol	10	U
95-95-4	2,4,5-Trichlorophenol	50	U
91-58-7	2-Chloronaphthalene	10	U
88-74-4	2-Nitroaniline	50	U
131-11-3	Dimethyl Phthalate	10	U
208-96-8	Acenaphthylene	10	U
606-20-2	2,6-Dinitrotoluene	10	U

FORM I SV-1 1/87 Rev.

1C

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE ...

BY763

Lab Name: COMPUCHEM LABS Contract: 68-D9-0032

Lab Code: COMPU Case No.: 12058 SAS No.: _____ SDG No.: BX260

Matrix: (soil/water) WATER Lab Sample ID: 267128

Sample wt/vol: 1000 (g/mL) ML Lab File ID: GH067128B16

Level: (low/med) LOW Date Received: 06/12/89

% Moisture: not dec. ____ dec. ____ Date Extracted: 06/14/89

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 06/15/89

GPC Cleanup: (Y/N) N pH: _____ Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
99-09-2	3-Nitroaniline	50	U
83-32-9	Acenaphthene	10	U
51-28-5	2,4-Dinitrophenol	50	U
100-02-7	4-Nitrophenol	50	U
132-64-9	Dibenzofuran	10	U
121-14-2	2,4-Dinitrotoluene	10	U
84-66-2	Diethylphthalate	10	~~U~~ UJ
7005-72-3	4-Chlorophenyl-phenylether	10	U
86-73-7	Fluorene	10	U
100-01-6	4-Nitroaniline	50	U
534-52-1	4,6-Dinitro-2-Methylphenol	50	U
86-30-6	N-Nitrosodiphenylamine (1)	10	U
101-55-3	4-Bromophenyl-phenylether	10	U
118-74-1	Hexachlorobenzene	10	U
87-86-5	Pentachlorophenol	50	U
85-01-8	Phenanthrene	10	U
120-12-7	Anthracene	10	U
84-74-2	Di-n-Butylphthalate	10	U
206-44-0	Fluoranthene	10	U
129-00-0	Pyrene	10	U
85-68-7	Butylbenzylphthalate	10	U
91-94-1	3,3'-Dichlorobenzidine	20	U
56-55-3	Benzo(a)Anthracene	10	U
218-01-9	Chrysene	10	U
117-81-7	bis(2-Ethylhexyl)Phthalate	10	U
117-84-0	Di-n-Octyl Phthalate	10	U
205-99-2	Benzo(b)Fluoranthene	10	U
207-08-9	Benzo(k)Fluoranthene	10	U
50-32-8	Benzo(a)Pyrene	10	U
193-39-5	Indeno(1,2,3-cd)Pyrene	10	U
53-70-3	Dibenzo(a,h)Anthracene	10	U
191-24-2	Benzo(g,h,i)Perylene	10	U

(1) - Cannot be separated from Diphenylamine

gww 2/19/9

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

SBLK08

Lab Name: COMPUCHEM LABS Contract: 68-D9-0032

Lab Code: COMPU Case No.: 12058 SAS No.: _____ SDG No.: BX260

Matrix: (soil/water) WATER Lab Sample ID: SBLK08

Sample wt/vol: 1000 (g/mL) ML Lab File ID: GH067362A15

Level: (low/med) LOW Date Received: _____

% Moisture: not dec. ____ dec. ____ Date Extracted: 06/14/89

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 06/15/89

GPC Cleanup: (Y/N) N pH: _____ Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
108-95-2	Phenol	10	U
111-44-4	bis(2-Chloroethyl)Ether	10	U
95-57-8	2-Chlorophenol	10	U
541-73-1	1,3-Dichlorobenzene	10	U
106-46-7	1,4-Dichlorobenzene	10	U
100-51-6	Benzyl Alcohol	10	U
95-50-1	1,2-Dichlorobenzene	10	U
95-48-7	2-Methylphenol	10	U
39638-32-9	bis(2-Chloroisopropyl)Ether	10	U
106-44-5	4-Methylphenol	10	U
621-64-7	N-Nitroso-Di-n-Propylamine	10	U
67-72-1	Hexachloroethane	10	U
98-95-3	Nitrobenzene	10	U
78-59-1	Isophorone	10	U
88-75-5	2-Nitrophenol	10	U
105-67-9	2,4-Dimethylphenol	10	U
65-85-0	Benzoic Acid	50	U
111-91-1	bis(2-Chloroethoxy)Methane	10	U
120-83-2	2,4-Dichlorophenol	10	U
120-82-1	1,2,4-Trichlorobenzene	10	U
91-20-3	Naphthalene	10	U
106-47-8	4-Chloroaniline	10	U
87-68-3	Hexachlorobutadiene	10	U
59-50-7	4-Chloro-3-Methylphenol	10	U
91-57-6	2-Methylnaphthalene	10	U
77-47-4	Hexachlorocyclopentadiene	10	U
88-06-2	2,4,6-Trichlorophenol	10	U
95-95-4	2,4,5-Trichlorophenol	50	U
91-58-7	2-Chloronaphthalene	10	U
88-74-4	2-Nitroaniline	50	U
131-11-3	Dimethyl Phthalate	10	U
208-96-8	Acenaphthylene	10	U
606-20-2	2,6-Dinitrotoluene	10	U

1C

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

SBLK08

Lab Name: COMPUCHEM LABS Contract: 68-D9-0032

Lab Code: COMPU Case No.: 12058 SAS No.: _____ SDG No.: BX260

Matrix: (soil/water) WATER Lab Sample ID: SBLK08

Sample wt/vol: 1000 (g/mL) ML Lab File ID: GH067362A15

Level: (low/med) LOW Date Received: _____

% Moisture: not dec. ____ dec. ____ Date Extracted: 06/14/89

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 06/15/89

GPC Cleanup: (Y/N) N pH: _____ Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
99-09-2	3-Nitroaniline	50	U
83-32-9	Acenaphthene	10	U
51-28-5	2,4-Dinitrophenol	50	U
100-02-7	4-Nitrophenol	50	U
132-64-9	Dibenzofuran	10	U
121-14-2	2,4-Dinitrotoluene	10	U
84-66-2	Diethylphthalate	10	U
7005-72-3	4-Chlorophenyl-phenylether	10	U
86-73-7	Fluorene	10	U
100-01-6	4-Nitroaniline	50	U
534-52-1	4,6-Dinitro-2-Methylphenol	50	U
86-30-6	N-Nitrosodiphenylamine (1)	10	U
101-55-3	4-Bromophenyl-phenylether	10	U
118-74-1	Hexachlorobenzene	10	U
87-86-5	Pentachlorophenol	50	U
85-01-8	Phenanthrene	10	U
120-12-7	Anthracene	10	U
84-74-2	Di-n-Butylphthalate	10	U
206-44-0	Fluoranthene	10	U
129-00-0	Pyrene	10	U
85-68-7	Butylbenzylphthalate	10	U
91-94-1	3,3'-Dichlorobenzidine	20	U
56-55-3	Benzo(a)Anthracene	10	U
218-01-9	Chrysene	10	U
117-81-7	bis(2-Ethylhexyl)Phthalate	10	U
117-84-0	Di-n-Octyl Phthalate	10	U
205-99-2	Benzo(b)Fluoranthene	10	U
207-08-9	Benzo(k)Fluoranthene	10	U
50-32-8	Benzo(a)Pyrene	10	U
193-39-5	Indeno(1,2,3-cd)Pyrene	10	U
53-70-3	Dibenzo(a,h)Anthracene	10	U
191-24-2	Benzo(g,h,i)Perylene	10	U

(1) - Cannot be separated from Diphenylamine

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

SBLK80

Lab Name: COMPUCHEM LABS Contract: 68-D9-0032

Lab Code: COMPU Case No.: 12058 SAS No.: _____ SDG No.: BX260

Matrix: (soil/water) WATER Lab Sample ID: SBLK80

Sample wt/vol: 1000 (g/mL) ML Lab File ID: GJ066466A20

Level: (low/med) LOW Date Received: _____

% Moisture: not dec. ____ dec. ____ Date Extracted: 06/09/89

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 06/11/89

GPC Cleanup: (Y/N) N pH: _____ Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
108-95-2	Phenol	10	U
111-44-4	bis(2-Chloroethyl)Ether	10	U
95-57-8	2-Chlorophenol	10	U
541-73-1	1,3-Dichlorobenzene	10	U
106-46-7	1,4-Dichlorobenzene	10	U
100-51-6	Benzyl Alcohol	10	U
95-50-1	1,2-Dichlorobenzene	10	U
95-48-7	2-Methylphenol	10	U
39638-32-9	bis(2-Chloroisopropyl)Ether	10	U
106-44-5	4-Methylphenol	10	U
621-64-7	N-Nitroso-Di-n-Propylamine	10	U
67-72-1	Hexachloroethane	10	U
98-95-3	Nitrobenzene	10	U
78-59-1	Isophorone	10	U
88-75-5	2-Nitrophenol	10	U
105-67-9	2,4-Dimethylphenol	10	U
65-85-0	Benzoic Acid	50	U
111-91-1	bis(2-Chloroethoxy)Methane	10	U
120-83-2	2,4-Dichlorophenol	10	U
120-82-1	1,2,4-Trichlorobenzene	10	U
91-20-3	Naphthalene	10	U
106-47-8	4-Chloroaniline	10	U
87-68-3	Hexachlorobutadiene	10	U
59-50-7	4-Chloro-3-Methylphenol	10	U
91-57-6	2-Methylnaphthalene	10	U
77-47-4	Hexachlorocyclopentadiene	10	U
88-06-2	2,4,6-Trichlorophenol	10	U
95-95-4	2,4,5-Trichlorophenol	50	U
91-58-7	2-Chloronaphthalene	10	U
88-74-4	2-Nitroaniline	50	U
131-11-3	Dimethyl Phthalate	10	U
208-96-8	Acenaphthylene	10	U
606-20-2	2,6-Dinitrotoluene	10	U

1C

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

SBLK80

Lab Name: COMPUCHEM LABS Contract: 68-D9-0032

Lab Code: COMPU Case No.: 12058 SAS No.: _____ SDG No.: BX260

Matrix: (soil/water) WATER Lab Sample ID: SBLK80

Sample wt/vol: 1000 (g/mL) ML Lab File ID: GJ066466A20

Level: (low/med) LOW Date Received: _____

% Moisture: not dec. ____ dec. ____ Date Extracted: 06/09/89

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 06/11/89

GPC Cleanup: (Y/N) N pH: _____ Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
99-09-2	3-Nitroaniline	50	U
83-32-9	Acenaphthene	10	U
51-28-5	2,4-Dinitrophenol	50	U
100-02-7	4-Nitrophenol	50	U
132-64-9	Dibenzofuran	10	U
121-14-2	2,4-Dinitrotoluene	10	U
84-66-2	Diethylphthalate	10	U
7005-72-3	4-Chlorophenyl-phenylether	10	U
86-73-7	Fluorene	10	U
100-01-6	4-Nitroaniline	50	U
534-52-1	4,6-Dinitro-2-Methylphenol	50	U
86-30-6	N-Nitrosodiphenylamine (1)	10	U
101-55-3	4-Bromophenyl-phenylether	10	U
118-74-1	Hexachlorobenzene	10	U
87-86-5	Pentachlorophenol	50	U
85-01-8	Phenanthrene	10	U
120-12-7	Anthracene	10	U
84-74-2	Di-n-Butylphthalate	10	U
206-44-0	Fluoranthene	10	U
129-00-0	Pyrene	10	U
85-68-7	Butylbenzylphthalate	10	U
91-94-1	3,3'-Dichlorobenzidine	20	U
56-55-3	Benzo(a)Anthracene	10	U
218-01-9	Chrysene	10	U
117-81-7	bis(2-Ethylhexyl)Phthalate	10	U
117-84-0	Di-n-Octyl Phthalate	10	U
205-99-2	Benzo(b)Fluoranthene	10	U
207-08-9	Benzo(k)Fluoranthene	10	U
50-32-8	Benzo(a)Pyrene	10	U
193-39-5	Indeno(1,2,3-cd)Pyrene	10	U
53-70-3	Dibenzo(a,h)Anthracene	10	U
191-24-2	Benzo(g,h,i)Perylene	10	U

(1) - Cannot be separated from Diphenylamine

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

SBLK83

Lab Name: COMPUCHEM LABS Contract: 68-D9-0032

Lab Code: COMPU Case No.: 12058 SAS No.: _____ SDG No.: BX258

Matrix: (soil/water) SOIL Lab Sample ID: SBLK83

Sample wt/vol: 30.0 (g/mL) G Lab File ID: GJ066463B04

Level: (low/med) LOW Date Received: _____

% Moisture: not dec. ____ dec. ____ Date Extracted: 06/09/89

Extraction: (SepF/Cont/Sonc) SONC Date Analyzed: 06/09/89

GPC Cleanup: (Y/N) N pH: _____ Dilution Factor: 1.00

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
108-95-2	Phenol	330	U
111-44-4	bis(2-Chloroethyl)Ether	330	U
95-57-8	2-Chlorophenol	330	U
541-73-1	1,3-Dichlorobenzene	330	U
106-46-7	1,4-Dichlorobenzene	330	U
100-51-6	Benzyl Alcohol	330	U
95-50-1	1,2-Dichlorobenzene	330	U
95-48-7	2-Methylphenol	330	U
39638-32-9	bis(2-Chloroisopropyl)Ether	330	U
106-44-5	4-Methylphenol	330	U
621-64-7	N-Nitroso-Di-n-Propylamine	330	U
67-72-1	Hexachloroethane	330	U
98-95-3	Nitrobenzene	330	U
78-59-1	Isophorone	330	U
88-75-5	2-Nitrophenol	330	U
105-67-9	2,4-Dimethylphenol	330	U
65-85-0	Benzoic Acid	1600	U
111-91-1	bis(2-Chloroethoxy)Methane	330	U
120-83-2	2,4-Dichlorophenol	330	U
120-82-1	1,2,4-Trichlorobenzene	330	U
91-20-3	Naphthalene	330	U
106-47-8	4-Chloroaniline	330	U
87-68-3	Hexachlorobutadiene	330	U
59-50-7	4-Chloro-3-Methylphenol	330	U
91-57-6	2-Methylnaphthalene	330	U
77-47-4	Hexachlorocyclopentadiene	330	U
88-06-2	2,4,6-Trichlorophenol	330	U
95-95-4	2,4,5-Trichlorophenol	1600	U
91-58-7	2-Chloronaphthalene	330	U
88-74-4	2-Nitroaniline	1600	U
131-11-3	Dimethyl Phthalate	330	U
208-96-8	Acenaphthylene	330	U
606-20-2	2,6-Dinitrotoluene	330	U

1C

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

SBLK83

Lab Name: COMPUCHEM LABS Contract: 68-D9-0032

Lab Code: COMPU Case No.: 12058 SAS No.: _____ SDG No.: BX258

Matrix: (soil/water) SOIL Lab Sample ID: SBLK83

Sample wt/vol: 30.0 (g/mL) G Lab File ID: GJ066463B04

Level: (low/med) LOW Date Received: _____

% Moisture: not dec. _____ dec. _____ Date Extracted: 06/09/89

Extraction: (SepF/Cont/Sonc) SONC Date Analyzed: 06/09/89

GPC Cleanup: (Y/N) N pH: _____ Dilution Factor: 1.00

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
99-09-2	3-Nitroaniline	1600	U
83-32-9	Acenaphthene	330	U
51-28-5	2,4-Dinitrophenol	1600	U
100-02-7	4-Nitrophenol	1600	U
132-64-9	Dibenzofuran	330	U
121-14-2	2,4-Dinitrotoluene	330	U
84-66-2	Diethylphthalate	330	U
7005-72-3	4-Chlorophenyl-phenylether	330	U
86-73-7	Fluorene	330	U
100-01-6	4-Nitroaniline	1600	U
534-52-1	4,6-Dinitro-2-Methylphenol	1600	U
86-30-6	N-Nitrosodiphenylamine (1)	330	U
101-55-3	4-Bromophenyl-phenylether	330	U
118-74-1	Hexachlorobenzene	330	U
87-86-5	Pentachlorophenol	1600	U
85-01-8	Phenanthrene	330	U
120-12-7	Anthracene	330	U
84-74-2	Di-n-Butylphthalate	330	U
206-44-0	Fluoranthene	330	U
129-00-0	Pyrene	330	U
85-68-7	Butylbenzylphthalate	330	U
91-94-1	3,3'-Dichlorobenzidine	660	U
56-55-3	Benzo(a)Anthracene	330	U
218-01-9	Chrysene	330	U
117-81-7	bis(2-Ethylhexyl)Phthalate	330	U
117-84-0	Di-n-Octyl Phthalate	330	U
205-99-2	Benzo(b)Fluoranthene	330	U
207-08-9	Benzo(k)Fluoranthene	330	U
50-32-8	Benzo(a)Pyrene	330	U
193-39-5	Indeno(1,2,3-cd)Pyrene	330	U
53-70-3	Dibenzo(a,h)Anthracene	330	U
191-24-2	Benzo(g,h,i)Perylene	330	U

(1) - Cannot be separated from Diphenylamine

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

SBLK86

Lab Name: COMPUCHEM LABS Contract: 68-D9-0032

Lab Code: COMPU Case No.: 12058 SAS No.: _____ SDG No.: BX260

Matrix: (soil/water) WATER Lab Sample ID: SBLK86

Sample wt/vol: 1000 (g/mL) ML Lab File ID: GH067149B16

Level: (low/med) LOW Date Received: _____

% Moisture: not dec. ____ dec. ____ Date Extracted: 06/14/89

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 06/15/89

GPC Cleanup: (Y/N) N pH: _____ Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
108-95-2	Phenol	10	U
111-44-4	bis(2-Chloroethyl)Ether	10	U
95-57-8	2-Chlorophenol	10	U
541-73-1	1,3-Dichlorobenzene	10	U
106-46-7	1,4-Dichlorobenzene	10	U
100-51-6	Benzyl Alcohol	10	U
95-50-1	1,2-Dichlorobenzene	10	U
95-48-7	2-Methylphenol	10	U
39638-32-9	bis(2-Chloroisopropyl)Ether	10	U
106-44-5	4-Methylphenol	10	U
621-64-7	N-Nitroso-Di-n-Propylamine	10	U
67-72-1	Hexachloroethane	10	U
98-95-3	Nitrobenzene	10	U
78-59-1	Isophorone	10	U
88-75-5	2-Nitrophenol	10	U
105-67-9	2,4-Dimethylphenol	10	U
65-85-0	Benzoic Acid	50	U
111-91-1	bis(2-Chloroethoxy)Methane	10	U
120-83-2	2,4-Dichlorophenol	10	U
120-82-1	1,2,4-Trichlorobenzene	10	U
91-20-3	Naphthalene	10	U
106-47-8	4-Chloroaniline	10	U
87-68-3	Hexachlorobutadiene	10	U
59-50-7	4-Chloro-3-Methylphenol	10	U
91-57-6	2-Methylnaphthalene	10	U
77-47-4	Hexachlorocyclopentadiene	10	U
88-06-2	2,4,6-Trichlorophenol	10	U
95-95-4	2,4,5-Trichlorophenol	50	U
91-58-7	2-Chloronaphthalene	10	U
88-74-4	2-Nitroaniline	50	U
131-11-3	Dimethyl Phthalate	10	U
208-96-8	Acenaphthylene	10	U
606-20-2	2,6-Dinitrotoluene	10	U

1C

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

SBLK86

Lab Name: COMPUCHEM LABS Contract: 68-D9-0032

Lab Code: COMPU Case No.: 12058 SAS No.: _____ SDG No.: BX260

Matrix: (soil/water) WATER Lab Sample ID: SBLK86

Sample wt/vol: 1000 (g/mL) ML Lab File ID: GH067149B16

Level: (low/med) LOW Date Received: _____

% Moisture: not dec. ____ dec. ____ Date Extracted: 06/14/89

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 06/15/89

GPC Cleanup: (Y/N) N pH: _____ Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
99-09-2	3-Nitroaniline	50	U
83-32-9	Acenaphthene	10	U
51-28-5	2,4-Dinitrophenol	50	U
100-02-7	4-Nitrophenol	50	U
132-64-9	Dibenzofuran	10	U
121-14-2	2,4-Dinitrotoluene	10	U
84-66-2	Diethylphthalate	10	U
7005-72-3	4-Chlorophenyl-phenylether	10	U
86-73-7	Fluorene	10	U
100-01-6	4-Nitroaniline	50	U
534-52-1	4,6-Dinitro-2-Methylphenol	50	U
86-30-6	N-Nitrosodiphenylamine (1)	10	U
101-55-3	4-Bromophenyl-phenylether	10	U
118-74-1	Hexachlorobenzene	10	U
87-86-5	Pentachlorophenol	50	U
85-01-8	Phenanthrene	10	U
120-12-7	Anthracene	10	U
84-74-2	Di-n-Butylphthalate	10	U
206-44-0	Fluoranthene	10	U
129-00-0	Pyrene	10	U
85-68-7	Butylbenzylphthalate	10	U
91-94-1	3,3'-Dichlorobenzidine	20	U
56-55-3	Benzo(a)Anthracene	10	U
218-01-9	Chrysene	10	U
117-81-7	bis(2-Ethylhexyl)Phthalate	10	U
117-84-0	Di-n-Octyl Phthalate	10	U
205-99-2	Benzo(b)Fluoranthene	10	U
207-08-9	Benzo(k)Fluoranthene	10	U
50-32-8	Benzo(a)Pyrene	10	U
193-39-5	Indeno(1,2,3-cd)Pyrene	10	U
53-70-3	Dibenzo(a,h)Anthracene	10	U
191-24-2	Benzo(g,h,i)Perylene	10	U

(1) - Cannot be separated from Diphenylamine

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

SBLK90

Lab Name: COMPUCHEM LABS Contract: 68-D9-0032

Lab Code: COMPU Case No.: 12058 SAS No.: _____ SDG No.: BX260

Matrix: (soil/water) WATER Lab Sample ID: SBLK90

Sample wt/vol: 1000 (g/mL) ML Lab File ID: GJ066751A06

Level: (low/med) LOW Date Received: _____

% Moisture: not dec. ____ dec. ____ Date Extracted: 06/12/89

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 06/12/89

GPC Cleanup: (Y/N) N pH: _____ Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
108-95-2	Phenol	10	U
111-44-4	bis(2-Chloroethyl)Ether	10	U
95-57-8	2-Chlorophenol	10	U
541-73-1	1,3-Dichlorobenzene	10	U
106-46-7	1,4-Dichlorobenzene	10	U
100-51-6	Benzyl Alcohol	10	U
95-50-1	1,2-Dichlorobenzene	10	U
95-48-7	2-Methylphenol	10	U
39638-32-9	bis(2-Chloroisopropyl)Ether	10	U
106-44-5	4-Methylphenol	10	U
621-64-7	N-Nitroso-Di-n-Propylamine	10	U
67-72-1	Hexachloroethane	10	U
98-95-3	Nitrobenzene	10	U
78-59-1	Isophorone	10	U
88-75-5	2-Nitrophenol	10	U
105-67-9	2,4-Dimethylphenol	10	U
65-85-0	Benzoic Acid	50	U
111-91-1	bis(2-Chloroethoxy)Methane	10	U
120-83-2	2,4-Dichlorophenol	10	U
120-82-1	1,2,4-Trichlorobenzene	10	U
91-20-3	Naphthalene	10	U
106-47-8	4-Chloroaniline	10	U
87-68-3	Hexachlorobutadiene	10	U
59-50-7	4-Chloro-3-Methylphenol	10	U
91-57-6	2-Methylnaphthalene	10	U
77-47-4	Hexachlorocyclopentadiene	10	U
88-06-2	2,4,6-Trichlorophenol	10	U
95-95-4	2,4,5-Trichlorophenol	50	U
91-58-7	2-Chloronaphthalene	10	U
88-74-4	2-Nitroaniline	50	U
131-11-3	Dimethyl Phthalate	10	U
208-96-8	Acenaphthylene	10	U
606-20-2	2,6-Dinitrotoluene	10	U

1C

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

SBLK90

Lab Name: COMPUCHEM LABS Contract: 68-D9-0032

Lab Code: COMPU Case No.: 12058 SAS No.: _____ SDG No.: BX260

Matrix: (soil/water) WATER Lab Sample ID: SBLK90

Sample wt/vol: 1000 (g/mL) ML Lab File ID: GJ066751A06

Level: (low/med) LOW Date Received: _____

% Moisture: not dec. ____ dec. ____ Date Extracted: 06/12/89

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 06/12/89

GPC Cleanup: (Y/N) N pH: _____ Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
99-09-2	3-Nitroaniline	50	U
83-32-9	Acenaphthene	10	U
51-28-5	2,4-Dinitrophenol	50	U
100-02-7	4-Nitrophenol	50	U
132-64-9	Dibenzofuran	10	U
121-14-2	2,4-Dinitrotoluene	10	U
84-66-2	Diethylphthalate	10	U
7005-72-3	4-Chlorophenyl-phenylether	10	U
86-73-7	Fluorene	10	U
100-01-6	4-Nitroaniline	50	U
534-52-1	4,6-Dinitro-2-Methylphenol	50	U
86-30-6	N-Nitrosodiphenylamine (1)	10	U
101-55-3	4-Bromophenyl-phenylether	10	U
118-74-1	Hexachlorobenzene	10	U
87-86-5	Pentachlorophenol	50	U
85-01-8	Phenanthrene	10	U
120-12-7	Anthracene	10	U
84-74-2	Di-n-Butylphthalate	10	U
206-44-0	Fluoranthene	10	U
129-00-0	Pyrene	10	U
85-68-7	Butylbenzylphthalate	10	U
91-94-1	3,3'-Dichlorobenzidine	20	U
56-55-3	Benzo(a)Anthracene	10	U
218-01-9	Chrysene	10	U
117-81-7	bis(2-Ethylhexyl)Phthalate	10	U
117-84-0	Di-n-Octyl Phthalate	10	U
205-99-2	Benzo(b)Fluoranthene	10	U
207-08-9	Benzo(k)Fluoranthene	10	U
50-32-8	Benzo(a)Pyrene	10	U
193-39-5	Indeno(1,2,3-cd)Pyrene	10	U
53-70-3	Dibenzo(a,h)Anthracene	10	U
191-24-2	Benzo(g,h,i)Perylene	10	U

(1) - Cannot be separated from Diphenylamine

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

SBLK99

Lab Name: COMPUCHEM LABS Contract: 68-D9-0032

Lab Code: COMPU Case No.: 12058 SAS No.: _____ SDG No.: BX260

Matrix: (soil/water) WATER Lab Sample ID: SBLK99

Sample wt/vol: 1000 (g/mL) ML Lab File ID: GH066857A06

Level: (low/med) LOW Date Received: _____

% Moisture: not dec. ____ dec. ____ Date Extracted: 06/13/89

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 06/13/89

GPC Cleanup: (Y/N) N pH: _____ Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
108-95-2	Phenol	10	U
111-44-4	bis(2-Chloroethyl)Ether	10	U
95-57-8	2-Chlorophenol	10	U
541-73-1	1,3-Dichlorobenzene	10	U
106-46-7	1,4-Dichlorobenzene	10	U
100-51-6	Benzyl Alcohol	10	U
95-50-1	1,2-Dichlorobenzene	10	U
95-48-7	2-Methylphenol	10	U
39638-32-9	bis(2-Chloroisopropyl)Ether	10	U
106-44-5	4-Methylphenol	10	U
621-64-7	N-Nitroso-Di-n-Propylamine	10	U
67-72-1	Hexachloroethane	10	U
98-95-3	Nitrobenzene	10	U
78-59-1	Isophorone	10	U
88-75-5	2-Nitrophenol	10	U
105-67-9	2,4-Dimethylphenol	10	U
65-85-0	Benzoic Acid	50	U
111-91-1	bis(2-Chloroethoxy)Methane	10	U
120-83-2	2,4-Dichlorophenol	10	U
120-82-1	1,2,4-Trichlorobenzene	10	U
91-20-3	Naphthalene	10	U
106-47-8	4-Chloroaniline	10	U
87-68-3	Hexachlorobutadiene	10	U
59-50-7	4-Chloro-3-Methylphenol	10	U
91-57-6	2-Methylnaphthalene	10	U
77-47-4	Hexachlorocyclopentadiene	10	U
88-06-2	2,4,6-Trichlorophenol	10	U
95-95-4	2,4,5-Trichlorophenol	50	U
91-58-7	2-Chloronaphthalene	10	U
88-74-4	2-Nitroaniline	50	U
131-11-3	Dimethyl Phthalate	10	U
208-96-8	Acenaphthylene	10	U
606-20-2	2,6-Dinitrotoluene	10	U

1C

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

SBLK99

Lab Name: COMPUCHEM LABS Contract: 68-D9-0032

Lab Code: COMPU Case No.: 12058 SAS No.: _____ SDG No.: BX260

Matrix: (soil/water) WATER Lab Sample ID: SBLK99

Sample wt/vol: 1000 (g/mL) ML Lab File ID: GH066857A06

Level: (low/med) LOW Date Received: _____

% Moisture: not dec. ____ dec. ____ Date Extracted: 06/13/89

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 06/13/89

GPC Cleanup: (Y/N) N pH: _____ Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
99-09-2	3-Nitroaniline	50	U
83-32-9	Acenaphthene	10	U
51-28-5	2,4-Dinitrophenol	50	U
100-02-7	4-Nitrophenol	50	U
132-64-9	Dibenzofuran	10	U
121-14-2	2,4-Dinitrotoluene	10	U
84-66-2	Diethylphthalate	10	U
7005-72-3	4-Chlorophenyl-phenylether	10	U
86-73-7	Fluorene	10	U
100-01-6	4-Nitroaniline	50	U
534-52-1	4,6-Dinitro-2-Methylphenol	50	U
86-30-6	N-Nitrosodiphenylamine (1)	10	U
101-55-3	4-Bromophenyl-phenylether	10	U
118-74-1	Hexachlorobenzene	10	U
87-86-5	Pentachlorophenol	50	U
85-01-8	Phenanthrene	10	U
120-12-7	Anthracene	10	U
84-74-2	Di-n-Butylphthalate	10	U
206-44-0	Fluoranthene	10	U
129-00-0	Pyrene	10	U
85-68-7	Butylbenzylphthalate	10	U
91-94-1	3,3'-Dichlorobenzidine	20	U
56-55-3	Benzo(a)Anthracene	10	U
218-01-9	Chrysene	10	U
117-81-7	bis(2-Ethylhexyl)Phthalate	10	U
117-84-0	Di-n-Octyl Phthalate	10	U
205-99-2	Benzo(b)Fluoranthene	10	U
207-08-9	Benzo(k)Fluoranthene	10	U
50-32-8	Benzo(a)Pyrene	10	U
193-39-5	Indeno(1,2,3-cd)Pyrene	10	U
53-70-3	Dibenzo(a,h)Anthracene	10	U
191-24-2	Benzo(g,h,i)Perylene	10	U

(1) - Cannot be separated from Diphenylamine

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO: BY768

Lab Name: COMPUCHEM LABS Contract: 68-D9-0032

Lab Code: COMPU Case No.: 12058 SAS No.: _____ SDG No.: BX260

Matrix: (soil/water) WATER Lab Sample ID: 267129

Sample wt/vol: 1000 (g/mL) ML Lab File ID: GH067129B16

Level: (low/med) LOW Date Received: 06/12/89

% Moisture: not dec. ____ dec. ____ Date Extracted: 06/14/89

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 06/15/89

GPC Cleanup: (Y/N) N pH: _____ Dilution Factor: 1.0

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND		Q
108-95-2	Phenol	10	U
111-44-4	bis(2-Chloroethyl)Ether	10	U
95-57-8	2-Chlorophenol	10	U
541-73-1	1,3-Dichlorobenzene	10	U
106-46-7	1,4-Dichlorobenzene	10	U
100-51-6	Benzyl Alcohol	10	U
95-50-1	1,2-Dichlorobenzene	10	U
95-48-7	2-Methylphenol	10	U
39638-32-9	bis(2-Chloroisopropyl)Ether	10	U
106-44-5	4-Methylphenol	10	U
621-64-7	N-Nitroso-Di-n-Propylamine	10	U
67-72-1	Hexachloroethane	10	U
98-95-3	Nitrobenzene	10	U
78-59-1	Isophorone	10	U
88-75-5	2-Nitrophenol	10	U
105-67-9	2,4-Dimethylphenol	10	U
65-85-0	Benzoic Acid	50	UUJ
111-91-1	bis(2-Chloroethoxy)Methane	10	U
120-83-2	2,4-Dichlorophenol	10	U
120-82-1	1,2,4-Trichlorobenzene	10	U
91-20-3	Naphthalene	10	U
106-47-8	4-Chloroaniline	10	U
87-68-3	Hexachlorobutadiene	10	U
59-50-7	4-Chloro-3-Methylphenol	10	U
91-57-6	2-Methylnaphthalene	10	U
77-47-4	Hexachlorocyclopentadiene	10	U
88-06-2	2,4,6-Trichlorophenol	10	U
95-95-4	2,4,5-Trichlorophenol	50	U
91-58-7	2-Chloronaphthalene	10	U
88-74-4	2-Nitroaniline	50	U
131-11-3	Dimethyl Phthalate	10	U
208-96-8	Acenaphthylene	10	U
606-20-2	2,6-Dinitrotoluene	10	U

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BY768

Lab Name: COMPUCHEM LABS Contract: 68-D9-0032

Lab Code: COMPU Case No.: 12058 SAS No.: _____ SDG No.: BX260

Matrix: (soil/water) WATER Lab Sample ID: 267129

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: CN067129B12

Level: (low/med) LOW Date Received: 06/12/89

% Moisture: not dec. ____ Date Analyzed: 06/14/89

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	3	BJ
67-64-1	Acetone	16	J
75-15-0	Carbon Disulfide	21	
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	5	U
540-59-0	1,2-Dichloroethene (total)	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone	10	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon Tetrachloride	5	U
108-05-4	Vinyl Acetate	10	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	5	U
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	Trans-1,3-Dichloropropene	5	U
75-25-2	Bromoform	5	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Total Xylenes	5	U

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BY767

Lab Name: COMPUCHEM LABS Contract: 68-D9-0032

Lab Code: COMPU Case No.: 12058 SAS No.: _____ SDG No.: BX260

Matrix: (soil/water) WATER Lab Sample ID: 267132

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: CN067132B12

Level: (low/med) LOW Date Received: 06/12/89

% Moisture: not dec. ____ Date Analyzed: 06/14/89

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	5	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	5	U
540-59-0	1,2-Dichloroethene (total)	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone	10	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon Tetrachloride	5	U
108-05-4	Vinyl Acetate	10	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	5	U
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	Trans-1,3-Dichloropropene	5	U
75-25-2	Bromoform	5	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Total Xylenes	5	U

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1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BY766

Lab Name: COMPUCHEM LABS Contract: 68-D9-0032

Lab Code: COMPU Case No.: 12058 SAS No.: _____ SDG No.: BX260

Matrix: (soil/water) WATER Lab Sample ID: 267131

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: CN067131B12

Level: (low/med) LOW Date Received: 06/12/89

% Moisture: not dec. ____ Date Analyzed: 06/14/89

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	1	BJ
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	5	U
540-59-0	1,2-Dichloroethene (total)	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone	10	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon Tetrachloride	5	U
108-05-4	Vinyl Acetate	10	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	5	U
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	Trans-1,3-Dichloropropene	5	U
75-25-2	Bromoform	5	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Total Xylenes	5	U

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

SBLK07

Lab Name: COMPUCHEM LABS Contract: 68-D9-0032

Lab Code: COMPU Case No.: 12058 SAS No.: _____ SDG No.: BX260

Matrix: (soil/water) WATER Lab Sample ID: SBLK07

Sample wt/vol: 1000 (g/mL) ML Lab File ID: GJ067163C16

Level: (low/med) LOW Date Received: _____

% Moisture: not dec. ____ dec. ____ Date Extracted: 06/14/89

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 06/16/89

GPC Cleanup: (Y/N) N pH: _____ Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
108-95-2	Phenol	10	U
111-44-4	bis(2-Chloroethyl)Ether	10	U
95-57-8	2-Chlorophenol	10	U
541-73-1	1,3-Dichlorobenzene	10	U
106-46-7	1,4-Dichlorobenzene	10	U
100-51-6	Benzyl Alcohol	10	U
95-50-1	1,2-Dichlorobenzene	10	U
95-48-7	2-Methylphenol	10	U
39638-32-9	bis(2-Chloroisopropyl)Ether	10	U
106-44-5	4-Methylphenol	10	U
621-64-7	N-Nitroso-Di-n-Propylamine	10	U
67-72-1	Hexachloroethane	10	U
98-95-3	Nitrobenzene	10	U
78-59-1	Isophorone	10	U
88-75-5	2-Nitrophenol	10	U
105-67-9	2,4-Dimethylphenol	10	U
65-85-0	Benzoic Acid	50	U
111-91-1	bis(2-Chloroethoxy)Methane	10	U
120-83-2	2,4-Dichlorophenol	10	U
120-82-1	1,2,4-Trichlorobenzene	10	U
91-20-3	Naphthalene	10	U
106-47-8	4-Chloroaniline	10	U
87-68-3	Hexachlorobutadiene	10	U
59-50-7	4-Chloro-3-Methylphenol	10	U
91-57-6	2-Methylnaphthalene	10	U
77-47-4	Hexachlorocyclopentadiene	10	U
88-06-2	2,4,6-Trichlorophenol	10	U
95-95-4	2,4,5-Trichlorophenol	50	U
91-58-7	2-Chloronaphthalene	10	U
88-74-4	2-Nitroaniline	50	U
131-11-3	Dimethyl Phthalate	10	U
208-96-8	Acenaphthylene	10	U
606-20-2	2,6-Dinitrotoluene	10	U

1C

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

SBLK07

Lab Name: COMPUCHEM LABS Contract: 68-D9-0032

Lab Code: COMPU Case No.: 12058 SAS No.: _____ SDG No.: BX260

Matrix: (soil/water) WATER Lab Sample ID: SBLK07

Sample wt/vol: 1000 (g/mL) ML Lab File ID: GJ067163C16

Level: (low/med) LOW Date Received: _____

% Moisture: not dec. ____ dec. ____ Date Extracted: 06/14/89

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 06/16/89

GPC Cleanup: (Y/N) N pH: _____ Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
99-09-2	3-Nitroaniline	50	U
83-32-9	Acenaphthene	10	U
51-28-5	2,4-Dinitrophenol	50	U
100-02-7	4-Nitrophenol	50	U
132-64-9	Dibenzofuran	10	U
121-14-2	2,4-Dinitrotoluene	10	U
84-66-2	Diethylphthalate	10	U
7005-72-3	4-Chlorophenyl-phenylether	10	U
86-73-7	Fluorene	10	U
100-01-6	4-Nitroaniline	50	U
534-52-1	4,6-Dinitro-2-Methylphenol	50	U
86-30-6	N-Nitrosodiphenylamine (1)	10	U
101-55-3	4-Bromophenyl-phenylether	10	U
118-74-1	Hexachlorobenzene	10	U
87-86-5	Pentachlorophenol	50	U
85-01-8	Phenanthrene	10	U
120-12-7	Anthracene	10	U
84-74-2	Di-n-Butylphthalate	10	U
206-44-0	Fluoranthene	10	U
129-00-0	Pyrene	10	U
85-68-7	Butylbenzylphthalate	10	U
91-94-1	3,3'-Dichlorobenzidine	20	U
56-55-3	Benzo(a)Anthracene	10	U
218-01-9	Chrysene	10	U
117-81-7	bis(2-Ethylhexyl)Phthalate	10	U
117-84-0	Di-n-Octyl Phthalate	10	U
205-99-2	Benzo(b)Fluoranthene	10	U
207-08-9	Benzo(k)Fluoranthene	10	U
50-32-8	Benzo(a)Pyrene	10	U
193-39-5	Indeno(1,2,3-cd)Pyrene	10	U
53-70-3	Dibenzo(a,h)Anthracene	10	U
191-24-2	Benzo(g,h,i)Perylene	10	U

(1) - Cannot be separated from Diphenylamine

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BY774

Lab Name: COMPUCHEM LABS Contract: 68-D9-0032

Lab Code: COMPU Case No.: 12058 SAS No.: _____ SDG No.: BX258

Matrix: (soil/water) SOIL Lab Sample ID: 267125

Sample wt/vol: 5.0 (g/mL) G Lab File ID: GH067125C18

Level: (low/med) LOW Date Received: 06/12/89

% Moisture: not dec. 14 Date Analyzed: 06/15/89

Column: (pack/cap) CAP Dilution Factor: 1.0

JMJ 2/12/90

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG

CAS NO.	COMPOUND		Q
74-87-3	Chloromethane	12	U
74-83-9	Bromomethane	12	U
75-01-4	Vinyl Chloride	12	U
75-00-3	Chloroethane	12	~~U~~ UJ
75-09-2	Methylene Chloride	14	~~B~~ U
67-64-1	Acetone	64	~~B~~ UJ
75-15-0	Carbon Disulfide	6	U
75-35-4	1,1-Dichloroethene	6	U
75-34-3	1,1-Dichloroethane	6	U
540-59-0	1,2-Dichloroethene (total)	6	U
67-66-3	Chloroform	62	~~B~~ U
107-06-2	1,2-Dichloroethane	6	U
78-93-3	2-Butanone	12	U
71-55-6	1,1,1-Trichloroethane	6	U
56-23-5	Carbon Tetrachloride	6	U
108-05-4	Vinyl Acetate	12	U
75-27-4	Bromodichloromethane	6	U
78-87-5	1,2-Dichloropropane	6	U
10061-01-5	cis-1,3-Dichloropropene	6	U
79-01-6	Trichloroethene	6	U
124-48-1	Dibromochloromethane	6	U
79-00-5	1,1,2-Trichloroethane	6	U
71-43-2	Benzene	6	U
10061-02-6	Trans-1,3-Dichloropropene	6	U
75-25-2	Bromoform	6	U
108-10-1	4-Methyl-2-Pentanone	12	U
591-78-6	2-Hexanone	12	U
127-18-4	Tetrachloroethene	6	~~U~~ UJ
79-34-5	1,1,2,2-Tetrachloroethane	6	U
108-88-3	Toluene	6	U
108-90-7	Chlorobenzene	6	U
100-41-4	Ethylbenzene	6	U
100-42-5	Styrene	6	U
1330-20-7	Total Xylenes	6	U

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BY775

Lab Name: COMPUCHEM LABS Contract: 68-D9-0032

Lab Code: COMPU Case No.: 12058 SAS No.: _____ SDG No.: BX258

Matrix: (soil/water) SOIL Lab Sample ID: 267126

Sample wt/vol: 5.0 (g/mL) G Lab File ID: GH067126A18

Level: (low/med) LOW Date Received: 06/12/89

% Moisture: not dec. 19 Date Analyzed: 06/14/89

Column: (pack/cap) CAP Dilution Factor: 1.0

JMO 2/12/90

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	12	~~U~~ UJ
74-83-9	Bromomethane	12	U
75-01-4	Vinyl Chloride	12	U
75-00-3	Chloroethane	12	U
75-09-2	Methylene Chloride	15	~~B~~ U
67-64-1	Acetone	220	~~B~~ J
75-15-0	Carbon Disulfide	6	U
75-35-4	1,1-Dichloroethene	6	U
75-34-3	1,1-Dichloroethane	6	U
540-59-0	1,2-Dichloroethene (total)	6	U
67-66-3	Chloroform	6	~~B~~ U
107-06-2	1,2-Dichloroethane	6	U
78-93-3	2-Butanone	7	J
71-55-6	1,1,1-Trichloroethane	6	U
56-23-5	Carbon Tetrachloride	6	U
108-05-4	Vinyl Acetate	12	U
75-27-4	Bromodichloromethane	6	U
78-87-5	1,2-Dichloropropane	6	U
10061-01-5	cis-1,3-Dichloropropene	6	U
79-01-6	Trichloroethene	6	U
124-48-1	Dibromochloromethane	6	U
79-00-5	1,1,2-Trichloroethane	6	~~U~~ UJ
71-43-2	Benzene	6	U
10061-02-6	Trans-1,3-Dichloropropene	6	U
75-25-2	Bromoform	6	~~U~~ UJ
108-10-1	4-Methyl-2-Pentanone	12	U
591-78-6	2-Hexanone	12	U
127-18-4	Tetrachloroethene	6	~~U~~ UJ
79-34-5	1,1,2,2-Tetrachloroethane	6	U
108-88-3	Toluene	6	U
108-90-7	Chlorobenzene	6	U
100-41-4	Ethylbenzene	6	U
100-42-5	Styrene	6	U
1330-20-7	Total Xylenes	1	J

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BY773

Lab Name: COMPUCHEM LABS Contract: 68-D9-0032

Lab Code: COMPU Case No.: 12058 SAS No.: _____ SDG No.: BX258

Matrix: (soil/water) SOIL Lab Sample ID: 267124

Sample wt/vol: 5.0 (g/mL) G Lab File ID: GH067124A18

Level: (low/med) LOW Date Received: 06/12/89

% Moisture: not dec. 18 Date Analyzed: 06/14/89

Column: (pack/cap) CAP Dilution Factor: 1.0

JMO 6/12/90

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	12	~~U~~ UJ
74-83-9	Bromomethane	12	U
75-01-4	Vinyl Chloride	12	U
75-00-3	Chloroethane	12	U
75-09-2	Methylene Chloride	11	~~B~~ U
67-64-1	Acetone	130	~~B~~ R
75-15-0	Carbon Disulfide	6	U
75-35-4	1,1-Dichloroethene	6	U
75-34-3	1,1-Dichloroethane	6	U
540-59-0	1,2-Dichloroethene (total)	6	U
67-66-3	Chloroform	6	U
107-06-2	1,2-Dichloroethane	6	U
78-93-3	2-Butanone	12	U
71-55-6	1,1,1-Trichloroethane	6	U
56-23-5	Carbon Tetrachloride	6	U
108-05-4	Vinyl Acetate	12	U
75-27-4	Bromodichloromethane	6	U
78-87-5	1,2-Dichloropropane	6	U
10061-01-5	cis-1,3-Dichloropropene	6	U
79-01-6	Trichloroethene	6	U
124-48-1	Dibromochloromethane	6	U
79-00-5	1,1,2-Trichloroethane	6	~~U~~ UJ
71-43-2	Benzene	43	
10061-02-6	Trans-1,3-Dichloropropene	6	U
75-25-2	Bromoform	6	~~U~~ UJ
108-10-1	4-Methyl-2-Pentanone	12	U
591-78-6	2-Hexanone	12	U
127-18-4	Tetrachloroethene	6	~~U~~ UJ
79-34-5	1,1,2,2-Tetrachloroethane	6	U
108-88-3	Toluene	8	
108-90-7	Chlorobenzene	6	U
100-41-4	Ethylbenzene	* 750 ~~420~~	~~E~~
100-42-5	Styrene	6	U
1330-20-7	Total Xylenes	* 2400 ~~720~~	~~E~~

* VALUES TAKEN FROM MEDIUM LEVEL SAMPLE ANALYSIS

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BY772

Lab Name: COMPUCHEM LABS Contract: 68-D9-0032

Lab Code: COMPU Case No.: 12058 SAS No.: _____ SDG No.: BX258

Matrix: (soil/water) SOIL Lab Sample ID: 267123

Sample wt/vol: 5.0 (g/mL) G Lab File ID: GH067123A18

Level: (low/med) LOW Date Received: 06/12/89

% Moisture: not dec. 20 Date Analyzed: 06/14/89

Column: (pack/cap) CAP Dilution Factor: 1.0

6/12/89

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	13	~~U~~ ~~UJ~~
74-83-9	Bromomethane	13	U
75-01-4	Vinyl Chloride	13	U
75-00-3	Chloroethane	13	U
75-09-2	Methylene Chloride	16	~~B~~ ~~U~~
67-64-1	Acetone	230	B J
75-15-0	Carbon Disulfide	6	U
75-35-4	1,1-Dichloroethene	6	U
75-34-3	1,1-Dichloroethane	6	U
540-59-0	1,2-Dichloroethene (total)	6	U
67-66-3	Chloroform	6	~~B~~ ~~U~~
107-06-2	1,2-Dichloroethane	6	U
78-93-3	2-Butanone	9	J
71-55-6	1,1,1-Trichloroethane	6	U
56-23-5	Carbon Tetrachloride	6	U
108-05-4	Vinyl Acetate	13	U
75-27-4	Bromodichloromethane	6	U
78-87-5	1,2-Dichloropropane	6	U
10061-01-5	cis-1,3-Dichloropropene	6	U
79-01-6	Trichloroethene	6	U
124-48-1	Dibromochloromethane	6	U
79-00-5	1,1,2-Trichloroethane	6	~~U~~ ~~UJ~~
71-43-2	Benzene	60	
10061-02-6	Trans-1,3-Dichloropropene	6	U
75-25-2	Bromoform	6	~~U~~ ~~UJ~~
108-10-1	4-Methyl-2-Pentanone	13	U
591-78-6	2-Hexanone	13	U
127-18-4	Tetrachloroethene	6	~~U~~ ~~UJ~~
79-34-5	1,1,2,2-Tetrachloroethane	6	U
108-88-3	Toluene	6	U
108-90-7	Chlorobenzene	6	U
100-41-4	Ethylbenzene	45	
100-42-5	Styrene	6	U
1330-20-7	Total Xylenes	6	U

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BY771

Lab Name: COMPUCHEM LABS Contract: 68-D9-0032

Lab Code: COMPU Case No.: 12058 SAS No.: _____ SDG No.: BX258

Matrix: (soil/water) SOIL Lab Sample ID: 267122

Sample wt/vol: 4.0 (g/mL) G Lab File ID: C2R67122B23

Level: (low/med) MED Date Received: 06/12/89

% Moisture: not dec. 18 Date Analyzed: 06/18/89

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	1500	U
74-83-9	Bromomethane	1500	U
75-01-4	Vinyl Chloride	1500	U
75-00-3	Chloroethane	1500	U
75-09-2	Methylene Chloride	760	U
67-64-1	Acetone	1500	U
75-15-0	Carbon Disulfide	760	U
75-35-4	1,1-Dichloroethene	760	U
75-34-3	1,1-Dichloroethane	760	U
540-59-0	1,2-Dichloroethene (total)	760	U
67-66-3	Chloroform	760	U
107-06-2	1,2-Dichloroethane	760	U
78-93-3	2-Butanone	1500	U
71-55-6	1,1,1-Trichloroethane	760	U
56-23-5	Carbon Tetrachloride	760	U
108-05-4	Vinyl Acetate	1500	U
75-27-4	Bromodichloromethane	760	U
78-87-5	1,2-Dichloropropane	760	U
10061-01-5	cis-1,3-Dichloropropene	760	U
79-01-6	Trichloroethene	760	U
124-48-1	Dibromochloromethane	760	U
79-00-5	1,1,2-Trichloroethane	760	U
71-43-2	Benzene	760	U
10061-02-6	Trans-1,3-Dichloropropene	760	U
75-25-2	Bromoform	760	U
108-10-1	4-Methyl-2-Pentanone	1500	U
591-78-6	2-Hexanone	1500	U
127-18-4	Tetrachloroethene	760	U
79-34-5	1,1,2,2-Tetrachloroethane	760	U
108-88-3	Toluene	760	U
108-90-7	Chlorobenzene	760	U
100-41-4	Ethylbenzene	670	J
100-42-5	Styrene	760	U
1330-20-7	Total Xylenes	890	

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BY770

Lab Name: COMPUCHEM LABS Contract: 68-D9-0032

Lab Code: COMPU Case No.: 12058 SAS No.: _____ SDG No.: BX258

Matrix: (soil/water) SOIL Lab Sample ID: 267121

Sample wt/vol: 4.0 (g/mL) G Lab File ID: C2R67121A23

Level: (low/med) MED Date Received: 06/12/89

% Moisture: not dec. 14 Date Analyzed: 06/16/89

Column: (pack/cap) CAP Dilution Factor: 7.1

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	10000	U
74-83-9	Bromomethane	10000	U
75-01-4	Vinyl Chloride	10000	U
75-00-3	Chloroethane	10000	U
75-09-2	Methylene Chloride	5200	U
67-64-1	Acetone	10000	U
75-15-0	Carbon Disulfide	5200	U
75-35-4	1,1-Dichloroethene	5200	U
75-34-3	1,1-Dichloroethane	5200	U
540-59-0	1,2-Dichloroethene (total)	5200	U
67-66-3	Chloroform	5200	U
107-06-2	1,2-Dichloroethane	5200	U
78-93-3	2-Butanone	10000	U
71-55-6	1,1,1-Trichloroethane	5200	U
56-23-5	Carbon Tetrachloride	5200	U
108-05-4	Vinyl Acetate	10000	U
75-27-4	Bromodichloromethane	5200	U
78-87-5	1,2-Dichloropropane	5200	U
10061-01-5	cis-1,3-Dichloropropene	5200	U
79-01-6	Trichloroethene	5200	U
124-48-1	Dibromochloromethane	5200	U
79-00-5	1,1,2-Trichloroethane	5200	U
71-43-2	Benzene	2000	J
10061-02-6	Trans-1,3-Dichloropropene	5200	U
75-25-2	Bromoform	5200	U
108-10-1	4-Methyl-2-Pentanone	10000	U
591-78-6	2-Hexanone	10000	U
127-18-4	Tetrachloroethene	5200	U
79-34-5	1,1,2,2-Tetrachloroethane	5200	U
108-88-3	Toluene	52000	
108-90-7	Chlorobenzene	5200	U
100-41-4	Ethylbenzene	37000	
100-42-5	Styrene	5200	U
1330-20-7	Total Xylenes	220000	E

6/26/89

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BY765

Lab Name: COMPUCHEM LABS Contract: 68-D9-0032

Lab Code: COMPU Case No.: 12058 SAS No.: _____ SDG No.: BX258

Matrix: (soil/water) SOIL Lab Sample ID: 267116

Sample wt/vol: 4.0 (g/mL) G Lab File ID: C3R67116A23

Level: (low/med) MED Date Received: 06/12/89

% Moisture: not dec. 16 Date Analyzed: 06/19/89

Column: (pack/cap) CAP Dilution Factor: 3.3

JMW 3/12/90

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	5000	U
74-83-9	Bromomethane	5000	U
75-01-4	Vinyl Chloride	5000	U
75-00-3	Chloroethane	5000	U
75-09-2	Methylene Chloride	2500	U
67-64-1	Acetone	5000	U
75-15-0	Carbon Disulfide	2500	U
75-35-4	1,1-Dichloroethene	2500	U
75-34-3	1,1-Dichloroethane	2500	U
540-59-0	1,2-Dichloroethene (total)	2500	U
67-66-3	Chloroform	2500	U
107-06-2	1,2-Dichloroethane	2500	U
78-93-3	2-Butanone	5000	U
71-55-6	1,1,1-Trichloroethane	2500	U
56-23-5	Carbon Tetrachloride	2500	U
108-05-4	Vinyl Acetate	5000	U
75-27-4	Bromodichloromethane	2500	U
78-87-5	1,2-Dichloropropane	2500	U
10061-01-5	cis-1,3-Dichloropropene	2500	U
79-01-6	Trichloroethene	2500	U
124-48-1	Dibromochloromethane	2500	U
79-00-5	1,1,2-Trichloroethane	2500	U
71-43-2	Benzene	2500	U
10061-02-6	Trans-1,3-Dichloropropene	2500	U
75-25-2	Bromoform	2500	U
108-10-1	4-Methyl-2-Pentanone	5000	U
591-78-6	2-Hexanone	5000	U
127-18-4	Tetrachloroethene	2500	U
79-34-5	1,1,2,2-Tetrachloroethane	2500	U
108-88-3	Toluene	2500	U
108-90-7	Chlorobenzene	2500	U
100-41-4	Ethylbenzene	8900	
100-42-5	Styrene	2500	U
1330-20-7	Total Xylenes	2200	J

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
BY764

Lab Name: COMPUCHEM LABS Contract: 68-D9-0032

Lab Code: COMPU Case No.: 12058 SAS No.: _____ SDG No.: BX260

Matrix: (soil/water) WATER Lab Sample ID: 267130

Sample wt/vol: 0.20 (g/mL) ML Lab File ID: CR067130B12

Level: (low/med) LOW Date Received: 06/12/89

% Moisture: not dec. ____ Date Analyzed: 06/14/89

Column: (pack/cap) CAP Dilution Factor: 1.0

(mu 2-12-90

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND		Q
74-87-3	Chloromethane	250	U
74-83-9	Bromomethane	250	U
75-01-4	Vinyl Chloride	250	U
75-00-3	Chloroethane	250	U
75-09-2	Methylene Chloride	31	~~BJ~~ U
67-64-1	Acetone	190	~~J~~ U
75-15-0	Carbon Disulfide	130	U
75-35-4	1,1-Dichloroethene	130	U
75-34-3	1,1-Dichloroethane	130	U
540-59-0	1,2-Dichloroethene (total)	130	U
67-66-3	Chloroform	130	U
107-06-2	1,2-Dichloroethane	130	U
78-93-3	2-Butanone	250	U
71-55-6	1,1,1-Trichloroethane	130	U
56-23-5	Carbon Tetrachloride	130	U
108-05-4	Vinyl Acetate	250	U
75-27-4	Bromodichloromethane	130	U
78-87-5	1,2-Dichloropropane	130	U
10061-01-5	cis-1,3-Dichloropropene	130	U
79-01-6	Trichloroethene	130	U
124-48-1	Dibromochloromethane	130	U
79-00-5	1,1,2-Trichloroethane	130	U
71-43-2	Benzene	4400	
10061-02-6	Trans-1,3-Dichloropropene	130	U
75-25-2	Bromoform	130	U
108-10-1	4-Methyl-2-Pentanone	250	U
591-78-6	2-Hexanone	250	U
127-18-4	Tetrachloroethene	130	U
79-34-5	1,1,2,2-Tetrachloroethane	130	U
108-88-3	Toluene	3700	
108-90-7	Chlorobenzene	130	U
100-41-4	Ethylbenzene	1700	
100-42-5	Styrene	130	U
1330-20-7	Total Xylenes	4200	

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

VBLKA2

Lab Name: COMPUCHEM LABS Contract: 68-D9-0032

Lab Code: COMPU Case No.: 12058 SAS No.: _____ SDG No.: BX258

Matrix: (soil/water) SOIL Lab Sample ID: VBLKA2

Sample wt/vol: 5.0 (g/mL) G Lab File ID: GH068680A19

Level: (low/med) LOW Date Received: _____

% Moisture: not dec. ____ Date Analyzed: 06/21/89

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	7	
67-64-1	Acetone	30	
75-15-0	Carbon Disulfide	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	5	U
540-59-0	1,2-Dichloroethene (total)	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone	10	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon Tetrachloride	5	U
108-05-4	Vinyl Acetate	10	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	5	U
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	Trans-1,3-Dichloropropene	5	U
75-25-2	Bromoform	5	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Total Xylenes	5	U

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

VBLKAD

Lab Name: COMPUCHEM LABS Contract: 68-D9-0032

Lab Code: COMPU Case No.: 12058 SAS No.: _____ SDG No.: BX260

Matrix: (soil/water) WATER Lab Sample ID: VBLKAD

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: CB890611A10

Level: (low/med) LOW Date Received: _____

% Moisture: not dec. ____ Date Analyzed: 06/11/89

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	5	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	5	U
540-59-0	1,2-Dichloroethene (total)	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone	10	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon Tetrachloride	5	U
108-05-4	Vinyl Acetate	10	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	5	U
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	Trans-1,3-Dichloropropene	5	U
75-25-2	Bromoform	5	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Total Xylenes	5	U

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

VBLKJL

Lab Name: COMPUCHEM LABS Contract: 68-D9-0032

Lab Code: COMPU Case No.: 12058 SAS No.: _____ SDG No.: BX260

Matrix: (soil/water) WATER Lab Sample ID: VBLKJL

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: CB890614B12

Level: (low/med) LOW Date Received: _____

% Moisture: not dec. ____ Date Analyzed: 06/14/89

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	1	J
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	5	U
540-59-0	1,2-Dichloroethene (total)	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone	10	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon Tetrachloride	5	U
108-05-4	Vinyl Acetate	10	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	5	U
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	Trans-1,3-Dichloropropene	5	U
75-25-2	Bromoform	5	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Total Xylenes	5	U

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

VBLKMR

Lab Name: COMPUCHEM LABS Contract: 68-D9-0032

Lab Code: COMPU Case No.: 12058 SAS No.: _____ SDG No.: BX260

Matrix: (soil/water) WATER Lab Sample ID: VBLKMR

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: CC890613B19

Level: (low/med) LOW Date Received: _____

% Moisture: not dec. ____ Date Analyzed: 06/13/89

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	5	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	5	U
540-59-0	1,2-Dichloroethene (total)	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone	10	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon Tetrachloride	5	U
108-05-4	Vinyl Acetate	10	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	5	U
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	Trans-1,3-Dichloropropene	5	U
75-25-2	Bromoform	5	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Total Xylenes	5	U

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

VBLKQ7

Lab Name: COMPUCHEM LABS Contract: 68-D9-0032

Lab Code: COMPU Case No.: 12058 SAS No.: _____ SDG No.: BX258

Matrix: (soil/water) SOIL Lab Sample ID: VBLKQ7

Sample wt/vol: 5.0 (g/mL) G Lab File ID: GH066712C10

Level: (low/med) LOW Date Received: _____

% Moisture: not dec. ____ Date Analyzed: 06/13/89

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	6	
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	5	U
540-59-0	1,2-Dichloroethene (total)	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone	10	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon Tetrachloride	5	U
108-05-4	Vinyl Acetate	10	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	5	U
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	Trans-1,3-Dichloropropene	5	U
75-25-2	Bromoform	5	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Total Xylenes	5	U

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

VBLKPA

Lab Name: COMPUCHEM LABS Contract: 68-D9-0032

Lab Code: COMPU Case No.: 12058 SAS No.: _____ SDG No.: BX260

Matrix: (soil/water) WATER Lab Sample ID: VBLKPA

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: CC890612C10

Level: (low/med) LOW Date Received: _____

% Moisture: not dec. ____ Date Analyzed: 06/12/89

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	5	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	5	U
540-59-0	1,2-Dichloroethene (total)	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone	10	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon Tetrachloride	5	U
108-05-4	Vinyl Acetate	10	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	5	U
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	Trans-1,3-Dichloropropene	5	U
75-25-2	Bromoform	5	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Total Xylenes	5	U

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

VBLKP9

Lab Name: COMPUCHEM LABS Contract: 68-D9-0032

Lab Code: COMPU Case No.: 12058 SAS No.: _____ SDG No.: BX258

Matrix: (soil/water) SOIL Lab Sample ID: VBLKP9

Sample wt/vol: 5.0 (g/mL) G Lab File ID: GH066502A18

Level: (low/med) LOW Date Received: _____

% Moisture: not dec. ____ Date Analyzed: 06/10/89

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	6	
67-64-1	Acetone	15	
75-15-0	Carbon Disulfide	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	5	U
540-59-0	1,2-Dichloroethene (total)	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone	10	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon Tetrachloride	5	U
108-05-4	Vinyl Acetate	10	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	5	U
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	Trans-1,3-Dichloropropene	5	U
75-25-2	Bromoform	5	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Total Xylenes	5	U

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

VBLKR8

Lab Name: COMPUCHEM LABS Contract: 68-D9-0032

Lab Code: COMPU Case No.: 12058 SAS No.: _____ SDG No.: BX258

Matrix: (soil/water) SOIL Lab Sample ID: VBLKR8

Sample wt/vol: 4.0 (g/mL) G Lab File ID: CN066886A23

Level: (low/med) MED Date Received: _____

% Moisture: not dec. ____ Date Analyzed: 06/13/89

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	1300	U
74-83-9	Bromomethane	1300	U
75-01-4	Vinyl Chloride	1300	U
75-00-3	Chloroethane	1300	U
75-09-2	Methylene Chloride	440	J
67-64-1	Acetone	1300	U
75-15-0	Carbon Disulfide	630	U
75-35-4	1,1-Dichloroethene	630	U
75-34-3	1,1-Dichloroethane	630	U
540-59-0	1,2-Dichloroethene (total)	630	U
67-66-3	Chloroform	630	U
107-06-2	1,2-Dichloroethane	630	U
78-93-3	2-Butanone	1300	U
71-55-6	1,1,1-Trichloroethane	630	U
56-23-5	Carbon Tetrachloride	630	U
108-05-4	Vinyl Acetate	1300	U
75-27-4	Bromodichloromethane	630	U
78-87-5	1,2-Dichloropropane	630	U
10061-01-5	cis-1,3-Dichloropropene	630	U
79-01-6	Trichloroethene	630	U
124-48-1	Dibromochloromethane	630	U
79-00-5	1,1,2-Trichloroethane	630	U
71-43-2	Benzene	630	U
10061-02-6	Trans-1,3-Dichloropropene	630	U
75-25-2	Bromoform	630	U
108-10-1	4-Methyl-2-Pentanone	1300	U
591-78-6	2-Hexanone	1300	U
127-18-4	Tetrachloroethene	630	U
79-34-5	1,1,2,2-Tetrachloroethane	630	U
108-88-3	Toluene	630	U
108-90-7	Chlorobenzene	630	U
100-41-4	Ethylbenzene	630	U
100-42-5	Styrene	630	U
1330-20-7	Total Xylenes	630	U

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VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

VBLKR9

Lab Name: COMPUCHEM LABS Contract: 68-D9-0032

Lab Code: COMPU Case No.: 12058 SAS No.: _____ SDG No.: BX258

Matrix: (soil/water) SOIL Lab Sample ID: VBLKR9

Sample wt/vol: 4.0 (g/mL) G Lab File ID: CN066887C23

Level: (low/med) MED Date Received: _____

% Moisture: not dec. ____ Date Analyzed: 06/14/89

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	1300	U
74-83-9	Bromomethane	1300	U
75-01-4	Vinyl Chloride	1300	U
75-00-3	Chloroethane	1300	U
75-09-2	Methylene Chloride	470	J
67-64-1	Acetone	1300	U
75-15-0	Carbon Disulfide	630	U
75-35-4	1,1-Dichloroethene	630	U
75-34-3	1,1-Dichloroethane	630	U
540-59-0	1,2-Dichloroethene (total)	630	U
67-66-3	Chloroform	630	U
107-06-2	1,2-Dichloroethane	630	U
78-93-3	2-Butanone	1300	U
71-55-6	1,1,1-Trichloroethane	630	U
56-23-5	Carbon Tetrachloride	630	U
108-05-4	Vinyl Acetate	1300	U
75-27-4	Bromodichloromethane	630	U
78-87-5	1,2-Dichloropropane	630	U
10061-01-5	cis-1,3-Dichloropropene	630	U
79-01-6	Trichloroethene	630	U
124-48-1	Dibromochloromethane	630	U
79-00-5	1,1,2-Trichloroethane	630	U
71-43-2	Benzene	630	U
10061-02-6	Trans-1,3-Dichloropropene	630	U
75-25-2	Bromoform	630	U
108-10-1	4-Methyl-2-Pentanone	1300	U
591-78-6	2-Hexanone	1300	U
127-18-4	Tetrachloroethene	630	U
79-34-5	1,1,2,2-Tetrachloroethane	630	U
108-88-3	Toluene	630	U
108-90-7	Chlorobenzene	630	U
100-41-4	Ethylbenzene	630	U
100-42-5	Styrene	630	U
1330-20-7	Total Xylenes	630	U

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

VBLKS1

Lab Name: COMPUCHEM LABS Contract: 68-D9-0032

Lab Code: COMPU Case No.: 12058 SAS No.: _____ SDG No.: BX258

Matrix: (soil/water) SOIL Lab Sample ID: VBLKS1

Sample wt/vol: 5.0 (g/mL) G Lab File ID: GH067175A18

Level: (low/med) LOW Date Received: _____

% Moisture: not dec. ____ Date Analyzed: 06/14/89

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	11	
67-64-1	Acetone	10	
75-15-0	Carbon Disulfide	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	5	U
540-59-0	1,2-Dichloroethene (total)	5	U
67-66-3	Chloroform	2	J
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone	10	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon Tetrachloride	5	U
108-05-4	Vinyl Acetate	10	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	5	U
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	Trans-1,3-Dichloropropene	5	U
75-25-2	Bromoform	5	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Total Xylenes	5	U

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

VBLKS2

Lab Name: COMPUCHEM LABS Contract: 68-D9-0032

Lab Code: COMPU Case No.: 12058 SAS No.: _____ SDG No.: BX258

Matrix: (soil/water) SOIL Lab Sample ID: VBLKS2

Sample wt/vol: 5.0 (g/mL) G Lab File ID: GH067176C18

Level: (low/med) LOW Date Received: _____

% Moisture: not dec. ____ Date Analyzed: 06/15/89

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	7	
67-64-1	Acetone	27	
75-15-0	Carbon Disulfide	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	5	U
540-59-0	1,2-Dichloroethene (total)	5	U
67-66-3	Chloroform	2	J
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone	10	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon Tetrachloride	5	U
108-05-4	Vinyl Acetate	10	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	5	U
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	Trans-1,3-Dichloropropene	5	U
75-25-2	Bromoform	5	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Total Xylenes	5	U

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

VBLKSM

Lab Name: COMPUCHEM LABS Contract: 68-D9-0032

Lab Code: COMPU Case No.: 12058 SAS No.: _____ SDG No.: BX260

Matrix: (soil/water) WATER Lab Sample ID: VBLKSM

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: CB890613A19

Level: (low/med) LOW Date Received: _____

% Moisture: not dec. ____ Date Analyzed: 06/13/89

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	5	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	5	U
540-59-0	1,2-Dichloroethene (total)	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone	10	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon Tetrachloride	5	U
108-05-4	Vinyl Acetate	10	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	5	U
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	Trans-1,3-Dichloropropene	5	U
75-25-2	Bromoform	5	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Total Xylenes	5	U

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VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

VBLKT7

Lab Name: COMPUCHEM LABS Contract: 68-D9-0032

Lab Code: COMPU Case No.: 12058 SAS No.: _____ SDG No.: BX258

Matrix: (soil/water) SOIL Lab Sample ID: VBLKT7

Sample wt/vol: 4.0 (g/mL) G Lab File ID: CN067390A23

Level: (low/med) MED Date Received: _____

% Moisture: not dec. ____ Date Analyzed: 06/16/89

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	1300	U
74-83-9	Bromomethane	1300	U
75-01-4	Vinyl Chloride	1300	U
75-00-3	Chloroethane	1300	U
75-09-2	Methylene Chloride	630	U
67-64-1	Acetone	1300	U
75-15-0	Carbon Disulfide	630	U
75-35-4	1,1-Dichloroethene	630	U
75-34-3	1,1-Dichloroethane	630	U
540-59-0	1,2-Dichloroethene (total)	630	U
67-66-3	Chloroform	630	U
107-06-2	1,2-Dichloroethane	630	U
78-93-3	2-Butanone	1300	U
71-55-6	1,1,1-Trichloroethane	630	U
56-23-5	Carbon Tetrachloride	630	U
108-05-4	Vinyl Acetate	1300	U
75-27-4	Bromodichloromethane	630	U
78-87-5	1,2-Dichloropropane	630	U
10061-01-5	cis-1,3-Dichloropropene	630	U
79-01-6	Trichloroethene	630	U
124-48-1	Dibromochloromethane	630	U
79-00-5	1,1,2-Trichloroethane	630	U
71-43-2	Benzene	630	U
10061-02-6	Trans-1,3-Dichloropropene	630	U
75-25-2	Bromoform	630	U
108-10-1	4-Methyl-2-Pentanone	1300	U
591-78-6	2-Hexanone	1300	U
127-18-4	Tetrachloroethene	630	U
79-34-5	1,1,2,2-Tetrachloroethane	630	U
108-88-3	Toluene	630	U
108-90-7	Chlorobenzene	630	U
100-41-4	Ethylbenzene	630	U
100-42-5	Styrene	630	U
1330-20-7	Total Xylenes	630	U

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VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

VBLKT8

Lab Name: COMPUCHEM LABS Contract: 68-D9-0032

Lab Code: COMPU Case No.: 12058 SAS No.: _____ SDG No.: BX258

Matrix: (soil/water) SOIL Lab Sample ID: VBLKT8

Sample wt/vol: 4.0 (g/mL) G Lab File ID: CN067391B23

Level: (low/med) MED Date Received: _____

% Moisture: not dec. ____ Date Analyzed: 06/18/89

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	1300	U
74-83-9	Bromomethane	1300	U
75-01-4	Vinyl Chloride	1300	U
75-00-3	Chloroethane	1300	U
75-09-2	Methylene Chloride	630	U
67-64-1	Acetone	1300	U
75-15-0	Carbon Disulfide	630	U
75-35-4	1,1-Dichloroethene	630	U
75-34-3	1,1-Dichloroethane	630	U
540-59-0	1,2-Dichloroethene (total)	630	U
67-66-3	Chloroform	630	U
107-06-2	1,2-Dichloroethane	630	U
78-93-3	2-Butanone	1300	U
71-55-6	1,1,1-Trichloroethane	630	U
56-23-5	Carbon Tetrachloride	630	U
108-05-4	Vinyl Acetate	1300	U
75-27-4	Bromodichloromethane	630	U
78-87-5	1,2-Dichloropropane	630	U
10061-01-5	cis-1,3-Dichloropropene	630	U
79-01-6	Trichloroethene	630	U
124-48-1	Dibromochloromethane	630	U
79-00-5	1,1,2-Trichloroethane	630	U
71-43-2	Benzene	630	U
10061-02-6	Trans-1,3-Dichloropropene	630	U
75-25-2	Bromoform	630	U
108-10-1	4-Methyl-2-Pentanone	1300	U
591-78-6	2-Hexanone	1300	U
127-18-4	Tetrachloroethene	630	U
79-34-5	1,1,2,2-Tetrachloroethane	630	U
108-88-3	Toluene	630	U
108-90-7	Chlorobenzene	630	U
100-41-4	Ethylbenzene	630	U
100-42-5	Styrene	630	U
1330-20-7	Total Xylenes	630	U

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VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

VBLKZ6

Lab Name: COMPUCHEM LABS Contract: 68-D9-0032

Lab Code: COMPU Case No.: 12058 SAS No.: _____ SDG No.: BX258

Matrix: (soil/water) SOIL Lab Sample ID: VBLKZ6

Sample wt/vol: 4.0 (g/mL) G Lab File ID: C2R68295C23

Level: (low/med) MED Date Received: _____

% Moisture: not dec. ____ Date Analyzed: 06/21/89

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	1300	U
74-83-9	Bromomethane	1300	U
75-01-4	Vinyl Chloride	1300	U
75-00-3	Chloroethane	1300	U
75-09-2	Methylene Chloride	350	J
67-64-1	Acetone	1300	U
75-15-0	Carbon Disulfide	630	U
75-35-4	1,1-Dichloroethene	630	U
75-34-3	1,1-Dichloroethane	630	U
540-59-0	1,2-Dichloroethene (total)	630	U
67-66-3	Chloroform	630	U
107-06-2	1,2-Dichloroethane	630	U
78-93-3	2-Butanone	1300	U
71-55-6	1,1,1-Trichloroethane	630	U
56-23-5	Carbon Tetrachloride	630	U
108-05-4	Vinyl Acetate	1300	U
75-27-4	Bromodichloromethane	630	U
78-87-5	1,2-Dichloropropane	630	U
10061-01-5	cis-1,3-Dichloropropene	630	U
79-01-6	Trichloroethene	630	U
124-48-1	Dibromochloromethane	630	U
79-00-5	1,1,2-Trichloroethane	630	U
71-43-2	Benzene	630	U
10061-02-6	Trans-1,3-Dichloropropene	630	U
75-25-2	Bromoform	630	U
108-10-1	4-Methyl-2-Pentanone	1300	U
591-78-6	2-Hexanone	1300	U
127-18-4	Tetrachloroethene	630	U
79-34-5	1,1,2,2-Tetrachloroethane	630	U
108-88-3	Toluene	630	U
108-90-7	Chlorobenzene	630	U
100-41-4	Ethylbenzene	630	U
100-42-5	Styrene	630	U
1330-20-7	Total Xylenes	630	U

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BY769

Lab Name: COMPUCHEM LABS Contract: 68-D9-0032

Lab Code: COMPU Case No.: 12058 SAS No.: _____ SDG No.: BX258

Matrix: (soil/water) SOIL Lab Sample ID: 267120

Sample wt/vol: 5.0 (g/mL) G Lab File ID: GH067120C18

Level: (low/med) LOW Date Received: 06/12/89

% Moisture: not dec. 12 Date Analyzed: 06/15/89

Column: (pack/cap) CAP Dilution Factor: 1.0

JMC 10/12/90

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

CAS NO.	COMPOUND		Q
74-87-3	Chloromethane	11	U
74-83-9	Bromomethane	11	U
75-01-4	Vinyl Chloride	11	U
75-00-3	Chloroethane	11	U UJ
75-09-2	Methylene Chloride	48	B U
67-64-1	Acetone	60	B UJ
75-15-0	Carbon Disulfide	6	U
75-35-4	1,1-Dichloroethene	6	U
75-34-3	1,1-Dichloroethane	6	U
540-59-0	1,2-Dichloroethene (total)	6	U
67-66-3	Chloroform	6 2	BJ U
107-06-2	1,2-Dichloroethane	6	U
78-93-3	2-Butanone	11	U
71-55-6	1,1,1-Trichloroethane	6	U
56-23-5	Carbon Tetrachloride	6	U
108-05-4	Vinyl Acetate	11	U
75-27-4	Bromodichloromethane	6	U
78-87-5	1,2-Dichloropropane	6	U
10061-01-5	cis-1,3-Dichloropropene	6	U
79-01-6	Trichloroethene	6	U
124-48-1	Dibromochloromethane	6	U
79-00-5	1,1,2-Trichloroethane	6	U
71-43-2	Benzene	21	
10061-02-6	Trans-1,3-Dichloropropene	6	U
75-25-2	Bromoform	6	U
108-10-1	4-Methyl-2-Pentanone	11	U
591-78-6	2-Hexanone	11	U
127-18-4	Tetrachloroethene	6	U UJ
79-34-5	1,1,2,2-Tetrachloroethane	6	U
108-88-3	Toluene	25	
108-90-7	Chlorobenzene	6	U
100-41-4	Ethylbenzene	130	
100-42-5	Styrene	6	U
1330-20-7	Total Xylenes	280	J

JK 6/27/89

1C

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BY768

Lab Name: COMPUCHEM LABS Contract: 68-D9-0032

Lab Code: COMPU Case No.: 12058 SAS No.: _____ SDG No.: BX260

Matrix: (soil/water) WATER Lab Sample ID: 267129

Sample wt/vol: 1000 (g/mL) ML Lab File ID: GH067129B16

Level: (low/med) LOW Date Received: 06/12/89

% Moisture: not dec. ____ dec. ____ Date Extracted: 06/14/89

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 06/15/89

GPC Cleanup: (Y/N) N pH: _____ Dilution Factor: 1.0

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND		Q
99-09-2	3-Nitroaniline	50	U
83-32-9	Acenaphthene	10	U
51-28-5	2,4-Dinitrophenol	50	U
100-02-7	4-Nitrophenol	50	U
132-64-9	Dibenzofuran	10	U
121-14-2	2,4-Dinitrotoluene	10	U
84-66-2	Diethylphthalate	10	U~~U~~J
7005-72-3	4-Chlorophenyl-phenylether	10	U
86-73-7	Fluorene	10	U
100-01-6	4-Nitroaniline	50	U
534-52-1	4,6-Dinitro-2-Methylphenol	50	U
86-30-6	N-Nitrosodiphenylamine (1)	10	U
101-55-3	4-Bromophenyl-phenylether	10	U
118-74-1	Hexachlorobenzene	10	U
87-86-5	Pentachlorophenol	50	U
85-01-8	Phenanthrene	10	U
120-12-7	Anthracene	10	U
84-74-2	Di-n-Butylphthalate	10	U
206-44-0	Fluoranthene	10	U
129-00-0	Pyrene	10	U
85-68-7	Butylbenzylphthalate	10	U
91-94-1	3,3'-Dichlorobenzidine	20	U
56-55-3	Benzo(a)Anthracene	10	U
218-01-9	Chrysene	10	U
117-81-7	bis(2-Ethylhexyl)Phthalate	3	~~U~~J
117-84-0	Di-n-Octyl Phthalate	10	U
205-99-2	Benzo(b)Fluoranthene	10	U
207-08-9	Benzo(k)Fluoranthene	10	U
50-32-8	Benzo(a)Pyrene	10	U
193-39-5	Indeno(1,2,3-cd)Pyrene	10	U
53-70-3	Dibenzo(a,h)Anthracene	10	U
191-24-2	Benzo(g,h,i)Perylene	10	U

(1) - Cannot be separated from Diphenylamine

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SAMPLE DATA PACKAGE 9.5

REFERENCE NO. 9

March 31, 1989

Ms. Caroline Kwan
U.S. Environmental Protection Agency
26 Federal Plaza
New York, New York 10278

Project: EPA Contract No: 68-01-7331

Document No: T648-C02-EP-CZUU-1

Subject: CLP Sample Analysis Data Summary of the 104(e) Letter Response Sampling Tutu Wellfield Area Work Assignment 648

Dear Ms. Kwan,

The purpose of this letter is to provide you with the balance of the CLP analysis results for the 104(e) letter response samples collected in the Tutu Wellfield Area, St Thomas, U.S. Virgin Islands from September 8 through September 15, 1988. The results of three samples, two which were collected at the Tutu Esso Service Station and one at the Tutu Texaco Service Station, were submitted to you in a report dated March 30, 1989. The identification and location of all other 104(e) letter response samples are given below:

Sample Number	Sample Location	Sample Matrix
e-01	O'Henry Cleaners	Soil
e-02	Ramsay Motor Center	Groundwater
e-03	trip blank	DI water
e-04	field blank	DI water
eR-07s	Ramsay Motor Center	Soil
eR-08s	Ramsay Motor Center	Soil
eC-09s	Consolidated Auto Parts	Soil
eC-10s	Consolidated Auto Parts	Soil
eC-11a	Consolidated Auto Parts	Surface water
eC-12a	field blank	DI water
eC-13a	trip blank	DI water
eTT-14	Tillet Gardens	Soil
eTT-15	Tillet Gardens	Soil
eT-01w	Texaco Service Station (cistern)	Water
eT-02s	Texaco Service Station	Soil
eT-02sd	Texaco Service Station (duplicate)	Soil
eT-03t	trip blank	DI water
648 WB	Water blank	DI water

In the attached table we have taken the liberty to limit the list of compounds to include benzenes, substituted benzenes, chlorinated hydrocarbons, toluene, xylene and any other organic compounds found above detection limits. These compounds (BTEX and chlorinated hydrocarbons) were identified as groundwater contaminants in past EPA sampling events conducted in the Tutu Wellfield Area.

Should you have any questions regarding these data, please do not hesitate to call me at (212) 393-9634.

Sincerely,

CDM Federal Programs Corporation

Scott Graber
TES III Regional Manager

Attachment

cc: Joe Claypoole
NYC File
Document Control

TABLE 1

ORGANIC COMPOUNDS DETECTED IN 104(e) LETTER RESPONSE SAMPLES
TUTU WELLFIELD AREA, ST. THOMAS, U.S. VIRGIN ISLANDS

COMPOUNDS	e-01	e-02	e-03	e-04
METHYLENE CHLORIDE				3J
ACETONE				16J
CARBON DISULFIDE				
CHLOROFORM			9	9
1,2-DICHLOROETHANE				
BROMODICHLOROMETHANE			6	7
DIBROMOCHLOROMETHANE			9	9J
BROMOFORM			9	9
4-METHYL-2-PENTANONE				
2-HEXANONE				
TOLUENE				
XYLENE				
BENZENE				
ETHYLBENZENE				
STYRENE				
2 BUTANONE				
TETRACHLOROETHANE	440000	11		

440 ppm

TENTATIVELY IDENTAFIED COMPOUNDS

PROPYLBENZENE
2 METHOXY 2,4,4 TRIPENTANONE
2 METHYLHEXANE
2 METHYLBUTANE
PENTANONE (A Cn)
HEXANE
2 ETHYL-1,3 DIMETHYLBENZENE
1 ETHYL-2,3 DIMETHYLBENZENE
ACETIC ACID (methyl ester)
1,4 DIETHYLBENZENE
3 METHYLPENTANE
2 ETHYLPENTANE

J - Estimated value
N - Presumptive evidence of the presence of the material

(all values reported in UG/KG)

TABLE 1 (CONTINUED)

ORGANIC COMPOUNDS DETECTED IN 104(e) LETTER RESPONSE SAMPLES
TUTU WELLFIELD AREA, ST. THOMAS, U.S. VIRGIN ISLANDS

COMPOUNDS	eR-07s	eR-08s	eC-09s	eC-10s
METHYLENE CHLORIDE				
ACETONE				
CARBON DISULFIDE				
CHLOROFORM				
1,2-DICHLOROETHANE				
BROMODICHLOROMETHANE				
DIBROMOCHLOROMETHANE				
BROMOFORM				
4-METHYL-2-PENTANONE	8			33J
2-HEXANONE	55			
TOLUENE	2		560J	1300
XYLENE	1	7	2500	5600
BENZENE		6		4J
ETHYLBENZENE		18	1300	2100
STYRENE				6
2 BUTANONE				

TENTATIVELY IDENTAFIED COMPOUNDS

PROPYLBENZENE		70JN		10JN
2 METHOXY 2,4,4 TRIPENTANONE		100JN		50JN
2 METHYLHEXANE				
2 METHYLBUTANE				
PENTANONE (A Cn)				
HEXANE				
2 ETHYL-1,3 DIMETHYLBENZENE				
1 ETHYL-2,3 DIMETHYLBENZENE				
ACETIC ACID (methyl ester)				
1,4 DIETHYLBENZENE				
3 METHYLPENTANE				
2 ETHYLPENTANE				

J - Estimated value
N - Presumptive evidence of the presence of the material

(all values reported in UG/KG)

TABLE 1 (continued)

ORGANIC COMPOUNDS DETECTED IN 104(e) LETTER RESPONSE SAMPLES
TUTU WELLFIELD AREA, ST. THOMAS, U.S. VIRGIN ISLANDS

COMPOUNDS	eC-11a	eC-12af	eTT-14	eTT-15
METHYLENE CHLORIDE				
ACETONE		4J		
CARBON DISULFIDE				
CHLOROFORM		7		
1,2-DICHLOROETHANE				
BROMODICHLOROMETHANE		6		
DIBROMOCHLOROMETHANE		8		
BROMOFORM		9		
4-METHYL-2-PENTANONE				
2-HEXANONE				
TOLUENE	10			
XYLENE	13		11J	
BENZENE				
ETHYLBENZENE	3			
STYRENE				
2 BUTANONE				
TENTATIVELY IDENTAFIED COMPOUNDS				
PROPYLBENZENE	20JN			
2 METHOXY 2,4,4 TRIPENTANONE				
2 METHYLHEXANE				
2 METHYLBUTANE	10JN			
PENTANONE (A Cn)	10JN			
HEXANE	6 JN			
2 ETHYL-1,3 DIMETHYLBENZENE			300JN	2000JN
1 ETHYL-2,3 DIMETHYLBENZENE			1000JN	3000JN
ACETIC ACID (methyl ester)				30JN
1,4 DIETHYLBENZENE				
3 METHYLPENTANE	20JN			
2 ETHYLPENTANE				

J - Estimated value
N - Presumptive evidence of the presence of the material

(all values reported in UG/KG)

TABLE 1 (continued)

ORGANIC COMPOUNDS DETECTED IN 104(e) LETTER RESPONSE SAMPLES
TUTU WELLFIELD AREA, ST. THOMAS, U.S. VIRGIN ISLANDS

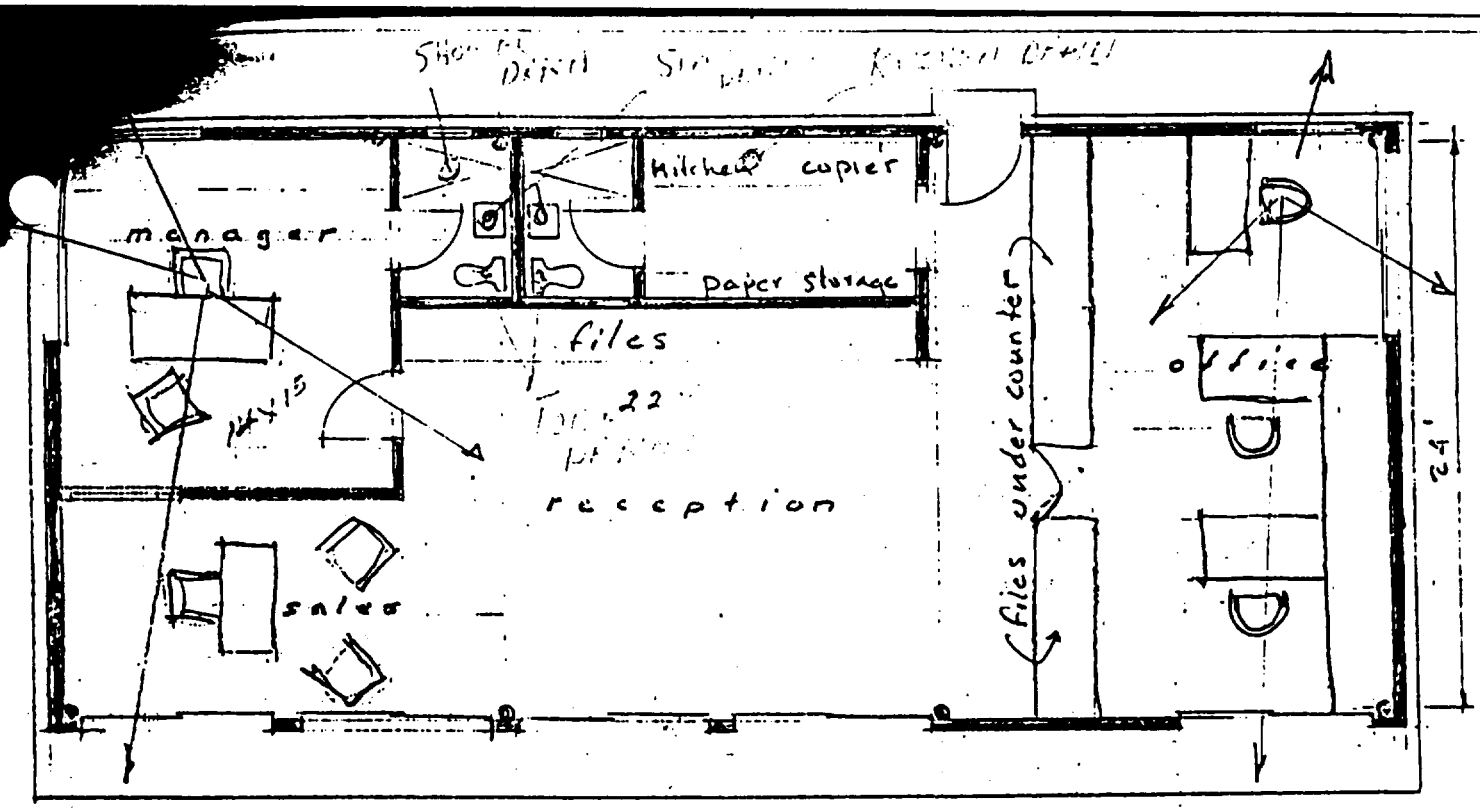
COMPOUNDS	eT-01w	eT-03t	648 WB
METHYLENE CHLORIDE		1J	
ACETONE		17	5J
CARBON DISULFIDE	2J		
CHLOROFORM		9	8
1,2-DICHLOROETHANE		2J	
BROMODICHLOROMETHANE		6	
DIBROMOCHLOROMETHANE		9	8
BROMOFORM		8	10
4-METHYL-2-PENTANONE			
2-HEXANONE			
TOLUENE			
XYLENE			
BENZENE			
ETHYLBENZENE			
STYRENE			
2 BUTANONE			

TENTATIVELY IDENTAFIED COMPOUNDS

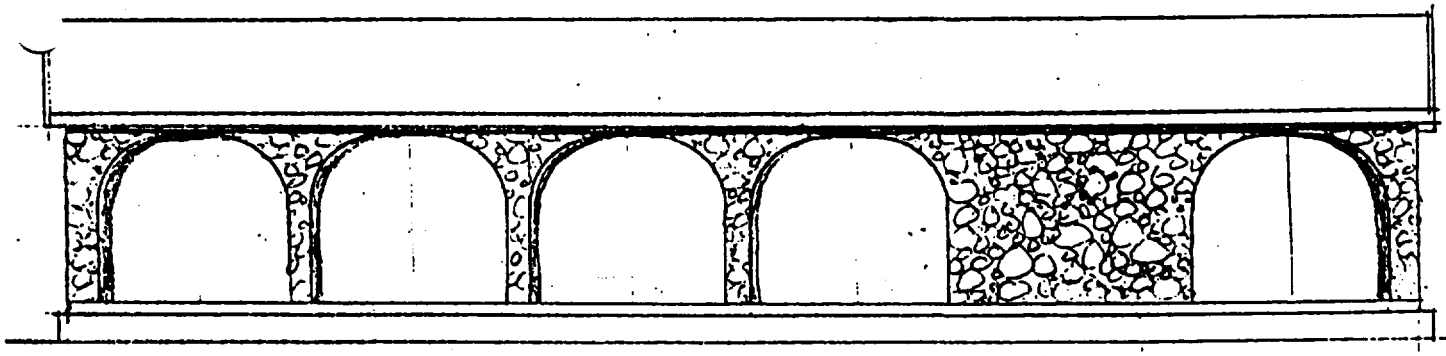
PROPYLBENZENE
2 METHOXY 2,4,4 TRIPENTANONE
2 METHYLHEXANE
2 METHYLBUTANE
PENTANONE (A Cn)
HEXANE
2 ETHYL-1,3 DIMETHYLBENZENE
1 ETHYL-2,3 DIMETHYLBENZENE
ACETIC ACID (methyl ester)
1,4 DIETHYLBENZENE
3 METHYLPENTANE
2 ETHYLPENTANE

J - Estimated value
N - Presumptive evidence of the presence of the material

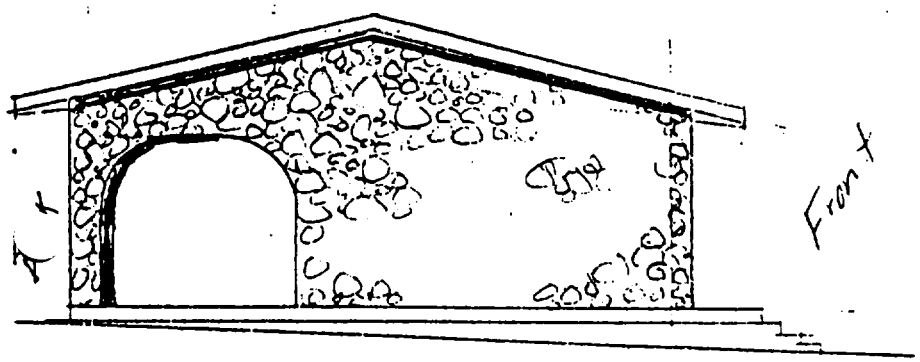
(all values reported in UG/KG)



FLOOR PLAN 1/8" = 1'-0"



WEST ELEVATION Front



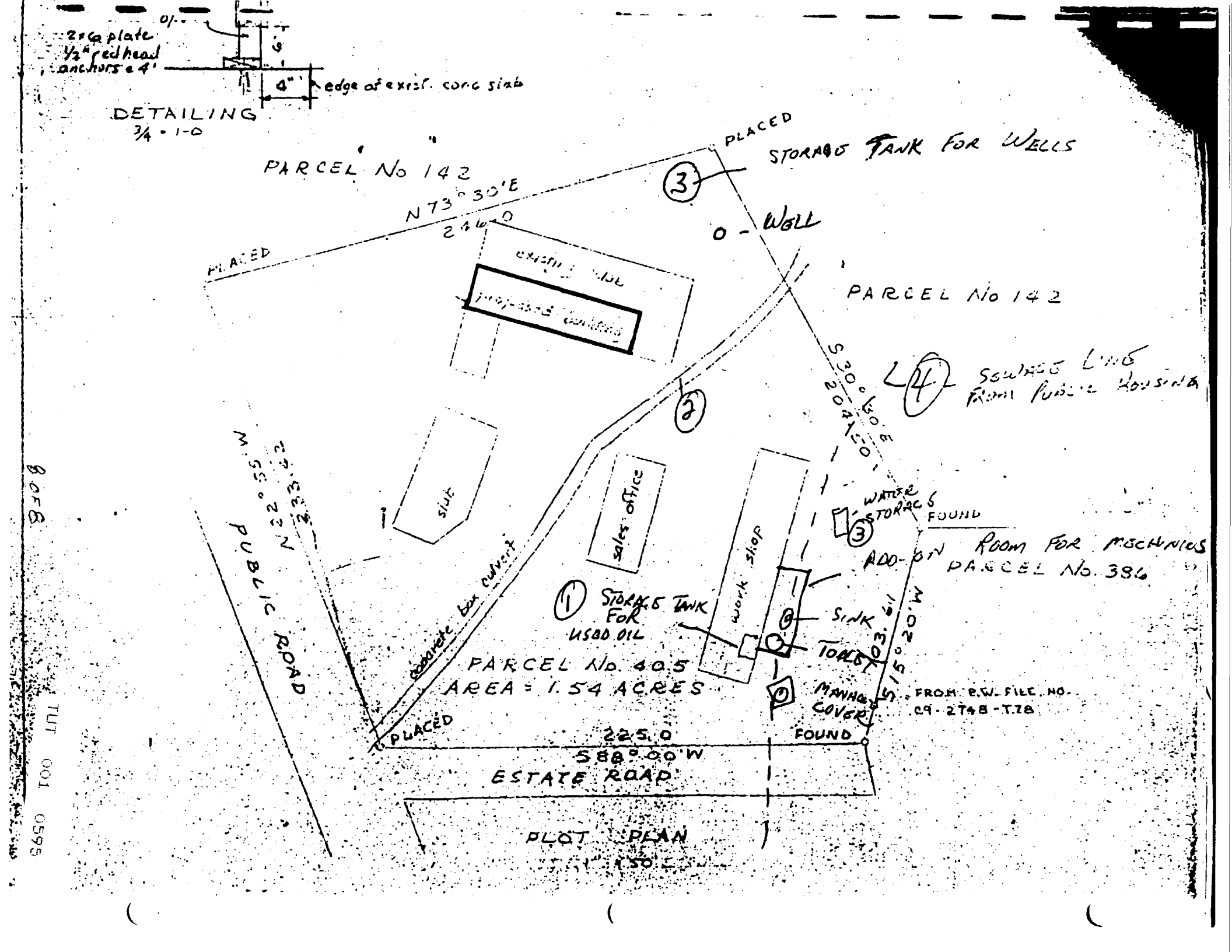
END ELEVATION

Front

RAMSAY MOTORS

(TUTU)

TUT 001 0594


2"ø plate
½" redhead anchors @ 4'
4"
edge of exist. conc slab
DETAILING
¾ = 1-0
PARCEL No 142
N 73° 30' E
PLACED
STORAGE TANK FOR WELLS
WELL
PARCEL No 142
S 30° 30' E
204.50
SOURCE LINE FROM PUBLIC HOUSING
PUBLIC ROAD
N 55° 22' W
SINK
SALES OFFICE
WORK SHOP
WATER STORAGE
FOUND
ADD-ON ROOM FOR MECHANICS
PARCEL No. 386
STORAGE TANK FOR USED OIL
SINK
TOILET
MANHOLE COVER
PARCEL No. 405
AREA = 1.54 ACRES
FROM P.W. FILE NO. C9-2748-T.78
PLACED
225.0
S 88° 00' W
FOUND
ESTATE ROAD
PLOT PLAN
1" = 50'

REFERENCE NO. 10

CDM Federal Programs Corporation

March 31, 1989

Ms. Caroline Kwan
U.S. Environmental Protection Agency
26 Federal Plaza
New York, New York 10278

Project: EPA Contract No: 68-01-7331

Document No: T648-C02-LR-DBXF-1

Subject: CLP Sample Analysis Data Summary of the
Tutu Texaco Service Station Tank Excavation
Tutu Wellfield Area, St. Thomas, U.S. Virgin Islands

Dear Ms. Kwan,

The purpose of this letter is to provide you with the CLP analysis results for the split samples collected during the Tutu Texaco Service Station tank excavation in the Tutu Wellfield Area, St Thomas, U.S. Virgin Islands from September 12 through September 15, 1988.

In the attached table we have taken the liberty to limit the list of compounds to include benzenes, substituted benzenes, chlorinated hydrocarbons, toluene, xylene and any other organic compounds found above detection limits. These compounds (BTEX and chlorinated hydrocarbons) were identified as groundwater contaminants in past EPA sampling events conducted in the Tutu Wellfield Area. The nomenclature of the samples listed in the above referenced table reflect the sample locations as follows:

- Samples with the prefix "EX" were collected from the excavation pit.
- Samples with the prefix "TP" were collected from the test holes located at the pit perimeter.
- Samples with the prefix "PW" were collected from the water pumped from the pit.
- Samples with the prefix "SP" were collected from the soil piles.

Should you have any questions regarding these data, please do not hesitate to call me at (212) 393-9634.

Sincerely,

CDM Federal Programs Corporation

Scott B. Graber

Scott Graber
TES III Regional Manager

Attachment

cc: NYC File
Document Control

40 Rector Street, 10th Floor New York, NY 10006 212 393-9634

TABLE 1

ORGANIC COMPOUNDS DETECTED IN TUTU TEXACO SERVICE STATION TANK EXCAVATION SPLIT SAMPLES, TUTU WELLFIELD AREA, ST. THOMAS, U.S. VIRGIN ISLANDS

COMPOUNDS	TP-01	TP-02	TP-03	TFB-01[1]
METHYLENE CHLORIDE				
ACETONE		18000BJ		5J
CARBON DISULFIDE				
CHLOROFORM			13J	
1,2-DICHLOROETHANE				6
BROMODICHLOROMETHANE				
DIBROMOCHLOROMETHANE				
BROMOFORM				
4-METHYL-2-PENTANONE		2700		
2-HEXANONE		14000J		
TOLUENE		4800	13J	
XYLENE	43000	22000		
BENZENE		1400	87J	
ETHYLBENZENE	5000	13000	170J	
STYRENE				
2 BUTANONE		2300J	6J	
TETRACHLOROETHANE				

TENTATIVELY IDENTAFIED COMPOUNDS

PROPYLBENZENE				
2 METHOXY 2,4,4 TRIPENTANONE			600JN	
2 METHYLHEXANE	2000JN			
2 METHYLBUTANE				
PENTANONE (A Cn)				
HEXANE				
2 ETHYL-1,3 DIMETHYLBENZENE				
1 ETHYL-2,3 DIMETHYLBENZENE				
ACETIC ACID (methyl ester)				
1,4 DIETHYLBENZENE				
2 METHYLETHYLBENZENE	6000JN			

J - Estimated value
N - Presumptive evidence of the presence of the material
[1] - denotes field blank
[2] - denotes trip blank
[3] - denotes duplicate sample
(all values reported in UG/KG)

TABLE 1 (continued)

ORGANIC COMPOUNDS DETECTED IN TUTU TEXACO SERVICE STATION TANK EXCAVATION SPLIT SAMPLES, TUTU WELLFIELD AREA, ST. THOMAS, U.S. VIRGIN ISLANDS

COMPOUNDS	EX-01	EX-02	EX-03	EX-03d[3]
METHYLENE CHLORIDE				
ACETONE				
CARBON DISULFIDE				
CHLOROFORM				
1,2-DICHLOROETHANE			10	
BROMODICHLOROMETHANE				
DIBROMOCHLOROMETHANE				
BROMOFORM				
4-METHYL-2-PENTANONE	6200J	49000J		30000J
2-HEXANONE			24000J	
TOLUENE	14000J	8900	3600	11000
XYLENE	31000J	58000	8100	25000
BENZENE	1200J	4600	280J	
ETHYLBENZENE	16000J	59000	4000	11000
STYRENE				
2 BUTANONE				2600J

TENTATIVELY IDENTAFIED COMPOUNDS

PROPYLBENZENE				
2 METHOXY 2,4,4 TRIPENTANONE				
2 METHYLHEXANE				
2 METHYLBUTANE				
PENTANONE (A Cn)				
HEXANE				
2 ETHYL-1,3 DIMETHYLBENZENE				
1 ETHYL-2,3 DIMETHYLBENZENE				
ACETIC ACID (methyl ester)				
1,4 DIETHYLBENZENE				
2 METHYLPENTANE	5000JN			

J - Estimated value
N - Presumptive evidence of the presence of the material
[1] - denotes field blank
[2] - denotes trip blank
[3] - denotes duplicate sample
(all values reported in UG/KG)

TABLE 1 (continued)

ORGANIC COMPOUNDS DETECTED IN TUTU TEXACO SERVICE STATION
TANK EXCAVATION SPLIT SAMPLES, TUTU WELLFIELD AREA,
ST. THOMAS, U.S. VIRGIN ISLANDS

COMPOUNDS	TFB-02[1]	EX-04	TFB-03[1]	FW-02
METHYLENE CHLORIDE			4J	
ACETONE	5J		13	
CARBON DISULFIDE				
CHLOROFORM				
1,2-DICHLOROETHANE				
BROMODICHLOROMETHANE				
DIBROMOCHLOROMETHANE				
BROMOFORM				
4-METHYL-2-PENTANONE				
2-HEXANONE				
TOLUENE		280J		
XYLENE	10	2000B		2J
BENZENE	24J			
ETHYLBENZENE	34B	1400		
STYRENE				
2 BUTANONE				
TETRACHLOROETHANE				

TENTATIVELY IDENTAFIED COMPOUNDS

PROPYLBENZENE
2 METHOXY 2,4,4 TRIPENTANONE
2 METHYLHEXANE
2 METHYLBUTANE
PENTANONE (A Cn)
HEXANE
2 ETHYL-1,3 DIMETHYLBENZENE
1 ETHYL-2,3 DIMETHYLBENZENE
ACETIC ACID (methyl ester)
1,4 DIETHYLBENZENE
2 METHYLPENTANE

J - Estimated value
N - Presumptive evidence of the presence of the material
[1] - denotes field blank
[2] - denotes trip blank
[3] - denotes duplicate sample
(all values reported in UG/KG)

TABLE 1 (continued)

ORGANIC COMPOUNDS DETECTED IN TUTU TEXACO SERVICE STATION
TANK EXCAVATION SPLIT SAMPLES, TUTU WELLFIELD AREA,
ST. THOMAS, U.S. VIRGIN ISLANDS

COMPOUNDS	SP-1T	SP-2T	SP-3T	SP-3DT[3]
METHYLENE CHLORIDE				
ACETONE				
CARBON DISULFIDE				
CHLOROFORM				
1,2-DICHLOROETHANE				
BROMODICHLOROMETHANE				
DIBROMOCHLOROMETHANE				
BROMOFORM				
4-METHYL-2-PENTANONE				
2-HEXANONE			17000J	7800
TOLUENE			670J	
XYLENE	720J	720J	5600	1900
BENZENE				
ETHYLBENZENE	990	920	3200	1400
STYRENE				
2 BUTANONE				
TETRACHLOROETHANE				

TENTATIVELY IDENTAFIED COMPOUNDS

PROPYLBENZENE
2 METHOXY 2,4,4 TRIPENTANONE
2 METHYLHEXANE
2 METHYLBUTANE
PENTANONE (A Cn)
HEXANE
2 ETHYL-1,3 DIMETHYLBENZENE
1 ETHYL-2,3 DIMETHYLBENZENE
ACETIC ACID (methyl ester)
1,4 DIETHYLBENZENE
2 METHYLPENTANE

J - Estimated value
N - Presumptive evidence of the presence of the material
[1] - denotes field blank
[2] - denotes trip blank
[3] - denotes duplicate sample
(all values reported in UG/KG)

TABLE 1 (continued)

ORGANIC COMPOUNDS DETECTED IN TUTU TEXACO SERVICE STATION TANK EXCAVATION SPLIT SAMPLES, TUTU WELLFIELD AREA, ST. THOMAS, U.S. VIRGIN ISLANDS

COMPOUNDS	SP-2M	SP-3DM[3]	SP-4T[2]	SP-FB-59[1]
METHYLENE CHLORIDE				
ACETONE	4500J			12
CARBON DISULFIDE				
CHLOROFORM				
1,2-DICHLOROETHANE				2J
BROMODICHLOROMETHANE				
DIBROMOCHLOROMETHANE				
BROMOFORM				
4-METHYL-2-PENTANONE				
2-HEXANONE	7900J	12000J		
TOLUENE	520J	280J	240J	
XYLENE	1700	1300	1900	
BENZENE				
ETHYLBENZENE	1400	1700	1300	
STYRENE				
2 BUTANONE				
TETRACHLOROETHANE				
TENTATIVELY IDENTAFIED COMPOUNDS				
PROPYLBENZENE				
2 METHOXY 2,4,4 TRIPENTANONE				
2 METHYLHEXANE				
2 METHYLBUTANE				
PENTANONE (A Cn)				
HEXANE				
2 ETHYL-1,3 DIMETHYLBENZENE				
1 ETHYL-2,3 DIMETHYLBENZENE				
ACETIC ACID (methyl ester)	4000JN			
1,4 DIETHYLBENZENE				
2 METHYLPENTANE				

J - Estimated value
N - Presumptive evidence of the presence of the material
[1] - denotes field blank
[2] - denotes trip blank
[3] - denotes duplicate sample
(all values reported in UG/KG)

TABLE 1 (continued)

ORGANIC COMPOUNDS DETECTED IN TUTU TEXACO SERVICE STATION TANK EXCAVATION SPLIT SAMPLES, TUTU WELLFIELD AREA, ST. THOMAS, U.S. VIRGIN ISLANDS

COMPOUNDS	SP-T-60[2]	SP-T-61[2]	648-WB (water blank)
METHYLENE CHLORIDE			
ACETONE	10	26J	5J
CARBON DISULFIDE			
CHLOROFORM			8
1,2-DICHLOROETHANE	2J		
BROMODICHLOROMETHANE			6
DIBROMOCHLOROMETHANE			8
BROMOFORM			10
4-METHYL-2-PENTANONE			
2-HEXANONE			
TOLUENE			
XYLENE			
ETHYLBENZENE			
STYRENE			
2 BUTANONE			
TETRACHLOROETHANE			

TENTATIVELY IDENTAFIED COMPOUNDS

PROPYLBENZENE
2 METHOXY 2,4,4 TRIPENTANONE
2 METHYLHEXANE
2 METHYLBUTANE
PENTANONE (A Cn)
HEXANE
2 ETHYL-1,3 DIMETHYLBENZENE
1 ETHYL-2,3 DIMETHYLBENZENE
ACETIC ACID (methyl ester)
1,4 DIETHYLBENZENE
2 METHYLPENTANE

J - Estimated value
N - Presumptive evidence of the presence of the material
[1] - denotes field blank
[2] - denotes trip blank
[3] - denotes duplicate sample
(all values reported in UG/KG)

TUT 001 0603

REFERENCE NO. 11

February 2, 1990

Ms. Caroline Kwan
U.S. Environmental Protection Agency
26 Federal Plaza
New York, New York 10278

Project: EPA Contract No:68-W9-0002

Document No: TES V - C02048 - LR - BMVG

Subject: Work Assignment C02048
CLP Sample Analysis Data Summary of Oils
from the Tutu Texaco Station, Tutu Esso Station,
Ramsay Motor Center, and Consolidated Auto Parts,
Tutu Wellfield Area, St. Thomas, U.S. Virgin Islands

Dear Ms. Kwan,

The purpose of this letter is to provide you with the CLP analysis results for volatile organic compounds in 12 oils collected on July 8, 1989, during the resampling of 104(e) sites in the Tutu Wellfield Area, St. Thomas, U.S. Virgin Islands.

Table 1 lists the compounds found above detection limits, including benzenes, substituted benzenes, chlorinated hydrocarbons, toluene, xylene and other organic compounds. However, detection limits for a given compound are not constant, but increase with increasing sample dilution. Some of the analyzed samples were heavily diluted; they may contain undetected compounds that would have been discovered at a lower dilution factor where their detection limits would have been lower. To show you which samples may contain undetected compounds, a list of sample dilution factors used for each sample and detection limits for all analyzed compounds at those dilutions is included as Table 2.

The prefixes of the samples listed reflect the sample locations as follows:

- o eR - Ramsay Motor Center
- o eT - Tutu Texaco Station
- o eC - Consolidated Auto Parts
- o eE - Tutu Esso Station

Volatile holding times are often used for litigation support. They are set primarily to minimize compound losses due to volatization and biodegradation. These processes generally result in reduction of the compound concentration. Thus, although holding times were exceeded in all cases, causing the values to be qualified as estimates (J), these numbers can be conservatively regarded as minimum values.

40 Rector Street, 10th Floor New York, NY 10006 212 393-9634

TUT 001 0605

Two samples, eT-02-03a and eC-02-01a, were mistakenly analyzed as water by the lab. Consequently, almost all data from these samples were rejected (R).

All values for tentatively identified compounds are qualified with the letter N (presumptive evidence of the presence of the material). This merely reflects the fact that the compound identification was tentative.

The analyses show detectable levels of chlorinated hydrocarbons in sample eT-02-6a, collected from the Tutu Texaco station and in eE-02-01a, -02a, and -03a, from the Tutu Esso station.

Should you have any questions regarding these data, please do not hesitate to call me or Sally Odland at (212) 393-9634.

Sincerely,

CDM Federal Programs Corporation

Scott Graber
TES V Regional Manager

TABLE 1

ORGANIC COMPOUNDS DETECTED IN OILS
SECOND ROUND OF 104(E) SAMPLING
ST. THOMAS, U.S. VIRGIN ISLANDS

(ug/kg)

COMPOUNDS	eR-02-01a	eT-02-01a	eT-02-02a
METHYLENE CHLORIDE			
ACETONE			
2-HEXANONE	180,000 J		
TOLUENE	450,000 J	340,000 J	76,000 J
XYLENE	1,200,000 J	1,600,000 J	190,000 J
BENZENE	64,000 J		7,000 J
ETHYLBENZENE	130,000 J	190,000 J	35,000 J
TETRACHLOROETHENE			
1,1,1-TRICHLORETHANE			
TENTATIVELY IDENTIFIED COMPOUNDS			
PROPYLBENZENE	120,000 JN		
1-ETHYL-2,3 DIMETHYLBENZENE			
1,2,3-TRIMETHYLBENZENE			
1,2,4 TRIMETHYLBENZENE			
2-METHYLBUTANE	68,000 JN		
2,3-DIMETHYLBUTANE	23,000 JN		
3-METHYLPENTANE			
METHYL-CYCLOPENTANE	37,000 JN		
HEXANE (DOT)			
3-METHYLHEXANE			
2-METHOXY-2-METHYLPROPANE			

J- estimated value
N- presumptive evidence of the presence of the material

TUT 001 0607

TABLE 1 (Continued)

ORGANIC COMPOUNDS DETECTED IN OILS
SECOND ROUND OF 104(E) SAMPLING
ST. THOMAS, U.S. VIRGIN ISLANDS

(ug/kg)

COMPOUNDS	eT-02-03a*	eT-02-04a	eT-02-05a
METHYLENE CHLORIDE			
ACETONE	2,400 J		
2-HEXANONE		59,000 J	
TOLUENE		490,000 J	130,000 J
XYLENE	300 J	900,000 J	330,000 J
BENZENE		46,000 J	11,000 J
ETHYLBENZENE		140,000 J	49,000 J
TETRACHLOROETHENE			
1,1,1-TRICHLORETHANE			
TENTATIVELY IDENTIFIED COMPOUNDS			
PROPYLBENZENE		57,000 JN	31,000 JN
1-ETHYL-2,3 DIMETHYLBENZENE			
1,2,3-TRIMETHYLBENZENE			
1,2,4 TRIMETHYLBENZENE			
2-METHYLBUTANE			
2,3-DIMETHYLBUTANE			
3-METHYLPENTANE		33,000 JN	
METHYL-CYCLOPENTANE			
HEXANE (DOT)			6,600 JN
3-METHYLHEXANE			8,000 JN
2-METHOXY-2-METHYLPROPANE			

J- estimated value
N- presumptive evidence of the presence of the material

*Sample mistakenly analyzed as water. All other values are flagged as "R" (rejected).

TUT 001 0608

TABLE 1 (Continued)

ORGANIC COMPOUNDS DETECTED IN OILS
SECOND ROUND OF 104(E) SAMPLING
ST. THOMAS, U.S. VIRGIN ISLANDS

(ug/kg)

COMPOUNDS	eT-02-06a	eT-02-07a	eC-02-01a*
METHYLENE CHLORIDE		3,800 J	
ACETONE			13 J
2-HEXANONE			
TOLUENE	110,000 J	24,000 J	
XYLENE	88,000 J	120,000 J	
BENZENE	4,000 J		
ETHYLBENZENE	61,000 J	13,000 J	
TETRACHLOROETHENE			
1,1,1-TRICHLORETHANE	3,900 J		
TENTATIVELY IDENTIFIED COMPOUNDS			
PROPYLBENZENE			
1-ETHYL-2,3 DIMETHYLBENZENE		5,400 JN	
1,2,3-TRIMETHYLBENZENE	55,000 JN		
1,2,4 TRIMETHYLBENZENE			
2-METHYLBUTANE			
2,3-DIMETHYLBUTANE			
3-METHYLPENTANE			
METHYL-CYCLOPENTANE			
HEXANE (DOT)			
3-METHYLHEXANE			
2-METHOXY-2-METHYLPROPANE			

J- estimated value
N- presumptive evidence of the presence of the material

TUT 001 0609

TABLE 1 (Continued)

ORGANIC COMPOUNDS DETECTED IN OILS
SECOND ROUND OF 104(E) SAMPLING
ST. THOMAS, U.S. VIRGIN ISLANDS

(ug/kg)

COMPOUNDS	eE-02-01a	eE-02-02a	eE-02-03a
METHYLENE CHLORIDE			
ACETONE			
2-HEXANONE			
TOLUENE	91,000 J	57,000 J	92,000 J
XYLENE	28,000 J	150,000 J	230,000 J
BENZENE	12,000 J		
ETHYLBENZENE	32,000 J	19,000 J	
TETRACHLOROETHENE	30,000 J	63,000 J	91,000 J
1,1,1-TRICHLORETHANE	25,000 J	42,000 J	
TENTATIVELY IDENTIFIED COMPOUNDS			
PROPYLBENZENE			
1-ETHYL-2,3 DIMETHYLBENZENE			
1,2,3-TRIMETHYLBENZENE	140,000 JN		
1,2,4 TRIMETHYLBENZENE	16,000 JN		
2-METHYLBUTANE			
2,3-DIMETHYLBUTANE			
3-METHYLPENTANE	7,900 JN		
METHYL-CYCLOPENTANE			
HEXANE (DOT)			
3-METHYLHEXANE			
2-METHOXY-2-METHYLPROPANE	25,000 JN		

J- estimated value
N- presumptive evidence of the presence of the material

* Sample mistakenly analyzed as water. All other values are flagged as "R" (rejected).

TUT 001 0610

TABLE 1 (Continued)

ORGANIC COMPOUNDS DETECTED IN OILS
SECOND ROUND OF 104(E) SAMPLING
ST. THOMAS, U.S. VIRGIN ISLANDS

(ug/kg)

COMPOUNDS	eE-02-03a
METHYLENE CHLORIDE	
ACETONE	
2-HEXANONE	
TOLUENE	92,000 J
XYLENE	230,000 J
BENZENE	
ETHYLBENZENE	
TETRACHLOROETHENE	91,000 J
1,1,1-TRICHLORETHANE	

TENTATIVELY IDENTIFIED COMPOUNDS

PROPYLBENZENE
1-ETHYL-2,3 DIMETHYLBENZENE
1,2,3-TRIMETHYLBENZENE
1,2,4 TRIMETHYLBENZENE
2-METHYLBUTANE
2,3-DIMETHYLBUTANE
3-METHYLPENTANE
METHYL-CYCLOPENTANE
HEXANE
3-METHYLHEXANE
2-METHOXY-2-METHYLPROPANE

J- estimated value
N- presumptive evidence of the presence of the material

TUT 001 0611

TABLE 2

DETECTION LIMITS FOR VARIOUS VOLATILE ORGANIC COMPOUNDS AT DIFFERENT DILUTION LEVELS

Sample dilutions were as follows:

Sample	Dilution	Sample	Dilution
eR-02-01a	50x	eT-02-06a	10x
eT-02-01a	50x	eT-02-07a	10x
eT-02-02a	10x	eE-02-01a	10x
eT-02-04a	40x	eE-02-02a	10x
eT-02-05a	20x	eE-02-03a	200x

Samples eT-02-03a and eC-02-01a were mistakenly analyzed as waters. Results were rejected. Dilution rates are irrelavant.

Detection limits for the analyzed VOCs at the relevant dilutions fall into three groups:

Dilution Factor (UG/KG)

Compounds	200x	50x	40x	20x	10x
Group 1	1,300,000	310,000	250,000	130,000	63,000
Group 2	250,000	63,000	50,000	25,000	13,000
Group 3	130,000	31,000	25,000	13,000	6,300

Group 1 Compounds
trans -1,3-Dichloropropene

Group 2 Compounds
Chloromethane, Bromomethane, Vinyl Chloride, Chloroethane, Acetone, 2-Butanone, Vinyl Acetate, 4-Methyl-2-Pentanone, 2-Hexanone

Group 3 Compounds
Methylene Chloride, Carbon Disulfide, 1,1-Dichloroethene, 1,1-Dichloroethane, 1,2-Dichloroethene (total), Chloroform, 1,2-Dichloroethane, 1,1,1-Trichloroethane, Carbon Tetrachloride, Bromodichloromenthane, 1,2-Dichloropropane, cis-1,3-Dichloropropene, Trichloroethene, Dibromochloromethane, 1,1,2-Trichloroethane, Benzene, Bromoform, Tetrachloroethene, 1,1,2,2-Tetrachloroethane, Toluene, Chlorobenzene, Ethylbenzene, Styrene, Total Xylenes.

TUT 001 0612

MEMORANDUM

TO: Document Control

FROM: Margo Rosato MR

SUBJECT: Validated Data

DATE: January 3, 1990

DCN: TES5-C02001-DV-BLWN

****

Enclosed please find two copies of validated data for the following sites:

SITE	CASE NO.		ANALYSIS
Rosen	3900I	Set 41	Organic
	10925		Inorganic
	10925		Organic
	4208I	Set 5	Inorganic
	4208I	Set 6	Inorganic
	10851		Organic
North Sea	12163		Organic
	12163		Organic
	12057		Inorganic
	12057		Organic
Tutu	4512B		Organic
Mannheim	12684		Inorganic
	4835B		Organic

Please fill each case accordingly. Should you have any questions please do not hesitate to call me.

MR/md

Enclosure

CC: P. Hillis
S. Graber
J. Litwin

(TV16/62)

TUT 001 0613

RECORD OF COMMUNICATION

☐ PHONE CALL ☐ DISCUSSION ☐ FIELD TRIP ☐ CONFERENCE
☐ OTHER (SPECIFY)

(Record of item checked above)

TO: George Karras

FROM: Ronald W. Starks

DATE: 09/19/89

TIME: 0930

SUBJECT: CLP Organic Data Packages For Quality Assurance Review

SUMMARY OF COMMUNICATION

The Following CLP Organic Data are being sent to MMB for review

SITE	CASE #/ SAS #	LABORATORY	ANALYSIS/ MATRIX		NUMBER OF SAMPLES	BLANK NUMBER(S)	DUPLICATE NUMBER(S)
Industrial Latex R3/RI/FS	12610	Compuchem	Organic	Water Soil	06 08	BAR-20(TB) BAR-18(FB) BAR-21(RB) BAR-19(FB) BAR-14(FB)	NONE
TUTU Super Cat TES III	4512B	Versar	Organic	Water Soil	07 11	None	None
Denhard Property CDM/RI/FS	12630	Versar	Organic	Water Soil	07 05	BAW-05(TB) BAW-05(RB)	BAW12 BAW11
Cursio CDM/TesV	12434	Compuchem	Organic	Water	02	BY-901 BY-903	None

CONCLUSIONS, ACTION TAKEN OR REQUIRED

RECEIVED
DEC 14 1989
S & M BRANCH

INFORMATION COPIES
TO: File and Data Package

TUT 001 0614

EPA Form 1300-6 (7-72) REPLACES EPA NO FORM 5300-6 WHICH MAY BE USED UNTIL SUPPLY IS EXHAUSTED.

APPENDIX A.6

TUT 001 0615

REJECTION SUMMARY FORM
(No. of Compounds/No. of Fractions (Samples)

Type of Review: Tojal Date: 12/4/89 Case #: 4512B

Project: Tutu/Supercut Lab Name: Versar

Reviewer's Initials: R C Number of Samples: 13

Analytes Rejected Due to Exceeding Review Criteria:

	Surrogates	Holding Time	Calibration	Contamination	ID	Other	* Total # Samples	Total # Rejected/ Total # in all Samples
Acids (15)								
B/N (50)								
VOA (~~35~~ 34)	0	0	9	2	0	68	13	79 / 442
PEST (20)								
PCB (7)								
TCDD (1)								

Analytes Estimated Due to Exceeding Review Criteria for:

Acids (15)								
B/N (50)								
VOA (~~35~~ 34)	0	363	0	0	0	0	13	363 / 442
PEST (20)								
PCB (7)								
TCDD (1)								

* Includes any trip and field blanks, which are not subject to qualification based on some QC criteria (such as method blank contamination)

BK
12/14/89

ATTACHMENT 1
SOP NO. HW-6

TOTAL REVIEW

CLP DATA ASSESSMENT

Functional Guidelines for Evaluating Organic Analysis

Case No. 4512B SDG No. 1 LABORATORY VERSAR SITE TUTU/SUPERCAT

DATA ASSESSMENT:

The current functional guidelines (1988) for evaluating organic data have been applied.

All data are valid and acceptable except those analytes which have been qualified with a "J" (estimated), "U" (non-detects), "R" (unusable), or "JN" (presumptive evidence for the presence of the material at an estimated value). All action is detailed on the attached sheets.

Two facts should be noted by all data users. First, the "R" flag means that the associated value is unusable. In other words, due to significant QC problems the analysis is invalid and provides no information as to whether the compound is present or not. "R" values should not appear on data tables because they cannot be relied-upon, even as a last resort. The second fact to keep in mind is that no compound concentration, even if it has passed all QC tests, is guaranteed to be accurate. Strict QC serves to increase confidence in data but any value potentially contains error.

Reviewer's Signature: Rhonda Carter Date 12/4/1989

Verified By: Margo Rosato Date 12/4/1989

TUT 001 0616

DATA ASSESSMENT:

1. HOLDING TIME:

The amount of an analyte in a sample can change with time due to chemical instability, degradation, volatilization, etc. If the specified holding time is exceeded, the data may not be valid. Those analytes detected in the samples whose holding time has been exceeded will be qualified as estimated, "J". The non-detects (sample quantitation limits) will be flagged as estimated, "J", or unusable, "R", if the holding times are grossly exceeded.

The following action was taken in the samples and analytes due to excessive holding time.

All compounds were qualified J in samples 4512B-41, 42, 43, 44, - 46, 47, 48, 49, - 51, 52 and 53 due to excessive holding times. The non-detects in these samples were not rejected since volatilization, biodegradation, etc., are inhibited in an oil matrix. The medium level analysis raised the detection limits and the data user must understand that the "J" flag indicates detection limits may be higher.

The J flag for 2-butanone was superceded by rejection in the following samples: 4512B-42, 43, 44, 48, 49, 51 and 52. (see section 4).

Holding Times were exceeded for samples 4512B-45 and 50, however, they were qualified as described in section 10.

DATA ASSESSMENT:

2. BLANK CONTAMINATION:

Quality assurance (QA) blanks, i.e., method, trip, field, rinse and water blanks are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Trip blanks measure cross-contamination of samples during shipment. Field blanks measure cross-contamination of samples during field operations. If the concentration of the analyte is less than 5 times the blank contaminant level (10 times for the common contaminants), the analytes in the samples shown were qualified with "U" for these reasons:

A) Method blank contamination
Methylene chloride and acetone were flagged U in sample 4512B-53 (Dilution factor for medium level analysis and 200 fold dilution were taken into account). The laboratory analyzed method blanks (VBLK11, VBLK95 and VBLK29) as low level waters when they should have been analyzed as medium level soils.

B) Field or rinse blank contamination ("water blanks" or "distilled water blanks" are validated like any other sample)

C) Trip blank contamination

DATA ASSESSMENT:

4. CALIBRATION:

Satisfactory instrument calibration is established to ensure that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of giving acceptable performance at the beginning of an experimental sequence. The continuing calibration checks document that the instrument is giving satisfactory daily performance.

A) RESPONSE FACTOR:

The response factor measures the instrument's response to specific chemical compounds. The response factor for the Target Compound List (TCL) must be $\geq$ 0.05 in both the initial and continuing calibrations. A value < 0.05 indicates a serious detection and quantitation problem (poor sensitivity). Analytes detected in the sample will be qualified as estimated, "J". All non-detects for that compound will be rejected, "R".

2-Butanone was rejected in samples 4512B- 42, 43, 44, 45*, 48, 49, 50*, 51 and 52 because the calibration response factor was below 0.05.

* All analytes in samples 4512B-45 and 50 have been rejected due to other criteria, see section 10.

DATA ASSESSMENT:

5. CALIBRATION:

A) PERCENT RELATIVE STANDARD DEVIATION (%RSD) AND PERCENT DIFFERENCE (%D):

Percent RSD is calculated from the initial calibration and is used to indicate the stability of the specific compound response factor over increasing concentration. Percent D compares the response factor of the continuing calibration check to the mean response factor (MRF) from the initial calibration. Percent D is a measure of the instrument's daily performance. Percent RSD must be <30% and %D must be <25%. A value outside of these limits indicates potential detection and quantitation errors. For these reasons, all positive results are flagged as estimated, "J" and non-detects are flagged "UJ" (if %D or RSD >50%). If there is a gross deviation of %RSD and %D, the non-detects may be rejected, "R".

For the PCB/PESTICIDE fraction, %RSD for aldrin, endrin, DDT, and dibutylchlorendate must not exceed 10%. Percent D must be within 15% on the quantitation column and 20% on the confirmation column.

Acetone did not meet continuing calibration QC criteria in samples 4512B-41 and -45. but was qualified as estimated previously, due to holding time exceedance, and other qc as described in section 10.

DATA ASSESSMENT:

6. SURROGATES:

All samples are spiked with surrogate compounds prior to sample preparation to evaluate overall laboratory performance and efficiency of the analytical technique. If the measured surrogate concentrations were outside contract specifications, qualifications were applied to the samples and analytes as shown below.

Surrogate recovery was high in sample 4512B-48. Data was previously qualified as estimated due to holding time exceedance, and further qualification is not required.

DATA ASSESSMENT:

8. COMPOUND IDENTIFICATION:

A) VOLATILE AND SEMI-VOLATILE FRACTIONS:

TCL compounds are identified on the GC/MS by using the analyte's relative retention time (RRT) and by comparison to the ion spectra obtained from known standards. For the results to be a positive hit, the sample peak must be within ±0.06 RRT units of the standard compound and have an ion spectrum which has a ratio of the primary and secondary m/e intensities within 20% of that in the standard compound. For the tentatively identified compounds (TIC) the ion spectra must match accurately. In the cases in which there is not and adequate ion spectrum match, the laboratory may have provided false positive identification.*

B) PESTICIDE FRACTION:

The retention times of reported compounds must fall within the calculated retention time windows for the two chromatographic columns and a GC/MS confirmation is required if the concentration exceeds 10 ng/ml in the final sample extract.

~~Total xylenes in samples 4512B-45, 48, 49 and 52 was qualified N because of inadequate spectral match.~~ mdl 12/13/89

Four TIC's in sample 4512B-41, and 51, two TIC's in sample 4512B-46, three TIC's in sample 4512B-47, one TIC in samples 4512-48 and 49 were flagged JN.

*All TIC compound results (VOA and BNA) are flagged "J" (estimated), and also "N" (presumptive evidence of the presence of the compound) if an identification is made, to reflect the qualitative and quantitative error inherent in the analysis of compounds without corresponding calibration standards.

DATA ASSESSMENT:

9. MATRIX SPIKE/SPIKE DUPLICATE, MS/MSD:

The MS/MSD data are generated to determine the long-term precision and accuracy of the analytical method in various matrices. The MS/MSD may be used in conjunction with other QC criteria for some additional qualification of the data.

Toluene recovery in 4512B-49 MSD was high, data was qualified "J" due to holding time exceedance, further qualification is not required.

The lab analyzed two oil samples as low level waters but did not perform low level MS/MSD analysis. Samples vee actually oils and a medium level oil MS/MSD vas analyzed. Data has been ~~rejected~~ due to other QC criteria and further qualification due to the lack of a low level MS/MSD is not required. (see section 10)

DATA ASSESSMENT:

10. OTHER QC DATA OUT OF SPECIFICATION:
The laboratory incorrectly labeled samples with SAS# 4685B when the SAS packing lists clearly indicates the sample numbers begin with 4512B. Reviever corrected (see phone log).
The laboratory incorrectly identified the matrix for samples 4512B- 45 and 50 as water and analyzed as waters (see phone log) - these samples should not have been analyzed as waters and all nondetect data was rejected. Positive results, acetone in samples 4512B-45 and 50 and total xylenes in 4512B-45; were flagged J as estimated.

11. SYSTEM PERFORMANCE AND OVERALL ASSESSMENT (continued on next page if necessary):

12. CONTRACT PROBLEMS / NON-COMPLIANCE:
- Lab did not provide Form VI for initial Calibration performed on 7/12/89 and 8/19/89.
- Lab did not provide Form VII for continuing calibration performed on 7/19/89 at 9:51 and 23:25, 7/20/89, 8/19/89, 8/21/89 and 8/23/89. However, the lab did provide the raw data for the above calibrations.
- 2 oil matrix samples were incorrectly analyzed as water matrix samples.

13. This package contains re-extraction, re-analysis or dilution. Upon revieving the QA results, the following form I(s) are identified to be used.

DPO: [ ] ACTION [ ] FYI Region II

ORGANIC REGIONAL DATA ASSESSMENT SUMMARY

CASE NO. 4512 B LABORATORY Versar

SDG NO. N/A DATA USER

SOW SAS REVIEW COMPLETION DATE 12/4/89

NO. OF SAMPLES ____ WATER ____ SOIL 13 OTHER (oils)

REVIEWER [ ] ESD [ ] ESAT [ ] OTHER, CONTRACT/CONTRACTOR COM

	VOA	BNA	PEST	OTHER
1. HOLDING TIMES	M	N/A	N/A	N/A
2. GC-MS TUNE/ GC PERFORMANCE	O			
3. INITIAL CALIBRATIONS	X			
4. CONTINUING CALIBRATIONS	X			
5. FIELD BLANKS ("F" = not applicable)	F			
6. LABORATORY BLANKS	X			
7. SURROGATES	O			
8. MATRIX SPIKE/DUPLICATES	O			
9. REGIONAL QC ("F" = not applicable) (incorrectly analyzed oil matrix samples as waters)	Z			
10. INTERNAL STANDARDS	O		—	
11. COMPOUND IDENTIFICATION				
12. COMPOUND QUANTITATION				
13. SYSTEM PERFORMANCE	↓			
14. OVERALL ASSESSMENT	M			

O = No problems or minor problems that do not affect data usability.
X = No more than *about* 5% of the data points are qualified as either estimated or unusable.
M = More than *about* 5% of the data points are qualified as estimated.
Z = More than *about* 5% of the data points are qualified as unusable.

DPO ACTION ITEMS: _____

AREAS OF CONCERN: _____

In Reference to Case No(s):
4512B

Contract Laboratory Program
REGIONAL/LABORATORY COMMUNICATION SYSTEM

Telephone Record Log

Date of Call: 11/30/89

Laboratory Name: ~~Lion~~ Versar

Lab Contact: Linda Bock

Region: II

Regional Contact: COM

Call Initiated By: ___ Laboratory ✓ Region

In reference to data for the following sample number(s):

All

Summary of Questions/Issues Discussed:

① Sample numbers do not agree with SMO packing list

② Samples 4512B-15 and 50 were ~~are~~ listed as waters on FL's

Summary of Resolution:

① Lab acknowledged - Reviewer corrected form 1's.

② All samples are soils, ~~not~~ software automatically lists matrix according to calibration; samples 15 and 50 were analyzed as waters, i.e. 5ml of oil (+ dilutions in MeOH) and results for these samples are therefore in units of ug/L (L of oil).

Margo Losado — 11/30/89
Signature — Date

Distribution: (1) Lab Copy, (2) Region Copy, (3) SMO Copy

In Reference to Case No(s):
4658B44

Contract Laboratory Program
REGIONAL/LABORATORY COMMUNICATION SYSTEM
Telephone Record Log

Date of Call: 11/27/89

Laboratory Name: Versar
Lab Contact: Clay Hammer (703) 750-3000
Region: II
Regional Contact: Rhonda Carter

Call Initiated By: ___ Laboratory ✓ Region

In reference to data for the following sample number(s):
All samples

Summary of Questions/Issues Discussed:
- VOA - Confirm calculations for positive hits
- Confirm whether there was MS/MSD for water samples

Summary of Resolution:
- Received for response for calculations
- As per Lab's Book there were no water samples
- Refer to SAS, the form 1 are listed incorrectly

Rhonda Carter — Signature
11/29/89 — Date

Distribution: (1) Lab Copy, (2) Region Copy, (3) SMO Copy

TUT 001 0627

Versar Inc.

MEMORANDUM

To: Rhonda Carter

From: Linda E. Bock
GC/MS Data Quality Manager

Date: November 28, 1989

Re: Your call to Charlie Carter regarding SAS 45128

For SAS 45128, there was one set of QC performed for the soil samples. There were no water samples in this SAS.

For the calculations of CRQLs, the level of medium automatically implies that a 125 dilution factor was used. Any further dilution appears as the dilution factor on the Form IA. For example, sample 4658841, page 100029 is a medium level soil with a dilution factor of 50. This would mean that the total dilution performed on this sample is 125 times 50, or 6250, which would then be multiplies by the CRQL. Rounding would bring the value to two significant figures.

As for the SAS numbers, the Packing List (page 100006) has both 45128 and 46588. Since 46588 appeared on the VOA bottles, this was the number used by the analysts for their data.

Please contact me at (703)750-3000 ext 748 if you require further assistance.

To: Rhonda Carter

From: Linda Bock
GC/MS Data Quality manager

Calculation of hit would be as follows:

Sample 4658B-51 (page 200010)

Form IA has a value for 1,1,1-Trichloroethene of 25000 ug/kg.

For VOA prep, 4 g of sample into 10 ml,
10 µl of extract into 5 ml, purge.

CRQL for med soil is 125 times higher than low soil
dilution factor = 10
quan report for 1,1,1-TCE = 20.075
125 × 10 × 20.075 = 25094 which
rounds to 25000 ug/kg.

TUT 001 0629

SOP NO. HW-6
Revision #6

CLP ORGANICS DATA REVIEW AND PRELIMINARY REVIEW

CONCURRED BY: _____ Date: 4/6/89
Louis Bevilacqua
Monitoring Management Branch

APPROVED BY: _____ Date: 4/14/89
Gerard F. McKenna, Chief
Monitoring Management Branch

TUT 001 0630

CKAGE COMPLETENESS AND DELIVERABLES

CASE NUMBER: 4512B

LAB: Versar

SITE: Tutu Supercut

1.0 Data Completeness and Deliverables	YES	NO	N/A
1.1 Have any missing deliverables been received and added to the data package.	[ ]	✓	—
ACTION: Call lab for explanation / resubmittal of any missing deliverables. If lab cannot provide them, note the effect on review of the package under the "Contract Problems/Non-compliance" section of reviewer narrative.			
1.2 Was SMO OCS checklist included with package?	[ ]	✓	—
2.0 Cover Letter/Case Narrative			
2.1 Is the Narrative or Cover Letter present?	[✓]	—	—
2.2 Are Case Number and/or SAS number contained in the Narrative or Cover Letter?	[✓]	—	—

3.0 Data Validation Checklist

The following checklist is divided into three parts. Part A is filled out if the data package contains any VOA analyses, Part B for any BNA analyses and Part C for Pesticide/PCBs.

Does this package contain:

VOA data?	✓	—
BNA data?	—	✓
Pesticide/PCB data?	—	✓

ACTION: Complete corresponding parts of checklist.

laboratory incorrectly labelled samples as 4658B-41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52 when the SAS packing list indicates the sample numbers should be 4512B-41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52-53:

	YES	NO	N/A

PART A: VOA ANALYSES

1.0 Traffic Reports and Laboratory Narrative

1.1 Are the Traffic Report Forms present for all samples? ☑ — —

ACTION: If no, contact lab for replacement of missing or illegible copies.

1.2 Do the Traffic Reports or Lab Narrative indicate any problems with sample receipt, condition of samples, analytical problems or special notations affecting the quality of the data? — ☑ —

ACTION: Use professional judgement to evaluate the effect on the quality of the data.

ACTION: If any sample analyzed as a soil contains more than 50% water, all data should be rejected.

ACTION: If both VOA vials for a sample have air bubbles, flag all positive results "J" and all non-detects "R".

2.0 Holding Times

2.1 Have any VOA holding times, determined from date of collection to date of analysis, been exceeded? ✓ ☐ —

If unpreserved, aqueous aromatic volatiles must be analyzed within 7 days of collection and non-aromatic volatiles must be analyzed within 14 days. If preserved with hydrochloric acid and stored at 4°C, then both aromatic and non-aromatic volatiles must be analyzed within 14 days. If uncertain about preservation, contact the sampler to determine whether the samples were preserved.

A ten-day holding time for soil samples is recommended.

Table of Holding Time Violations

Sample	Sample Matrix	Preserved ?	(See Traffic Report) Date Sampled	Date Lab Received	Date Analyzed
4658B41	Soil	NO	6/8/89	7/5/89	7/19/89
4658B42	Soil	NO	6/8/89	7/5/89	8/19/89
4658B43					8/19/89
4658B44					8/19/89

ACTION: If holding times are exceeded, flag all positive results as estimated ("J") and sample quantitation limits as estimated ("UJ"), and document in the narrative that holding times were exceeded.

2.2.90

Table of Holding Time Violations

Sample	Sample Matrix	Preserved	Date Sampled	Date Lab Received	Date Analyzed
4658B45	~~water~~	oil NO	6/8/89	7/5/89	8/21/89
4658B46	~~soil~~				7/20/89
4658B47	~~soil~~				7/20/89
4658B48	~~soil~~				7/19/89
4658B49	~~soil~~				7/19/89
4658B50	~~water~~				8/24/89
4658B51	~~soil~~				7/19/89
4658B52	~~soil~~				7/19/89
4658B53	~~soil~~				7/20/89

	YES	NO	N/A

If analyses were done more than 14 days beyond holding time, either on the first analysis or upon reanalysis, the reviewer must use professional judgement to determine the reliability of the data and the effects of additional storage on the sample results. The reviewer may determine that non-detect data are unusable ("R").

3.0 Surrogate Recovery (Form II)

3.1 Are the VOA Surrogate Recovery Summaries (Form II) present for each of the following matrices:			
a. Low Water	✓	—	—
b. Med Water		—	✓
c. Low Soil		—	✓
d. Med Soil	✓	—	—
3.2 Are all the VOA samples listed on the appropriate Surrogate Recovery Summaries for each of the following matrices:			
a. Low Water	✓	—	—
b. Med Water		—	✓
c. Low Soil		—	✓
d. Med Soil	✓	—	—

ACTION: Call lab for explanation / resubmittals. If missing deliverables are unavailable, document effect on data under "Conclusions" section of reviewer narrative.

3.3 Were outliers marked correctly with an asterisk?	✓	—	—

ACTION: Circle all outliers in red.

3.4 Was one or more VOA surrogate recovery outside of contract specifications for any sample or method blank?	✓		—
If yes, were samples reanalyzed?		✓	—
Were method blanks reanalyzed?		✓	—

ACTION: If surrogate recoveries are > 10% but all do not meet SOW specifications:

1. Flag all positive results as estimated ("J").
2. Flag all non-detects as estimated detection limits ("UJ").

	YES	NO	N/A
If any surrogate has a recovery of <10% : 1. Flag all positive results as estimated ("J"). 2. Flag all non-detects as unusable ("R"). Professional judgement should be used to qualify data that have method blank surrogate recoveries out of specification in both original and re-analyses. Check the internal standard areas.			
3.5 Are there any transcription/calculation errors between raw data and Form II?	___	[✓]	___
ACTION: If large errors exist, call lab for explanation / resubmittal, make any necessary corrections and note errors under "Conclusions".			
Matrix Spikes (Form III)			
4.1 Is the Matrix Spike Duplicate/Recovery Form (Form III) present?	[✓]	___	___
4.2 Were matrix spikes analyzed at the required frequency for each of the following matrices:			
a. Low Water (Lab analyzed 2 oil samples #5 + #50, as low level waters but did not perform MS/MSD analysis)	[___]	___	✓
b. Med Water	[___]	___	✓
c. Low Soil	[___]	___	✓
d. Med Soil (DIL)	[✓]	___	___
ACTION: If any matrix spike data are missing, take the action specified in 3.2 above.			

4.3 How many VOA spike recoveries are outside QC limits?

Water	Soils
N/A out of 10	1 out of 10

4.4 How many RPD's for matrix spike and matrix spike duplicate recoveries are outside QC limits?

Water	Soils
N/A out of 5	5 out of 5

ACTION: If MS and MSD both have less than 10% recovery for an analyte, negative results for that analyte should be rejected, and positive results should be flagged "J". The above applies only to the sample used for the MS/MSD analysis. Use professional judgement in applying this criterion to other samples in the package

	YES	NO	N/A
5.0 Blanks (Form IV)			
5.1 Is the Method Blank Summary (Form IV) present?	[✓]	__	__
5.2 Frequency of Analysis: for the analysis of VOA TCL compounds, has a reagent/method blank been analyzed for each set of samples or every 20 samples of similar matrix (low water, med water, low soil, medium soil), whichever is more frequent? (however, lab incorrectly analyzed blanks as waters instead of med. level soils for oil matrix - see assessment	[✓]	__	__
5.3 Has a VOA instrument blank been analyzed at least once every twelve hours for each GC/MS system used?	[✓]	__	__
ACTION: If any method blank data are missing, call lab for explanation / resubmittal. If not available, reject all associated positive data ("R").			
5.4 Chromatography: review the blank raw data - chromatograms (RICs), quant reports or data system printouts and spectra.			
Is the chromatographic performance (baseline stability) for each instrument acceptable for VOAs?	[✓]	__	__
ACTION: Use professional judgement to determine the effect on the data.			
6.0 Contamination			
NOTE: "Water blanks" and "distilled water blanks" are validated like any other sample and are not used to qualify data. Do not confuse them with the other QC blanks discussed below.			
6.1 Do any method/instrument/reagent blanks have positive results (TCL and/or TIC) for VOAs? When applied as described below, the contaminant concentration in these blanks are multiplied by the sample Dilution Factor.	✓	[__]	__
6.2 Do any field/trip/rinse blanks have positive VOA results (TCL and/or TIC)?	__	[__]	✓
ACTION: Prepare a list of the samples associated with each of the contaminated blanks. (Attach a separate sheet.)			
NOTE: Only field/rinse blanks taken the same day as the samples are used to qualify data. Trip blanks are used to qualify only those samples with which they were shipped. Blanks may not be qualified because of contamination in another blank. Blanks may be qualified for surrogate, spectral, tuning or calibration QC problems.			

ORGANICS
BLANK CONTAMINATIONS

CASE: 4512B
SITE: Tutu

LAB: VERSAR
FRACTION: VOA

ANALYTES	METHOD BLANK CONTAMINATIONS				RINSE BLANK CONT.		TRIP BLANK CONT.	
	ID 47911	IDU 7895	ID 47929	ID	NO:	NO:	NO:	NO:
TCL	AMOUNT	AMOUNT	AMOUNT	AMOUNT	AMOUNT	AMOUNT	AMOUNT	AMOUNT
Methylchloride	4		3					
~~Carbon Disulfide~~		4						
Acetone			14					
RT TIC								
32.5		2						
33.1		3						
33.9		4						
Carbondioxide		7						
	465846	465841	465853					
AFFECTED SAMPLES	465847							

YES NO N/A

ACTION: Follow the directions in the table below to qualify TCL results due to contamination. Use the largest value from all the associated blanks.

	Sample conc > CRQL but < 10x blank	Sample conc < CRQL & is < 10x blank value	Sample conc > CRQL value & >10x blank value
Methylene chloride Acetone Toluene 2-butanone	Flag sample result with a 'U'; cross out 'B' flag	Reject sample result and report CRQL; cross out 'B' flag	No qualification is needed

	Sample conc > CRQL but < 5x blank	Sample conc < CRQL & is < 5x blank value	Sample conc > CRQL value & > 5 blank value
Other Contaminants	Flag sample result with a 'U'; cross out 'B' flag	Reject sample result and report CRQL; cross out 'B' flag	No qualification is needed

ACTION: For TIC compounds, if the concentration in the sample is less than five times the concentration in the most contaminated associated blank, flag the sample data "R" (unusable).

6.3 Are there field/rinse/equipment blanks associated with every sample? [ ] [✓] ___

ACTION: For low level samples, note in data assessment that there is no associated field/rinse/equipment blank. Exception: samples taken from a drinking water tap do not have associated field blanks.

7.0 GC/MS Tuning and Mass Calibration (Form V)

7.1 Are the GC/MS Tuning and Mass Calibration Forms (Form V) present for Bromofluorobenzene (BFB)? [✓] ___ ___

7.2 Are the enhanced bar graph spectrum and mass/charge (m/z) listing for the BFB provided for each twelve hour shift? [✓] ___ ___

7.3 Has a tuning performance compound been analyzed for every twelve hours of sample analysis per instrument? [✓] ___ ___

ACTION: If any tuning data are missing, take action specified in 3.2 above.

ACTION: List date, time, instrument ID, and sample analyses for which no associated GC/MS tuning data are available.

	YES	NO	N/A

DATE	TIME	INSTRUMENT	SAMPLE NUMBERS

ACTION: If lab cannot provide missing data, reject ("R") all data generated outside an acceptable twelve hour calibration interval.

7.4 Have the ion abundance criteria been met for each instrument used? [✓] — —

ACTION: List all data which do not meet ion abundance criteria (attach a separate sheet).

ACTION: If tuning calibration is in error, flag all associated sample data as unusable ("R"). However, if expanded ion criteria are met (See 1988 Functional Guidelines), the data reviewer may accept data with appropriate qualifiers.

7.5 Are there any transcription / calculation errors between mass lists and Form Vs? (Check at least two values but if errors are found, check more.) — [✓] —

7.6 Have the appropriate number of significant figures (two) been reported? (Check at least two values, but if errors are found check more values.) [✓] [ ] —

ACTION: If large errors exist, call lab for explanation / resubmittal, make necessary corrections and note errors under "Conclusions".

7.7 Are the spectra of the mass calibration compound acceptable? [✓] — —

ACTION: Use professional judgement to determine whether associated data should be accepted, qualified, or rejected.

8.0 Target Compound List (TCL) Analytes

8.1 Are the Organic Analysis Data Sheets (Form I VOA) present with required header information on each page, for each of the following:

a. Samples and/or fractions as appropriate (sample no's. are incorrect.) [✓] — —

b. Matrix spikes and matrix spike duplicates [✓] — —

c. Blanks [✓] — —

	YES	NO	N/A
8.2 Are the VOA Reconstructed Ion Chromatograms, the mass spectra for the identified compounds, and the data system printouts (Quant Reports) included in the sample package for each of the following?			
a. Samples and/or fractions as appropriate	✓	—	—
b. Matrix spikes and matrix spike duplicates (Mass spectra not required)	✓	—	—
c. Blanks	✓	—	—
ACTION: If any data are missing, take action specified in 3.2 above.			
8.3 Are the response factors shown in the Quant Report?	✓	—	—
8.4 Is chromatographic performance acceptable with respect to:			
Baseline stability	✓	—	—
Resolution	✓	—	—
Peak shape	✓	—	—
Full-scale graph (attenuation)	✓	—	—
Other:_____		—	✓
ACTION: Use professional judgement to determine the acceptability of the data.			
8.5 Are the lab-generated standard mass spectra of the identified VOA compounds present for each sample?	✓	—	—
ACTION: If any mass spectra are missing, take action specified in 3.2 above. If Lab does not generate their own standard spectra, make note in "Contract Problems/Non-compliance".			
8.6 Is the RRT of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?	✓	—	—
8.7 Are all ions present in the standard mass spectrum at a relative intensity greater than 10% also present in the sample mass spectrum?	✓	X	— mlb 8/30/89
8.8 Do sample and standard relative ion intensities agree within 20%?	✓	X	—
ACTION: Use professional judgement to determine acceptability of data. If it is determined that incorrect identifications were made, all such data should be rejected, flagged "N" (presumptive evidence of the presence of the compound) or changed to not detected (at the calculated detection limit).			

* Xylene in 15, 28, 45, 48, 49, 52 flagged N

	YES	NO	N/A
9.0 Tentatively Identified Compounds (TIC)			
9.1 Are all Tentatively Identified Compound Forms (Form I, Part B) present; and do listed TICs include scan number or retention time, estimated concentration and "J" qualifier?	☑		
9.2 Are the mass spectra for the tentatively identified compounds and associated "best match" spectra included in the sample package for each of the following:			
a. Samples and/or fractions as appropriate	☑		
b. Blanks	☑		
ACTION: If any TIC data are missing, take action specified in 3.2 above.			
ACTION: Add "J" qualifier if missing and "N" qualifier to all identified TIC compounds on Form I, Part B.			
9.3 Are any TCL compounds (from any fraction) listed as TIC compounds (example: 1,2-dimethylbenzene is xylene--a VOA TCL--and should not be reported as a TIC)?		☑	
ACTION: Flag with "R" any TCL compound listed as a TIC.			
9.4 Are all ions present in the reference mass spectrum with a relative intensity greater than 10% also present in the sample mass spectrum?	☑		
9.5 Do TIC and "best match" standard relative ion intensities agree within 20%?	☑		
ACTION: Use professional judgement to determine acceptability of TIC identifications. If it is determined that an incorrect identification was made, change identification to "unknown" or to some less specific identification (example: "C3 substituted benzene") as appropriate.			
10.0 Compound Quantitation and Reported Detection Limits			
10.1 Are there any transcription / calculation errors in Form I results? Check at least two positive values. Verify that the correct internal standard, quantitation ion, and RRF were used to calculate Form I result. Were any errors found?		☑	
10.2 Are the CRQLs adjusted to reflect sample dilutions and, for soils, sample moisture? (soil matrix listed on F1's is actually oil matrix, see narrative and data assessment)	☑		

	YES	NO	N/A

ACTION: If errors are large, call lab for explanation / resubmittal, make any necessary corrections and note errors under "Conclusions".

ACTION: When a sample is analyzed at more than one dilution, the lowest CRQLs are used (unless a QC exceedance dictates the use of the higher CRQL data from the diluted sample analysis). Replace concentrations that exceed the calibration range in the original analysis by crossing out the "E" value on the original Form I and substituting it with data from the analysis of diluted sample. Specify which Form I is to be used, then draw a red "X" across the entire page of all Form I's that should not be used, including any in the summary package.

11.0 Standards Data (GC/MS)

11.1 Are the Reconstructed Ion Chromatograms, and data system printouts (Quant. Reports) present for initial and continuing calibration? [✓] — —

ACTION: If any calibration standard data are missing, take action specified in 3.2 above.

12.0 GC/MS Initial Calibration (Form VI)

12.1 Are the Initial Calibration Forms (Form VI) present and complete for the volatile fraction? [ ] [✓] —

Not for all initial calibrations lab did provide lab generated forms + raw data

ACTION: If any calibration standard forms are missing, take action specified in 3.2 above.

12.2 Are response factors stable for volatiles over the concentration range of the calibration (RSD <30%)? [ ] [✓] —

ACTION: Circle all outliers in red.

ACTION: When RSD >30%, non-detects may be qualified using professional judgement. Flag all positive results "J". When RSD >90%, flag all non-detects as unusable ("R"). (Region II policy.)

12.3 Do any compounds have a RRF < 0.05? [✓] [ ] —

ACTION: Circle all outliers in red.

ACTION: If any volatile compound has an average RRF < 0.05, flag positive results for that compound as estimated ("J"), and flag non-detects for that compound as unusable ("R").

	YES	NO	N/A
12.4 Are there any transcription / calculation errors in the reporting of average response factors (RRF) or %RSD? (Check at least two values but if errors are found, check more.)	—	[✓]	—

ACTION: Circle errors in red.

ACTION: If errors are large, call lab for explanation / resubmittal, make any necessary corrections and note errors under "Conclusions".

13.0 GC/MS Continuing Calibration (Form VII)

13.1 Are the Continuing Calibration Forms (Form VII) present and complete for the volatile fraction?	[✓]	✓	—
13.2 Has a continuing calibration standard been analyzed for every twelve hours of sample analysis per instrument?	[✓]	—	—

Not for all continuing calibrations, lab did provide lab generated terms

ACTION: List below all sample analyses that were not within twelve hours of the previous continuing calibration analysis.

_____

_____

_____

ACTION: If any forms are missing or no continuing calibration standard has been analyzed within twelve hours of every sample analysis, call lab for explanation / resubmittal. If continuing calibration data are not available, flag all associated sample data as unusable ("R").

13.3 Do any continuing calibration standard compounds have a RRF < 0.05?	✓	[ ]	—

ACTION: Circle all outliers in red.

ACTION: If any volatile compound has a RRF < 0.05, flag positive results for that compound as estimated ("J"), and flag non-detects for that compound as unusable ("R").

13.4 Do any compounds have a % difference between initial and continuing calibration RRF > 25%?	✓	[ ]	—

ACTION: Circle all outliers in red and qualify associated sample data as outlined in the table below:

YES NO N/A

% DIFFERENCE

25-50	50-90	>90
'J' positive results, no action for non detects	'J' positive results, 'UJ' non detects*	'J' positive results, "R" non detects

* Non detects are flagged only if difference is due to a loss of instrument sensitivit

13.5 Are there any transcription / calculation errors in the reporting of average response factors (RRF) or difference (%D) between initial and continuing RRFs? (Check at least two values but if errors are found, check more.) ___ ☑ ___

ACTION: Circle errors in red.

ACTION: If errors are large, call lab for explanation / resubmittal, make any necessary corrections and note errors under "Conclusions".

14.0 Internal Standards (Form VIII)

14.1 Are the internal standard areas (Form VIII) of every sample and blank within the upper and lower limits for each continuing calibration? ☑ ___ ___

ACTION: List all the outliers below.

Sample #	Internal Std	Area	Lower Limit	Upper Limit
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____

(Attach additional sheets if necessary.)

ACTION: If the internal standard area count is outside the upper or lower limit, flag with "J" all positive results and non-detects (U values) quantitated with this internal standard. If extremely low area counts are reported, or if performance exhibits a major abrupt drop off, flag all associated non-detects as unusable ("R").

14.2 Are the retention times of the internal standards within 30 seconds of the associated calibration standard? ☑ ___ ___

ACTION: Professional judgement should be used to qualify data if the retention times differ by more than 30 seconds.

	YES	NO	N/A
15.0 Field Duplicates			
15.1 Were any field duplicates submitted for VOA analysis?	[___]	✓	___

ACTION: Compare the reported results for field duplicates and calculate the relative percent difference.

ACTION: Any gross variation between field duplicate results must be addressed in the reviewer narrative. However, if large differences exist, identification of field duplicates should be confirmed by contacting the sampler.

Versar Inc.

1w of SW 1/4 of Sec 11 S 2W

ANALYTICAL DATA PACKAGE
Volatile Organic Analysis
Volume 1 of 2

EPA Case Number_____
SDG Number_____
SAS 45128 Region II
Date Reported 9-8-89
Versar Project 450.16 C# 744

TUT 001 0646

Versar Inc.

DELIVERABLES INDEX -- VOA ANALYSES ONLY

I. CASE NARRATIVE

- A. The narrative contains: case and contract numbers, summary of QC analyses, discussion of any analytical problems, and documentation of all corrective actions.
- B. Copy of Sample Traffic Reports.

II. QC SUMMARY

- A. Surrogate Percent Recovery Summary (Form II)
- B. Matrix Spike/Matrix Spike Duplicate Summary (Form III)
- C. Method Blank Summary (Form IV)
- D. GC/MS Tuning and Calibration Standard (Form V)

III. SAMPLE DATA

- A. Organic Analysis Data Sheet (Form I)
- B. Tentatively Identified Compounds (TIC)
- C. Raw Data for the Volatile Sample Fraction
  1. Reconstructed Ion Chromatogram (s)
  2. Quantitation Report
  3. Raw MSL mass spectra and background subtract MSL mass spectra with lab generated MSL standard spectra
  4. GC/MS library search spectra for each TIC

  Note: Samples arranged in alpha-numeric sequence.

IV. STANDARDS DATA

- A. Initial Calibration Data (Form VI) in order if more than one instrument is used.
- B. VOA standard(s) reconstructed ion chromatograms and quantitation reports for the initial calibration(s).
- C. Continuing Calibration (Form VII) in order by instrument.
- D. VOA standard(s) reconstructed ion chromatograms and quantitation reports for the continuing calibration(s).
- E. Internal Standard Data (Form VIII).

V. RAW QC DATA

- A. BFB (For each 12-hour period, for each GC/MS system)
  1. Bar graph spectrum
  2. Mass listing

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V. RAW QC DATA (CONT'D)

B. Reagent Blank Data
   1. Organic Analysis Data Sheet (Form I)
   2. Tentatively Identified Compounds (TIC)
   3. Raw Data
      a. Reconstructed ion chromatogram(s) and quantitation report(s).
      b. MSL spectra with lab generated standard
         i. Raw MSL compound spectra
         ii. Enhanced or background subtracted spectra
         iii. Laboratory generated MSL standard spectra
         iv. GC/MS library search spectra for each TIC
         v. Quantitation/calculation of each TIC concentration

C. Matrix Spike/Matrix Spike Duplicate Data
   1. Tabulated results (Form I) of non-spiked MSL compounds.
   2. Reconstructed ion chromatograms and quantitation reports.

VI. SAMPLE PREPARATION

A. Parameter Request Sheet
B. Sample Receiving Log-In Information
C. VOA Sample Comments
D. Instrument Injection Logs
E. Field Chain of Custody
F. Copy(s) of Federal Express Airbills

Versar, Inc.

I. NARRATIVE

II. QC SUMMARY

Versar Inc.

September 8, 1989

Narrative - Volatile Organic Analysis
Organic SAS 4512B
EPA Region II
Control 744

This report contains the CLP analytical data for the volatile organic analysis of thirteen oil samples received in conjunction with SAS 4512B. The samples listed below were received at Versar on July 5, 1989.

SAMPLE LIST

4658B41	4658B48
4658B42	4658B49
4658B43	4658B50
4658B44	4658B51
4658B45	4658B52
4658B46	4658B53
4658B47	

SAS REQUIREMENTS

- Report due date is forty days after VTSR
- All SAS
- Sample matrix is oil

GC/MS instrument calibrations using BFB met method specified criteria for volatile organic analysis. SPCC and CCC criteria were met for the initial calibration curves and the continuing calibration check standards. Sample analysis for volatile organics occurred within the twelve hour period following daily instrument calibration. Due to the very complex nature of the samples, analyses were not completed prior to expiration of sample holding time criteria.

Internal standard areas and associated retention times did not deviate outside specified windows.

Volatile surrogate standard recovery values met specified criteria for most samples. Surrogate recovery criteria used for these samples was developed for the soil matrix. Recovery of surrogate standards in the oil matrix may not be comparable with the soil recovery limits. One set of MS/MSD quality control samples was analyzed. Most recoveries met specified criteria. Relative percent difference (RPD) values did not meet specified criteria. This may be the result of the sample matrix.

Target compounds that did not meet contract specified mass spectral identification criteria were flagged with an "X" which indicates the presence of the compound is suspected.

TUT 001 0650

Versar Inc.

Please contact Larry Pollack, GC/MS Quality Control Manager, or me, should you require any additional information or have any questions pertaining to the volatile organic analysis of these oil samples.

Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or his designee, as verified by the following signature.

Linda E Bock September 8, 1989
Linda E. Bock
GC/MS Data Quality Manager
Laboratory Operations

Narrative Reviewed By:

Michael Buchanan
GC/MS Section Chief

Versar Inc.

Data Qualifier Flags

J For Target Compounds: This flag is used when mass spectral data indicates the presence of a compound but the result is less than the specified detection limit but still greater than zero.

For Non Target Compounds: This flag indicates that the concentration is an estimated value, assuming a 1 to 1 response with the internal standard.

B This flag is used when the analyte is found in the blank as well as in the sample. It indicates possible/probable contamination and warns the data user to take appropriate action.

U This flag states that the compound was analyzed for but was not detected. The number is the minimum attainable detection limit for the sample.

X or T This flag states that the mass spectrum does not meet EPA CLP criteria for confirmation, but compound presence is strongly suspected.

E This flag is used to indicate that the quantitation of the analyte is outside the linear calibration of the curve and that dilution was required in order to properly quantitate.

D This flag is used to indicate the value for the target analyte was calculated from a dilution (see "E" flag above).

Y This flag is used when a matrix spike compound is also confirmed present in the unspiked sample.

Flags excerpted from and established by the US EPA Contract Lab Program (CLP) protocol.

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

2K-02-01A

45125

46508841

Lab Name: VERSAR INC. Contract: _____

Lab Code: VERSAR Case No.: 430_16 SAS No.: 45128 SDG No.: 1

Matrix: (soil/water) ~~SOIL~~ OIL Lab Sample ID: 76182

Sample wt/vol: 4.0 (g/mL) G Lab File ID: UZ903

Level: (low/med) MED Date Received: 07/05/89

% Moisture: not dec. ____ Date Analyzed: 07/12/89

Column: (pack/cap) PACK Dilution Factor: 50

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q	
74-87-3	Chloromethane	63000	UJ	RC
74-83-9	Bromomethane	63000	U	
75-01-4	Vinyl Chloride	63000	U	V
75-00-3	Chloroethane	63000	U	
75-09-2	Methylene Chloride	31000	U	
67-64-1	Acetone	63000	U	
75-15-0	Carbon Disulfide	31000	U	
75-35-4	1,1-Dichloroethene	31000	U	
75-35-3	1,1-Dichloroethane	31000	U	
540-59-0	1,2-Dichloroethene (total)	31000	U	
67-66-3	Chloroform	31000	U	
107-06-2	1,2-Dichloroethane	31000	U	
78-93-3	2-Butanone	63000	U	
71-55-6	1,1,1-Trichloroethane	31000	U	
56-23-5	Carbon Tetrachloride	31000	U	
108-05-4	Vinyl Acetate	63000	U	
75-27-4	Bromodichloromethane	31000	U	
78-87-5	1,2-Dichloropropane	31000	U	
100610-1-5	cis-1,3-Dichloropropene	31000	U	
79-01-6	Trichloroethene	31000	U	
124-48-1	Dibromochloromethane	31000	U	
79-00-5	1,1,2-Trichloroethane	31000	U	
71-43-2	Benzene	64000		
10061-02-6	trans-1,3-Dichloropropene	310000	U	
75-25-2	Bromoform	31000	U	
108-10-1	4-Methyl-2-Pentanone	63000	U	
591-78-6	2-Hexanone	180000		
127-18-4	Tetrachloroethene	27000	J	
79-34-5	1,1,2,2-Tetrachloroethane	31000	U	
108-88-3	Toluene	450000		
108-90-7	Chlorobenzene	31000	U	
100-41-4	Ethylbenzene	180000		
100-42-5	Styrene	31000	U	
1330-20-7	Total Xylenes	1200000		

1E

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.
SR-02-01a
45213
4650841

Lab Name: ___VERSAR_____ Contract: _____

Lab Code: _VERSAR___ Case No.: 430_16 SAS No.: 4512B SDG No.: 1

Matrix: (soil/water) ~~SOIL~~ OIL Lab Sample ID: _76182

Sample wt/vol: 4 _(g/ml) G Lab File ID: __U7903

Level: (low/med) MED Date Received: ___07/05/89

% Moisture: not dec._____ Date Analyzed: ___07/19/89

Dilution Factor: _ 50

Number TICs found: _ 8 CONCENTRATION UNITS: (UG/L or UG/KG) __UG/Kg

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	78-78-4	BUTANE, 2-METHYL-	12.0333	68000	JN
2.	_____	UNKNOWN	14	120000	J
3.	96-37-7	CYCLOPENTANE, METHYL-	15.45	37000	JN
4.	79-29-8	BUTANE, 2,3-DIMETHYL-	16.7833	23000	JN
5.	_____	UNKNOWN	17.6666	83000	J
6.	_____	UNKNOWN	19.8333	90000	J
7.	_____	UNKNOWN	23.25	110000	J
8.	103-65-1	BENZENE, PROPYL-	34.4166	120000	JN
9.					
10.					
11.					
12.					
13.					
14.					
15.					
16.					
17.					
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20.					
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29.					
30.					

RC

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

4650842

Lab Name: VERSAR INC. Contract: _____

Lab Code: VERSAR Case No.: 430_16 SAS No.: 4512B SDG No.: 1

Matrix: (soil/water) ~~SOIL~~ Q/L Lab Sample ID: Z6183

Sample wt/vol: 4.0 (g/mL) G Lab File ID: U8575

Level: (low/med) MED Date Received: 07/05/89

% Moisture: not dec. ____ Date Analyzed: 08/19/89

Column: (pack/cap) PACK Dilution Factor: 50

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q	
74-87-3	Chloromethane	63000	U	J
74-83-9	Bromomethane	63000	U	
75-01-4	Vinyl Chloride	63000	U	
75-00-3	Chloroethane	63000	U	
75-09-2	Methylene Chloride	31000	U	
67-64-1	Acetone	63000	U	RC
75-15-0	Carbon Disulfide	31000	U	
75-35-4	1,1-Dichloroethene	31000	U	
75-35-3	1,1-Dichloroethane	31000	U	
540-59-0	1,2-Dichloroethene (total)	31000	U	
67-66-3	Chloroform	31000	U	
107-06-2	1,2-Dichloroethane	31000	U	
78-93-3	2-Butanone	63000	U	R 12/13/89
71-55-6	1,1,1-Trichloroethane	31000	U	J
56-23-5	Carbon Tetrachloride	31000	U	
108-05-4	Vinyl Acetate	63000	U	
75-27-4	Bromodichloromethane	31000	U	
78-87-5	1,2-Dichloropropane	31000	U	
100610-1-5	cis-1,3-Dichloropropene	31000	U	
79-01-6	Trichloroethene	31000	U	
124-48-1	Dibromochloromethane	31000	U	
79-00-5	1,1,2-Trichloroethane	31000	U	
71-43-2	Benzene	31000	U	
10061-02-6	trans-1,3-Dichloropropene	310000	U	
75-25-2	Bromoform	31000	U	
108-10-1	4-Methyl-2-Pentanone	63000	U	
591-78-6	2-Hexanone	63000	U	
127-18-4	Tetrachloroethene	31000	U	
79-34-5	1,1,2,2-Tetrachloroethane	31000	U	
108-88-3	Toluene	91000		
108-90-7	Chlorobenzene	31000	U	
100-41-4	Ethylbenzene	21000	J	
100-42-5	Styrene	31000	U	
1330-20-7	Total Xylenes	580000		

1E

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

45[illegible]
~~4650B~~42

Lab Name: VERSAR INC. Contract: _____

Lab Code: VERSAR Case No.: 430_16 SAS No.: 4512B__ SDG No.: 1_____

Matrix: (soil/water) ~~SOIL~~ OIL Lab Sample ID: Z6183_____

Sample wt/vol: __4.0 (g/mL) G___ Lab File ID: U8575_____

Level: (low/med) MED___ Date Received: 07/05/89

% Moisture: not dec. ____ Date Analyzed: 08/19/89

Column (pack/cap) PACK__ Dilution Factor: 50_____

Number TICs found: __0 CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

4512B ~~4650843~~

Lab Name: VERSAR INC. Contract: _____

Lab Code: VERSAR Case No.: 430_16 SAS No.: 4512B SDG No.: 1

Matrix: (soil/water) ~~SOIL~~ OIL Lab Sample ID: Z6184

Sample wt/vol: 4.0 (g/mL) G Lab File ID: U8577

Level: (low/med) MED Date Received: 07/05/89

% Moisture: not dec. ____ Date Analyzed: 08/19/89

Column: (pack/cap) PACK Dilution Factor: 50

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q	
74-87-3	Chloromethane	63000	U	J
74-83-9	Bromomethane	63000	U	
75-01-4	Vinyl Chloride	63000	U	
75-00-3	Chloroethane	63000	U	
75-09-2	Methylene Chloride	31000	U	
67-64-1	Acetone	63000	U	
75-15-0	Carbon Disulfide	31000	U	
75-35-4	1,1-Dichloroethene	31000	U	
75-35-3	1,1-Dichloroethane	31000	U	
540-59-0	1,2-Dichloroethene (total)	31000	U	
67-66-3	Chloroform	31000	U	
107-06-2	1,2-Dichloroethane	31000	U	
78-93-3	2-Butanone	63000	U	R
71-55-6	1,1,1-Trichloroethane	31000	U	J
56-23-5	Carbon Tetrachloride	31000	U	
108-05-4	Vinyl Acetate	63000	U	
75-27-4	Bromodichloromethane	31000	U	
78-87-5	1,2-Dichloropropane	31000	U	
100610-1-5	cis-1,3-Dichloropropene	31000	U	
79-01-6	Trichloroethene	31000	U	
124-48-1	Dibromochloromethane	31000	U	
79-00-5	1,1,2-Trichloroethane	31000	U	
71-43-2	Benzene	31000	U	
10061-02-6	trans-1,3-Dichloropropene	310000	U	
75-25-2	Bromoform	31000	U	
108-10-1	4-Methyl-2-Pentanone	63000	U	
591-78-6	2-Hexanone	63000	U	
127-18-4	Tetrachloroethene	31000	U	
79-34-5	1,1,2,2-Tetrachloroethane	31000	U	
108-88-3	Toluene	340000		
108-90-7	Chlorobenzene	31000	U	
100-41-4	Ethylbenzene	190000		
100-42-5	Styrene	31000	U	
1330-20-7	Total Xylenes	1600000		

MW 12/13/89

RC

1E

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.
4512B
~~46508843~~

Lab Name: VERSAR Contract:

Lab Code: VERSAR Case No.: 430_16 SAS No.: 4512B SDG No.: 1

Matrix: (soil/water) ~~SOIL~~ OIL

Lab Sample ID: 76184

Sample wt/vol: 4 (g/ml) G

Lab File ID: U8577

Level: (low/med) MED

Date Received: 07/05/89

% Moisture: not dec.

Date Analyzed: 08/19/89

Dilution Factor: 50

Number TICs found: 1

CONCENTRATION UNITS:
(UG/L or UG/KG) UG/Kg

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.		UNKNOWN	27.3333	41000	J
2.					
3.					
4.					
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VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

4512B

Lab Name: VERSAR INC. Contract: _____

Lab Code: VERSAR Case No.: 430_16 SAS No.: 4512B SDG No.: 1

Matrix: (soil/water) ~~SOIL~~ LIQUID Lab Sample ID: 76185

Sample wt/vol: 4.0 (g/mL) G Lab File ID: U8579

Level: (low/med) MED Date Received: 07/05/89

% Moisture: not dec. ____ Date Analyzed: 08/19/89

Column: (pack/cap) PACK Dilution Factor: 10

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	13000	UJ
74-83-9	Bromomethane	13000	U
75-01-4	Vinyl Chloride	13000	U
75-00-3	Chloroethane	13000	U
75-09-2	Methylene Chloride	6300	U
67-64-1	Acetone	13000	U
75-15-0	Carbon Disulfide	6300	U
75-35-4	1,1-Dichloroethene	6300	U
75-35-3	1,1-Dichloroethane	6300	U
540-59-0	1,2-Dichloroethene (total)	6300	U
67-66-3	Chloroform	6300	U
107-06-2	1,2-Dichloroethane	6300	U
78-93-3	2-Butanone	13000	UJ
71-55-6	1,1,1-Trichloroethane	6300	U
56-23-5	Carbon Tetrachloride	6300	U
108-05-4	Vinyl Acetate	13000	U
75-27-4	Bromodichloromethane	6300	U
78-87-5	1,2-Dichloropropane	6300	U
10061-01-5	cis-1,3-Dichloropropene	6300	U
79-01-6	Trichloroethene	6300	U
124-48-1	Dibromochloromethane	6300	U
79-00-5	1,1,2-Trichloroethane	6300	U
71-43-2	Benzene	7000	
10061-02-6	trans-1,3-Dichloropropene	63000	U
75-25-2	Bromoform	6300	U
108-10-1	4-Methyl-2-Pentanone	13000	U
591-78-6	2-Hexanone	13000	U
127-18-4	Tetrachloroethene	6300	U
79-34-5	1,1,2,2-Tetrachloroethane	6300	U
108-88-3	Toluene	76000	
108-90-7	Chlorobenzene	6300	U
100-41-4	Ethylbenzene	35000	
100-42-5	Styrene	6300	U
1330-20-7	Total Xylenes	190000	

RC

JW 12/13/89

1E

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

45123
4650844

Lab Name: VERSAR Contract: _____

Lab Code: VERSAR Case No.: 430_16 SAS No.: 4512B SDG No.: 1

Matrix: (soil/water) ~~SOIL~~ OIL Lab Sample ID: 76185

Sample wt/vol: 4 (g/ml) G Lab File ID: U8579

Level: (low/med) MED Date Received: 07/05/89

% Moisture: not dec. _____ Date Analyzed: 08/19/89

Dilution Factor: 10

Number TICs found: 1 CONCENTRATION UNITS: (UG/L or UG/KG) UG/Kg

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.		UNKNOWN	14.8666	22000	J
2.					
3.					
4.					
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VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

45127
46588345

Lab Name: VERSAR INC. Contract: _____

Lab Code: VERSAR Case No.: 430_16 SAS No.: 45128 SDG No.: 1

Matrix: (soil/water) ~~WATER~~ OIL Lab Sample ID: 76186

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: U8610

Level: (low/med) LOW Date Received: 07/05/89

% Moisture: not dec. ____ Date Analyzed: 08/21/89

Column: (pack/cap) PACK Dilution Factor: 50

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q	
74-87-3	Chloromethane	500	U	R
74-83-9	Bromomethane	500	U	
75-01-4	Vinyl Chloride	500	U	
75-00-3	Chloroethane	500	U	
75-09-2	Methylene Chloride	250	U	
67-64-1	Acetone	2400	J	
75-15-0	Carbon Disulfide	250	U	R
75-35-4	1,1-Dichloroethene	250	U	
75-35-3	1,1-Dichloroethane	250	U	
540-59-0	1,2-Dichloroethene (total)	250	U	
67-66-3	Chloroform	250	U	
107-06-2	1,2-Dichloroethane	250	U	
78-93-3	2-Butanone	500	U	
71-55-6	1,1,1-Trichloroethane	250	U	
56-23-5	Carbon Tetrachloride	250	U	
108-05-4	Vinyl Acetate	500	U	
75-27-4	Bromodichloromethane	250	U	
78-87-5	1,2-Dichloropropane	250	U	
100610-1-5	cis-1,3-Dichloropropene	250	U	RC
79-01-6	Trichloroethene	250	U	
124-48-1	Dibromochloromethane	250	U	
79-00-5	1,1,2-Trichloroethane	250	U	
71-43-2	Benzene	250	U	
10061-02-6	trans-1,3-Dichloropropene	250	U	
75-25-2	Bromoform	250	U	
108-10-1	4-Methyl-2-Pentanone	500	U	
591-78-6	2-Hexanone	500	U	
127-18-4	Tetrachloroethene	250	U	
79-34-5	1,1,2,2-Tetrachloroethane	250	U	
108-88-3	Toluene	250	U	
108-90-7	Chlorobenzene	250	U	
100-41-4	Ethylbenzene	250	U	
100-42-5	Styrene	250	U	
1330-20-7	Total Xylenes	300	U	XJ

1E

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

45123
~~46501~~45

Lab Name: VERSAR INC. Contract: _____

Lab Code: VERSAR Case No.: 430_16 SAS No.: 4512B__ SDG No.: 1_____

Matrix: (soil/water) ~~WATER~~ OIL Lab Sample ID: 76186_____

Sample wt/vol: __5.0 (g/mL) ML__ Lab File ID: U8619_____

Level: (low/med) LOW___ Date Received: 07/05/89

% Moisture: not dec. ____ Date Analyzed: 08/21/89

Column (pack/cap) PACK__ Dilution Factor: 50_____

Number TICs found: __0

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L_

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q

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VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

4512B ~~46568~~46

Lab Name: VERSAR INC. Contract: _____

Lab Code: VERSAR Case No.: 430_16 SAS No.: 4512B SDG No.: 1

Matrix: (soil/water) ~~SOIL~~ OIL Lab Sample ID: 76187

Sample wt/vol: 4.0 (g/mL) G Lab File ID: U7913

Level: (low/med) MED Date Received: 07/05/89

% Moisture: not dec. ____ Date Analyzed: 07/20/89

Column: (pack/cap) PACK Dilution Factor: 40

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	50000	U J
74-83-9	Bromomethane	50000	U
75-01-4	Vinyl Chloride	50000	U
75-00-3	Chloroethane	50000	U
75-09-2	Methylene Chloride	25000	U
67-64-1	Acetone	50000	U
75-15-0	Carbon Disulfide	25000	U
75-35-4	1,1-Dichloroethene	25000	U
75-35-3	1,1-Dichloroethane	25000	U
540-59-0	1,2-Dichloroethene (total)	25000	U
67-66-3	Chloroform	25000	U
107-06-2	1,2-Dichloroethane	25000	U
78-93-3	2-Butanone	50000	U
71-55-6	1,1,1-Trichloroethane	25000	U
56-23-5	Carbon Tetrachloride	25000	U
108-05-4	Vinyl Acetate	50000	U
75-27-4	Bromodichloromethane	25000	U
78-87-5	1,2-Dichloropropane	25000	U
100610-1-5	cis-1,3-Dichloropropene	25000	U
79-01-6	Trichloroethene	25000	U
124-48-1	Dibromochloromethane	25000	U
79-00-5	1,1,2-Trichloroethane	25000	U
71-43-2	Benzene ✓	46000	
10061-02-6	trans-1,3-Dichloropropene	250000	U
75-25-2	Bromoform	25000	U
108-10-1	4-Methyl-2-Pentanone	50000	U
591-78-6	2-Hexanone	59000	
127-18-4	Tetrachloroethene	25000	U
79-34-5	1,1,2,2-Tetrachloroethane	25000	U
108-88-3	Toluene ✓	490000	
108-90-7	Chlorobenzene	25000	U
100-41-4	Ethylbenzene ✓	140000	
100-42-5	Styrene	25000	U
1330-20-7	Total Xylenes ✓	900000	

RC

1E

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.
4512B3
4512B46

Lab Name: ___VERSAR_____ Contract: _____

Lab Code: _VERSAR___ Case No.: 430_16 SAS No.: 4512B SDG No.: 1

Matrix: (soil/water) ~~SOIL~~ OIL Lab Sample ID: _76187

Sample wt/vol: 4 _(g/ml)G Lab File ID: __U7913

Level: (low/med) MED Date Received: ___07/05/89

% Moisture: not dec._____ Date Analyzed: ___07/20/89

Dilution Factor: _ 40

Number TICs found: _ 3 CONCENTRATION UNITS: (UG/L or UG/KG) __UG/Kg

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	96-14-0	PENTANE, 3-METHYL-	19.8333	33000	JN
2.		UNK ETHYL METHYL BENZENE	22.9166	38000	J
3.	103-65-1	BENZENE, PROPYL-	34.4166	57000	JN
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VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

4512B 4660847

Name: VERSAR INC. Contract: _____

Lab Code: VERSAR Case No.: 430_16 SAS No.: 4512B SDG No.: 1

Matrix: (soil/water) ~~SOIL~~ W/L Lab Sample ID: 76188

Sample wt/vol: 4.0 (g/mL) G Lab File ID: U7912

Level: (low/med) MED Date Received: 07/05/89

% Moisture: not dec. ____ Date Analyzed: 07/20/89

Column: (pack/cap) PACK Dilution Factor: 20

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	25000	U J
74-83-9	Bromomethane	25000	U
75-01-4	Vinyl Chloride	25000	U
75-00-3	Chloroethane	25000	U
75-09-2	Methylene Chloride	13000	U
67-64-1	Acetone	25000	U
75-15-0	Carbon Disulfide	13000	U
75-35-4	1,1-Dichloroethene	13000	U
75-35-3	1,1-Dichloroethane	13000	U
540-59-0	1,2-Dichloroethene (total)	13000	U
67-66-3	Chloroform	13000	U
107-06-2	1,2-Dichloroethane	13000	U
78-93-3	2-Butanone	25000	U
71-55-6	1,1,1-Trichloroethane	13000	U
56-23-5	Carbon Tetrachloride	13000	U
108-05-4	Vinyl Acetate	25000	U
75-27-4	Bromodichloromethane	13000	U
78-87-5	1,2-Dichloropropane	13000	U
100610-1-5	cis-1,3-Dichloropropene	13000	U
79-01-6	Trichloroethene	13000	U
124-48-1	Dibromochloromethane	13000	U
79-00-5	1,1,2-Trichloroethane	13000	U
71-43-2	Benzene	11000	
10061-02-6	trans-1,3-Dichloropropene	130000	U
75-25-2	Bromoform	13000	U
108-10-1	4-Methyl-2-Pentanone	25000	U
591-78-6	2-Hexanone	25000	U
127-18-4	Tetrachloroethene	13000	U
79-34-5	1,1,2,2-Tetrachloroethane	13000	U
108-88-3	Toluene	130000	
108-90-7	Chlorobenzene	13000	U
100-41-4	Ethylbenzene	49000	
100-42-5	Styrene	13000	U
1330-20-7	Total Xylenes	330000	

1E

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.
4512B
4658B47

Lab Name: ___VERSAR_____ Contract: _____

Lab Code: _VERSAR___ Case No.: 430_16 SAS No.: 4512B SDG No.: 1

Matrix: (soil/water) ~~SOIL~~ OIL Lab Sample ID: _76188

Sample wt/vol: 4 _(g/ml)G Lab File ID: __U7912

Level: (low/med) MED Date Received: ___07/05/89

% Moisture: not dec._____ Date Analyzed: ___07/20/89

Dilution Factor: _ 20

Number TICs found: _ 3 CONCENTRATION UNITS: (UG/L or UG/KG) __UG/Kg

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	110-54-3	HEXANE (DOT)	19.8666	6600	JN
2.	589-34-4	HEXANE, 3-METHYL-	23.25	8000	J
3.	103-65-1	BENZENE, PROPYL	34.45	31000	J
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VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE
45123
4698848

Lab Name: VERSAR INC. Contract: _____

Lab Code: VERSAR Case No.: 430 16 SAS No.: 45128 SDG No.: 1

Matrix: (soil/water) SOIL OIL Lab Sample ID: 76159

Sample wt/vol: 4.0 (g/mL) G Lab File ID: Y6877

Level: (low/med) MED Date Received: 07/05/89

% Moisture: not dec. ____ Date Analyzed: 07/19/89

Column: (pack/cap) PACK Dilution Factor: 10

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	13000	U J
74-83-9	Bromomethane	13000	U
75-01-4	Vinyl Chloride	13000	U
75-00-3	Chloroethane	13000	U
75-09-2	Methylene Chloride	6300	U
67-64-1	Acetone	13000	U
75-15-0	Carbon Disulfide	6300	U
75-35-4	1,1-Dichloroethene	6300	U
75-34-3	1,1-Dichloroethane	6300	U
540-59-0	1,2-Dichloroethene (total)	6300	U
67-66-3	Chloroform	6300	U
107-06-2	1,2-Dichloroethane	6300	U
78-93-3	2-Butanone	13000	U
71-55-6	1,1,1-Trichloroethane	3900	J
56-23-5	Carbon Tetrachloride	6300	U
108-05-4	Vinyl Acetate	13000	U
75-27-4	Bromodichloromethane	6300	U
78-87-5	1,2-Dichloropropane	6300	U
10061-01-5	cis-1,3-Dichloropropene	6300	U
79-01-6	Trichloroethene	6300	U
124-48-1	Dibromochloromethane	6300	U
79-00-5	1,1,2-Trichloroethane	6300	U
71-43-2	Benzene	4000	J
10061-02-6	Trans-1,3-Dichloropropene	6300	U
75-25-2	Bromoform	6300	U
108-10-1	4-Methyl-2-Pentanone	13000	U
591-78-6	2-Hexanone	13000	U
127-18-4	Tetrachloroethene	6300	U
79-34-5	1,1,2,2-Tetrachloroethane	13000	U
108-88-3	Toluene	110000	
108-90-7	Chlorobenzene	6300	U
100-41-4	Ethylbenzene	61000	
100-42-5	Styrene	6300	U
1330-20-7	Total Xylenes	88000	U J

RC

mw 12/13/89

FORM I VOA 1/87 Rev.

TUT 001 0667

1E

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.
4512B
~~4650B48~~

Lab Name: ___VERSAR_____ Contract: _____

Lab Code: _VERSAR___ Case No.: 430_16 SAS No.: 4512B SDG No.: 1

Matrix: (soil/water) ~~SOIL~~ OIL Lab Sample ID: _76159

Sample wt/vol: 4 _(g/ml) G Lab File ID: __Y6877

Level: (low/med) MED Date Received: ___07/05/89

% Moisture: not dec._____ Date Analyzed: ___07/19/89

Dilution Factor: _ 10

Number TICs found: _ 1 CONCENTRATION UNITS: (UG/L or UG/KG) __UG/Kg

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	526-73-8	BENZENE, 1,2,3-TRIMETHYL-	28.0833	55000	JN
2.					
3.					
4.					
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6.					
7.					
8.					
9.					
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11.					
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RC

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

45125
~~4638849~~

Lab Name: VERSAR INC. Contract:

Lab Code: VERSAR Case No.: 430 16 SAS No.: 45128 SDG No.: 1

Matrix: (soil/water) ~~SOIL~~ OIL Lab Sample ID: 76190

Sample wt/vol: 4.0 (g/mL) G Lab File ID: Y6876

Level: (low/med) MED Date Received: 07/05/89

% Moisture: not dec. ____ Date Analyzed: 07/19/89

Column: (pack/cap) PACK Dilution Factor: 10

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	13000	U J
74-83-9	Bromomethane	13000	U
75-01-4	Vinyl Chloride	13000	U
75-00-3	Chloroethane	13000	U
75-09-2	Methylene Chloride	3800	
67-64-1	Acetone	13000	U
75-15-0	Carbon Disulfide	6300	U
75-35-4	1,1-Dichloroethene	6300	U
75-34-3	1,1-Dichloroethane	6300	U
540-59-0	1,2-Dichloroethene (total)	6300	U
67-66-3	Chloroform	6300	U
107-06-2	1,2-Dichloroethane	6300	U
78-93-3	2-Butanone	13000	U B
71-55-6	1,1,1-Trichloroethane	6300	U
56-23-5	Carbon Tetrachloride	6300	U
108-05-4	Vinyl Acetate	13000	U
75-27-4	Bromodichloromethane	6300	U
78-87-5	1,2-Dichloropropane	6300	U
10061-01-5	cis-1,3-Dichloropropene	6300	U
79-01-6	Trichloroethene	6300	U
124-48-1	Dibromochloromethane	6300	U
79-00-5	1,1,2-Trichloroethane	6300	U
71-43-2	Benzene	6300	U
10061-02-6	Trans-1,3-Dichloropropene	6300	U
75-25-2	Bromoform	6300	U
108-10-1	4-Methyl-2-Pentanone	13000	U
591-78-6	2-Hexanone	13000	U
127-18-4	Tetrachloroethene	6300	U
79-34-5	1,1,2,2-Tetrachloroethane	13000	U
108-88-3	Toluene ✓	24000	
108-90-7	Chlorobenzene	6300	U
100-41-4	Ethylbenzene ✓	13000	
100-42-5	Styrene	6300	U
1330-20-7	Total Xylenes ✓	120000	U J

RC

12/13/89

TUT 001 0669

1E

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.
4512B
~~4658B~~49

Lab Name: ___VERSAR_____ Contract: _____

Lab Code: _VERSAR___ Case No.: 430_16 SAS No.: 4512B SDG No.: 1

Matrix: (soil/water) ~~soil~~ D/L Lab Sample ID: _76190

Sample wt/vol: 4 _(g/ml) G Lab File ID: __Y6876

Level: (low/med) MED Date Received: ___07/05/89

% Moisture: not dec. _____ Date Analyzed: ___07/19/89

Dilution Factor: _ 10

Number TICs found: _ 2 CONCENTRATION UNITS: (UG/L or UG/KG) __UG/Kg

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	933-98-2	BENZENE, 1-ETHYL-2,3-DIMETHY	23.4	5400	JN
2.	_____	UNKNOWN	32	7500	J
3.	_____				
4.	_____				
5.	_____				
6.	_____				
7.	_____				
8.	_____				
9.	_____				
10.	_____				
11.	_____				
12.	_____				
13.	_____				
14.	_____				
15.	_____				
16.	_____				
17.	_____				
18.	_____				
19.	_____				
20.	_____				
21.	_____				
22.	_____				
23.	_____				
24.	_____				
25.	_____				
26.	_____				
27.	_____				
28.	_____				
29.	_____				
30.	_____				

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1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

45128
~~4650B50~~

Lab Name: VERSAR INC. Contract: _____

Lab Code: VERSAR Case No.: 430_16 SAS No.: 4512B SDG No.: 1

Matrix: (soil/water) ~~WATER~~ OIL Lab Sample ID: 76191

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: U8653

Level: (low/med) LOW Date Received: 07/05/89

% Moisture: not dec. ____ Date Analyzed: 08/24/89

Column: (pack/cap) PACK Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q	
74-87-3	Chloromethane	10	U	R
74-83-9	Bromomethane	10	U	
75-01-4	Vinyl Chloride	10	U	
75-00-3	Chloroethane	10	U	
75-09-2	Methylene Chloride	5	U	
67-64-1	Acetone	13	J	RC
75-15-0	Carbon Disulfide	5	U	R
75-35-4	1,1-Dichloroethene	5	U	
75-35-3	1,1-Dichloroethane	5	U	
540-59-0	1,2-Dichloroethene (total)	5	U	
67-66-3	Chloroform	5	U	
107-06-2	1,2-Dichloroethane	5	U	
78-93-3	2-Butanone	10	U	
71-55-6	1,1,1-Trichloroethane	5	U	
56-23-5	Carbon Tetrachloride	5	U	
108-05-4	Vinyl Acetate	10	U	
75-27-4	Bromodichloromethane	5	U	
78-87-5	1,2-Dichloropropane	5	U	
100610-1-5	cis-1,3-Dichloropropene	5	U	
79-01-6	Trichloroethene	5	U	
124-48-1	Dibromochloromethane	5	U	
79-00-5	1,1,2-Trichloroethane	5	U	
71-43-2	Benzene	5	U	
10061-02-6	trans-1,3-Dichloropropene	5	U	
75-25-2	Bromoform	5	U	
108-10-1	4-Methyl-2-Pentanone	10	U	
591-78-6	2-Hexanone	10	U	
127-18-4	Tetrachloroethene	5	U	
79-34-5	1,1,2,2-Tetrachloroethane	5	U	
108-88-3	Toluene	5	U	
108-90-7	Chlorobenzene	5	U	
100-41-4	Ethylbenzene	5	U	
100-42-5	Styrene	5	U	
1330-20-7	Total Xylenes	5	U	

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VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

4512B
~~4650B~~60

Lab Name: VERSAR INC. Contract: _____

Lab Code: VERSAR Case No.: 430_16 SAS No.: 4512B SDG No.: 1

Matrix: (soil/water) ~~WATER~~ D/L Lab Sample ID: 76191

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: U8653

Level: (low/med) LOW Date Received: 07/05/89

% Moisture: not dec. ____ Date Analyzed: 08/24/89

Column (pack/cap) PACK Dilution Factor: 1.0

Number TICs found: 0 CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
S-02-01A
4512B
~~4688851~~

Lab Name: VERSAR INC. Contract:

Lab Code: VERSAR Case No.: 430 16 SAS No.: 4512B SDG No.: 1

Matrix: (soil/water) ~~SOIL~~ OIL Lab Sample ID: 76192

Sample wt/vol: 4.0 (g/mL) G Lab File ID: Y6875

Level: (low/med) MED Date Received: 07/05/89

% Moisture: not dec. Date Analyzed: 07/19/89

Column: (pack/cap) PACK Dilution Factor: 10

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG

CAS NO.	COMPOUND		Q
74-87-3	Chloromethane	13000	U J
74-83-9	Bromomethane	13000	U
75-01-4	Vinyl Chloride	13000	U
75-00-3	Chloroethane	13000	U
75-09-2	Methylene Chloride	6300	U
67-64-1	Acetone	13000	U
75-15-0	Carbon Disulfide	6300	U
75-35-4	1,1-Dichloroethene	6300	U
75-34-3	1,1-Dichloroethane	6300	U
540-59-0	1,2-Dichloroethene (total)	6300	U
67-66-3	Chloroform	6300	U
107-06-2	1,2-Dichloroethane	6300	U
78-93-3	2-Butanone	13000	U R
71-55-6	1,1,1-Trichloroethane ✓	25000	
56-23-5	Carbon Tetrachloride	6300	U
108-05-4	Vinyl Acetate	13000	U
75-27-4	Bromodichloromethane	6300	U
78-87-5	1,2-Dichloropropane	6300	U
10061-01-5	cis-1,3-Dichloropropene	6300	U
79-01-6	Trichloroethene	6300	U
124-48-1	Dibromochloromethane	6300	U
79-00-5	1,1,2-Trichloroethane	6300	U
71-43-2	Benzene ✓	12000	
10061-02-6	Trans-1,3-Dichloropropene	6300	U
75-25-2	Bromoform	6300	U
108-10-1	4-Methyl-2-Pentanone	13000	U
591-78-6	2-Hexanone	13000	U
127-18-4	Tetrachloroethene	30000	
79-34-5	1,1,2,2-Tetrachloroethane	13000	U
108-88-3	Toluene ✓	91000	
108-90-7	Chlorobenzene	6300	U
100-41-4	Ethylbenzene ✓	32000	
100-42-5	Styrene	6300	U
1330-20-7	Total Xylenes ✓	~~38000~~	

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MW 12/13/89

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VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.
4512B
4650851

Lab Name: VERSAR Contract:

Lab Code: VERSAR Case No.: 430_16 SAS No.: 4512B SDG No.: 1

Matrix: (soil/water) ~~SOIL~~ O/L Lab Sample ID: _76192

Sample wt/vol: 4 (g/ml) G Lab File ID: Y6875

Level: (low/med) MED Date Received: 07/05/89

% Moisture: not dec. Date Analyzed: 07/19/89

Dilution Factor: 10

Number TICs found: 7 CONCENTRATION UNITS: (UG/L or UG/KG) UG/Kg

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.		UNKNOWN	12.6833	19000	J
2.	1634-04-4	PROPANE, 2-METHOXY-2-METHYL-	14.45	25000	JN
3.	96-14-0	PENTANE, 3-METHYL-	17.8833	7900	JN
4.		UNKNOWN HYDROCARBON	19.8333	8000	J
5.		UNKNOWN	22.9666	5900	J
6.	95-63-6	BENZENE, 1,2,4-TRIMETHYL-	27.2666	16000	JN
7.	526-73-8	BENZENE, 1,2,3-TRIMETHYL-	33.9166	140000	JN
8.					
9.					
10.					
11.					
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VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

UC12B 4650853

Name: VERSAR INC. Contract: _____

Lab Code: VERSAR Case No.: 430_16 SAS No.: 4512B__ SDG No.: 1_____

Matrix: (soil/water) ~~SOIL~~ OIL Lab Sample ID: 76194_____

Sample wt/vol: 4.0 (g/mL) G___ Lab File ID: U7936_____

Level: (low/med) MED___ Date Received: 07/05/89

% Moisture: not dec. ____ Date Analyzed: 07/20/89

Column: (pack/cap) PACK__ Dilution Factor: 200_____

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG		Q
74-87-3	Chloromethane	250000	U	J
74-83-9	Bromomethane	250000	U	
75-01-4	Vinyl Chloride	250000	U	
75-00-3	Chloroethane	250000	U	
75-09-2	Methylene Chloride	300000	U	UJ
67-64-1	Acetone	340000	U	UJ
75-15-0	Carbon Disulfide	130000	U	J
75-35-4	1,1-Dichloroethene	130000	U	
75-35-3	1,1-Dichloroethane	130000	U	
540-59-0	1,2-Dichloroethene (total)	130000	U	
67-66-3	Chloroform	130000	U	
107-06-2	1,2-Dichloroethane	130000	U	
78-93-3	2-Butanone	250000	U	
71-55-6	1,1,1-Trichloroethane	130000	U	
56-23-5	Carbon Tetrachloride	130000	U	
108-05-4	Vinyl Acetate	250000	U	
75-27-4	Bromodichloromethane	130000	U	
78-87-5	1,2-Dichloropropane	130000	U	
100610-1-5	cis-1,3-Dichloropropene	130000	U	
79-01-6	Trichloroethene	130000	U	
124-48-1	Dibromochloromethane	130000	U	
79-00-5	1,1,2-Trichloroethane	130000	U	
71-43-2	Benzene	130000	U	
10061-02-6	trans-1,3-Dichloropropene	1300000	U	
75-25-2	Bromoform	130000	U	
108-10-1	4-Methyl-2-Pentanone	250000	U	
591-78-6	2-Hexanone	250000	U	
127-18-4	Tetrachloroethene	91000	J	
79-34-5	1,1,2,2-Tetrachloroethane	130000	U	
108-88-3	Toluene	92000	J	
108-90-7	Chlorobenzene	130000	U	
100-41-4	Ethylbenzene	130000	U	
100-42-5	Styrene	130000	U	
1330-20-7	Total Xylenes	230000		

RC

1E

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

4512B
~~4650B~~53

Lab Name: VERSAR_INC._____ Contract: _____

Lab Code: VERSAR_ Case No.: 430_16 SAS No.: 4512B__ SDG No.: 1_____

Matrix: (soil/water) ~~SOIL~~ OIL Lab Sample ID: 76194_____ MSV

Sample wt/vol: __4.0 (g/mL) G___ Lab File ID: U7936_____

Level: (low/med) MED___ Date Received: 07/05/89

% Moisture: not dec. ____ Date Analyzed: 07/20/89

Column (pack/cap) PACK__ Dilution Factor: 200_____

Number TICs found: __0

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q

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VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

45128
~~4658852~~

Lab Name: VERSAR INC. Contract: _____

Lab Code: VERSAR Case No.: 430 16 SAS No.: 45128 SDG No.: 1

Matrix: (soil/water) ~~SOIL~~ O/C Lab Sample ID: 76193

Sample wt/vol: 4.0 (g/mL) G Lab File ID: Y6874

Level: (low/med) MED Date Received: 07/05/89

% Moisture: not dec. ____ Date Analyzed: 07/19/89

Column: (pack/cap) PACK Dilution Factor: 10

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG		Q
74-87-3	Chloromethane	13000	U	J
74-83-9	Bromomethane	13000	U	
75-01-4	Vinyl Chloride	13000	U	
75-00-3	Chloroethane	13000	U	
75-09-2	Methylene Chloride	6300	U	
67-64-1	Acetone	13000	U	
75-15-0	Carbon Disulfide	6300	U	
75-35-4	1,1-Dichloroethene	6300	U	
75-34-3	1,1-Dichloroethane	6300	U	
540-59-0	1,2-Dichloroethene (total)	6300	U	
67-66-3	Chloroform	6300	U	RC
107-06-2	1,2-Dichloroethane	6300	U	
78-93-3	2-Butanone	13000	U	
71-55-6	1,1,1-Trichloroethane ✓	42000		12/13/89
56-23-5	Carbon Tetrachloride	6300	U	
108-05-4	Vinyl Acetate	13000	U	
75-27-4	Bromodichloromethane	6300	U	
78-87-5	1,2-Dichloropropane	6300	U	
10061-01-5	cis-1,3-Dichloropropene	6300	U	
79-01-6	Trichloroethene	6300	U	
124-48-1	Dibromochloromethane	6300	U	
79-00-5	1,1,2-Trichloroethane	6300	U	
71-43-2	Benzene ✓	6300	U	
10061-02-6	Trans-1,3-Dichloropropene	6300	U	
75-25-2	Bromoform	6300	U	
108-10-1	4-Methyl-2-Pentanone	13000	U	
591-78-6	2-Hexanone	13000	U	
127-18-4	Tetrachloroethene ✓	63000		
79-34-5	1,1,2,2-Tetrachloroethane	13000	U	
108-88-3	Toluene ✓	57000		
108-90-7	Chlorobenzene	6300	U	
100-41-4	Ethylbenzene ✓	19000		
100-42-5	Styrene	6300	U	
1330-20-7	Total Xylenes ✓	130000	U	J

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.
45128
~~4680852~~

Lab Name: VERSAR INC. Contract: _____

Lab Code: VERSAR Case No.: 430 16 SAS No.: 45128 SDG No.: 1

Matrix: (soil/water) ~~SOIL~~ O/L Lab Sample ID: Z6193

Sample wt/vol: 4.0 (g/mL) G Lab File ID: Y6874

Level: (low/med) MED Date Received: 07/05/89

% Moisture: not dec. ____ Date Analyzed: 07/19/89

Column (pack/cap) PACK Dilution Factor: 10

Number TICs found: 0 CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q

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VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

VBLK95

Lab Name: VERSAR INC. Contract: _____

Lab Code: VERSAR Case No.: 430_16 SAS No.: 45128 SDG No.: 1

Matrix: (soil/water) WATER Lab Sample ID: VBLK95

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: U7895

Level: (low/med) LOW Date Received: _____

% Moisture: not dec. ____ Date Analyzed: 07/19/89

Column: (pack/cap) PACK Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	5	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	5	U
75-35-4	1,1-Dichloroethene	5	U
75-35-3	1,1-Dichloroethane	5	U
540-59-0	1,2-Dichloroethene (total)	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone	10	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon Tetrachloride	5	U
108-05-4	Vinyl Acetate	10	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
100610-1-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	5	U
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	trans-1,3-Dichloropropene	5	U
75-25-2	Bromoform	5	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Total Xylenes	5	U

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VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.
VBLK95

Lab Name: VERSAR Contract:

Lab Code: VERSAR Case No.: 430_16 SAS No.: 4512B SDG No.: 1

Matrix: (soil/water) WATER Lab Sample ID: _VBLK95

Sample wt/vol: 5 _(g/ml) ML Lab File ID: __U7895

Level: (low/med) LOW Date Received: _____

% Moisture: not dec. _____ Date Analyzed: ___07/19/89

Dilution Factor: _ 1

Number TICs found: _ 4

CONCENTRATION UNITS:
(UG/L or UG/KG) __UG/L

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	124-38-9	CARBON DIOXIDE (ACN)	1.7	7	J
2.		UNKNOWN	32.5	2	J
3.		UNKNOWN	33.1166	3	J
4.		UNKNOWN HYDROCARBON	33.8666	4	J
5.					
6.					
7.					
8.					
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VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

VBLK11

Name: VERSAR INC. Contract: _____

Lab Code: VERSAR Case No.: 430_16 SAS No.: 4512B__ SDG No.: 1_____

Matrix: (soil/water) WATER Lab Sample ID: VBLK11_____

Sample wt/vol: __5.0 (g/mL) ML__ Lab File ID: U7911_____

Level: (low/med) LOW___ Date Received: _____

% Moisture: not dec. ____ Date Analyzed: 07/20/89

Column: (pack/cap) PACK__ Dilution Factor: 1.0_____

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	4	BJ
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	5	U
75-35-4	1,1-Dichloroethene	5	U
75-35-3	1,1-Dichloroethane	5	U
540-59-0	1,2-Dichloroethene (total)	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone	10	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon Tetrachloride	5	U
108-05-4	Vinyl Acetate	10	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
100610-1-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	5	U
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	trans-1,3-Dichloropropene	5	U
75-25-2	Bromoform	5	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Total Xylenes	5	U

1E

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

VBLK11

Lab Name: VERSAR INC. Contract: _____

Lab Code: VERSAR Case No.: 430_16 SAS No.: 4512B__ SDG No.: 1_____

Matrix: (soil/water) WATER Lab Sample ID: VBLK11_____

Sample wt/vol: __5.0 (g/mL) ML__ Lab File ID: U7911_____

Level: (low/med) LOW___ Date Received: _____

% Moisture: not dec. ____ Date Analyzed: 07/20/89

Column (pack/cap) PACK__ Dilution Factor: 1.0_____

Number TICs found: __0

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L_

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

VBLK29

Name: VERSAR INC. Contract: _____

Lab Code: VERSAR Case No.: 430_16 SAS No.: 4512B__ SDG No.: 1_____

Matrix: (soil/water) WATER Lab Sample ID: VBLK29_____

Sample wt/vol: __5.0 (g/mL) ML__ Lab File ID: U7929_____

Level: (low/med) LOW___ Date Received: _____

% Moisture: not dec. ____ Date Analyzed: 07/20/89

Column: (pack/cap) PACK__ Dilution Factor: 1.0_____

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	3	BJ
67-64-1	Acetone	14	B
75-15-0	Carbon Disulfide	5	U
75-35-4	1,1-Dichloroethene	5	U
75-35-3	1,1-Dichloroethane	5	U
540-59-0	1,2-Dichloroethene (total)	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone	10	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon Tetrachloride	5	U
108-05-4	Vinyl Acetate	10	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
100610-1-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	5	U
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	trans-1,3-Dichloropropene	5	U
75-25-2	Bromoform	5	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Total Xylenes	5	U

1E

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

VBLK29

Lab Name: VERSAR_INC._____ Contract: _____

Lab Code: VERSAR_ Case No.: 430_16 SAS No.: 4512B__ SDG No.: 1_____

Matrix: (soil/water) WATER_ Lab Sample ID: VBLK29_____

Sample wt/vol: __5.0 (g/mL) ML__ Lab File ID: U7929_____

Level: (low/med) LOW___ Date Received: _____

% Moisture: not dec. ____ Date Analyzed: 07/20/89

Column (pack/cap) PACK__ Dilution Factor: 1.0_____

Number TICs found: __0

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L_

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

VBLK71

Lab Name: VERSAR INC. Contract: _____

Lab Code: VERSAR Case No.: 430_16 SAS No.: _____ SDG No.: 1_____

Matrix: (soil/water) SOIL Lab Sample ID: VBLK71_____

Sample wt/vol: 5.0 (g/mL) G Lab File ID: U8571_____

Level: (low/med) MED Date Received: _____

% Moisture: not dec. ____ Date Analyzed: 08/19/89

Column: (pack/cap) PACK Dilution Factor: 1.3_____

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG		Q
74-87-3	Chloromethane	1300	U	
74-83-9	Bromomethane	1300	U	
75-01-4	Vinyl Chloride	1300	U	
75-00-3	Chloroethane	1300	U	
75-09-2	Methylene Chloride	630	U	
67-64-1	Acetone	1300	U	
75-15-0	Carbon Disulfide	630	U	
75-35-4	1,1-Dichloroethene	630	U	
75-35-3	1,1-Dichloroethane	630	U	
540-59-0	1,2-Dichloroethene (total)	630	U	
67-66-3	Chloroform	630	U	
107-06-2	1,2-Dichloroethane	630	U	
78-93-3	2-Butanone	1300	U	
71-55-6	1,1,1-Trichloroethane	630	U	
56-23-5	Carbon Tetrachloride	630	U	
108-05-4	Vinyl Acetate	1300	U	
75-27-4	Bromodichloromethane	630	U	
78-87-5	1,2-Dichloropropane	630	U	
100610-1-5	cis-1,3-Dichloropropene	630	U	
79-01-6	Trichloroethene	630	U	
124-48-1	Dibromochloromethane	630	U	
79-00-5	1,1,2-Trichloroethane	630	U	
71-43-2	Benzene	630	U	
10061-02-6	trans-1,3-Dichloropropene	6300	U	
75-25-2	Bromoform	630	U	
108-10-1	4-Methyl-2-Pentanone	1300	U	
591-78-6	2-Hexanone	1300	U	
127-18-4	Tetrachloroethene	630	U	
79-34-5	1,1,2,2-Tetrachloroethane	630	U	
108-88-3	Toluene	630	U	
108-90-7	Chlorobenzene	630	U	
100-41-4	Ethylbenzene	630	U	
100-42-5	Styrene	630	U	
1330-20-7	Total Xylenes	630	U	

1E

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

VBLK71

Lab Name: VERSAR INC. Contract: _____

Lab Code: VERSAR Case No.: 430_16 SAS No.: _____ SDG No.: 1_____

Matrix: (soil/water) SOIL__ Lab Sample ID: VBLK71_____

Sample wt/vol: __5.0 (g/mL) G___ Lab File ID: U0571_____

Level: (low/med) MED___ Date Received: _____

% Moisture: not dec. ____ Date Analyzed: 08/19/89

Column (pack/cap) PACK__ Dilution Factor: 1.3_____

Number TICs found: __0 CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

VBLK01

Name: VERSAR INC. Contract: _____

Lab Code: VERSAR Case No.: 430_16 SAS No.: 4512B SDG No.: 1

Matrix: (soil/water) WATER Lab Sample ID: VBLK01

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: U8601

Level: (low/med) LOW Date Received: _____

% Moisture: not dec. ____ Date Analyzed: 08/21/89

Column: (pack/cap) PACK Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	5	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	5	U
75-35-4	1,1-Dichloroethene	5	U
75-35-3	1,1-Dichloroethane	5	U
540-59-0	1,2-Dichloroethene (total)	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone	10	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon Tetrachloride	5	U
108-05-4	Vinyl Acetate	10	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	5	U
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	trans-1,3-Dichloropropene	5	U
75-25-2	Bromoform	5	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Total Xylenes	5	U

1E

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

VBLK01

Lab Name: VERSAR INC. Contract: _____

Lab Code: VERSAR Case No.: 430_16 SAS No.: 4512B__ SDG No.: 1_____

Matrix: (soil/water) WATER Lab Sample ID: VBLK01_____

Sample wt/vol: __5.0 (g/mL) ML__ Lab File ID: U8601_____

Level (low/med) LOW___ Date Received: _____

% Moisture: not dec. ____ Date Analyzed: 08/21/89

Column (pack/cap) PACK__ Dilution Factor: 1.0_____

Number TICs found: __0

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L_

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

VBLK52

Name: VERSAR INC. Contract: _____

Lab Code: VERSAR Case No.: 430_16 SAS No.: 4512B__ SDG No.: 1_____

Matrix: (soil/water) WATER Lab Sample ID: VBLK52_____

Sample wt/vol: _____ (g/mL) ML Lab File ID: U8652_____

Level: (low/med) LOW Date Received: _____

% Moisture: not dec. ____ Date Analyzed: 08/23/89

Column: (pack/cap) PACK Dilution Factor: 1_____

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	5	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	5	U
75-35-4	1,1-Dichloroethene	5	U
75-35-3	1,1-Dichloroethane	5	U
540-59-0	1,2-Dichloroethene (total)	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone	10	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon Tetrachloride	5	U
108-05-4	Vinyl Acetate	10	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
100610-1-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	5	U
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	trans-1,3-Dichloropropene	5	U
75-25-2	Bromoform	5	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Total Xylenes	5	U

1E

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

VBLK52

Lab Name: VERSAR_INC._____ Contract: _____

Lab Code: VERSAR_ Case No.: 430_16 SAS No.: 4512B__ SDG No.: 1_____

Matrix: (soil/water) WATER_ Lab Sample ID: VBLK52_____

Sample wt/vol: _____ (g/mL) ML__ Lab File ID: U8652_____

Level: (low/med) LOW___ Date Received: _____

% Moisture: not dec. ____ Date Analyzed: 08/23/89

Column (pack/cap) PACK__ Dilution Factor: 1_____

Number TICs found: __0

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L_

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE

VBLK73

Lab Name: VERSAR INC. Contract: _____

Lab Code: VERSAR Case No.: 430 16 SAS No.: 4512B SDG No.: 1

Matrix: (soil/water) SOIL Lab Sample ID: VBLK73

Sample wt/vol: 4.0 (g/mL) G Lab File ID: Y6873

Level: (low/med) MED Date Received: _____

% Moisture: not dec. _____ Date Analyzed: 07/19/89

Column: (pack/cap) PACK Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	1300	U
74-83-9	Bromomethane	1300	U
75-01-4	Vinyl Chloride	1300	U
75-00-3	Chloroethane	1300	U
75-09-2	Methylene Chloride	630	U
67-64-1	Acetone	1300	U
75-15-0	Carbon Disulfide	630	U
75-35-4	1,1-Dichloroethene	630	U
75-34-3	1,1-Dichloroethane	630	U
540-59-0	1,2-Dichloroethene (total)	630	U
67-66-3	Chloroform	630	U
107-06-2	1,2-Dichloroethane	630	U
78-93-3	2-Butanone	1300	U
71-55-6	1,1,1-Trichloroethane	630	U
56-23-5	Carbon Tetrachloride	630	U
108-05-4	Vinyl Acetate	1300	U
75-27-4	Bromodichloromethane	630	U
78-87-5	1,2-Dichloropropane	630	U
10061-01-5	cis-1,3-Dichloropropene	630	U
79-01-6	Trichloroethene	630	U
124-48-1	Dibromochloromethane	630	U
79-00-5	1,1,2-Trichloroethane	630	U
71-43-2	Benzene	630	U
10061-02-6	Trans-1,3-Dichloropropene	630	U
75-25-2	Bromoform	630	U
108-10-1	4-Methyl-2-Pentanone	1300	U
591-78-6	2-Hexanone	1300	U
127-18-4	Tetrachloroethene	630	U
79-34-5	1,1,2,2-Tetrachloroethane	1300	U
108-88-3	Toluene	630	U
108-90-7	Chlorobenzene	630	U
100-41-4	Ethylbenzene	630	U
100-42-5	Styrene	630	U
1330-20-7	Total Xylenes	630	U
1330-20-7	m -Xylene	630	U

07/89

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

VBLK73

Lab Name: VERSAR INC. Contract:

Lab Code: VERSAR Case No.: 430 16 SAS No.: 45128 SDG No.: 1

Matrix: (soil/water) SOIL Lab Sample ID: VBLK73

Sample wt/vol: 4.0 (g/mL) G Lab File ID: Y6873

Level: (low/med) MED Date Received:

% Moisture: not dec. Date Analyzed: 07/19/89

Column (pack/cap) PACK Dilution Factor: 1.0

Number TICs found: 0 CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q

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VOLATILE ORGANICS ANALYSIS DATA SHEET

4658B49MS

Lab Name: VERSAR INC. Contract:

Lab Code: VERSAR Case No.: 430 16 SAS No.: 4512B SDG No.: 1

Matrix: (soil/water) SOIL Lab Sample ID: 76190

Sample wt/vol: 4.0 (g/mL) G Lab File ID: Y6879

Level: (low/med) MED Date Received: 07/05/89

% Moisture: not dec. Date Analyzed: 07/20/89

Column: (pack/cap) PACK Dilution Factor: 10

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	13000	U
74-83-9	Bromomethane	13000	U
75-01-4	Vinyl Chloride	13000	U
75-00-3	Chloroethane	13000	U
75-09-2	Methylene Chloride	6300	U
67-64-1	Acetone	13000	U
75-15-0	Carbon Disulfide	6300	U
75-35-4	1,1-Dichloroethene	6300	U
75-34-3	1,1-Dichloroethane	6300	U
540-59-0	1,2-Dichloroethene (total)	6300	U
67-66-3	Chloroform	6300	U
107-06-2	1,2-Dichloroethane	6300	U
78-93-3	2-Butanone	13000	U
71-55-6	1,1,1-Trichloroethane	6300	U
56-23-5	Carbon Tetrachloride	6300	U
108-05-4	Vinyl Acetate	13000	U
75-27-4	Bromodichloromethane	6300	U
78-87-5	1,2-Dichloropropane	6300	U
10061-01-5	cis-1,3-Dichloropropene	6300	U
79-01-6	Trichloroethene	6300	U
124-48-1	Dibromochloromethane	6300	U
79-00-5	1,1,2-Trichloroethane	6300	U
71-43-2	Benzene	6300	U
10061-02-6	Trans-1,3-Dichloropropene	6300	U
75-25-2	Bromoform	6300	U
108-10-1	4-Methyl-2-Pentanone	13000	U
591-78-6	2-Hexanone	13000	U
127-18-4	Tetrachloroethene	6300	U
79-34-5	1,1,2,2-Tetrachloroethane	13000	U
108-88-3	Toluene		Y
108-90-7	Chlorobenzene	6300	U
100-41-4	Ethylbenzene	99000	
100-42-5	Styrene		
1330-20-7	Total Xylenes	160000	

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VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

4658B49MSD

Lab Name: VERSAR INC. Contract: _____

Lab Code: VERSAR Case No.: 430 16 SAS No.: 45128 SDG No.: 1

Matrix: (soil/water) SOIL Lab Sample ID: Z6190

Sample wt/vol: 4.0 (g/mL) G Lab File ID: Y6880

Level: (low/med) MED Date Received: 07/05/89

% Moisture: not dec. ____ Date Analyzed: 07/20/89

Column: (pack/cap) PACK Dilution Factor: 10

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	13000	U
74-83-9	Bromomethane	13000	U
75-01-4	Vinyl Chloride	13000	U
75-00-3	Chloroethane	13000	U
75-09-2	Methylene Chloride	6300	U
67-64-1	Acetone	13000	U
75-15-0	Carbon Disulfide	6300	U
75-35-4	1,1-Dichloroethene	6300	U
75-34-3	1,1-Dichloroethane	6300	U
540-59-0	1,2-Dichloroethene (total)	6300	U
67-66-3	Chloroform	6300	U
107-06-2	1,2-Dichloroethane	6300	U
78-93-3	2-Butanone	13000	U
71-55-6	1,1,1-Trichloroethane	6300	U
56-23-5	Carbon Tetrachloride	6300	U
108-05-4	Vinyl Acetate	13000	U
75-27-4	Bromodichloromethane	6300	U
78-87-5	1,2-Dichloropropane	6300	U
10061-01-5	cis-1,3-Dichloropropene	6300	U
79-01-6	Trichloroethene	6300	U
124-48-1	Dibromochloromethane	6300	U
79-00-5	1,1,2-Trichloroethane	6300	U
71-43-2	Benzene	6300	U
10061-02-6	Trans-1,3-Dichloropropene	6300	U
75-25-2	Bromoform	6300	U
108-10-1	4-Methyl-2-Pentanone	13000	U
591-78-6	2-Hexanone	13000	U
127-18-4	Tetrachloroethene	6300	U
79-34-5	1,1,2,2-Tetrachloroethane	13000	U
108-88-3	Toluene		U
108-90-7	Chlorobenzene	6300	U
100-41-4	Ethylbenzene	87000	
100-42-5	Styrene	6300	U
1330-20-7	Total Xylenes	260000	

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REFERENCE NO. 12

June 27, 1989

Ms. Caroline Kwan
U.S. Environmental Protection Agency
26 Federal Plaza
New York, New York 10278

Contract No: 68-01-7331
Document No: T648-C02-LR-DKKP-1

Subject: Overview of 104(e) Letter Response Sampling in the Tutu Wellfield Area and Supercat Laundromat Area, St. Thomas, U.S. Virgin Islands

Dear Ms. Kwan:

From June 5, 1989 through June 9, 1989, CDM Federal Programs Corporation (CDM FPC) conducted a second round of 104(e) letter response sampling activities at the following facilities in the Tutu Wellfield Area: O'Henry Dry Cleaners, Ramsay Motors, Consolidated Auto Parts (now Gasset Motors), Esso Tutu Car Care Center, Texaco Tutu Service Station, and the Laga Building. During the same time interval, CDM FPC conducted 104(e) letter response sampling in the Supercat Laundromat Area at the following facilities: Supercat Laundromat, Caribbean Jeep Rental, and the Texaco Station. The sampling was done in an attempt to reveal potential sources of chlorinated hydrocarbon contamination found in area ground water.

Permission to enter the facilities to be sampled was obtained by Gregory Rhymer from the St. Thomas Department of Planning and Natural Resources (DPNR). Mr. Rhymer also obtained and arranged for the disposal of the decontamination solvents which were used by CDM FPC during the sampling activities.

The following is a summary of the 104(e) letter response sampling by facility:

TUTU WELLFIELD AREA

O'Henry Dry Cleaning Facility: A total of 3 soil samples were collected from this facility using hand augers during the second round of 104(e) sampling. Two of the samples were collected from a single boring location located directly under a pile of debris, which includes discarded filters used in dry cleaning processes. These samples were composited from soil 6-15 inches and 15-24 inches below the ground surface. During the sampling activities, sustained HNu readings exceeding 90 ppm (benzene equivalents) were detected in the borehole. The third soil sample was collected approximately 8 feet south of the first borehole. No sustained HNu readings above background (0.2 ppm) were detected in this second borehole.

40 Rector Street, 10th Floor New York, NY 10006 212 393-9634

Laga Building: Several samples were collected in an area containing abandoned drums adjacent to the Laga Building. A preliminary assessment of the area indicated 9 empty 55 gallon drums which are corroded and/or rusty, 16 sealed 55 gallon drums containing unknown product, 1 unsealed 55 gallon drum containing unknown product, 3 plastic drums, and 2 empty 35 gallon drums. Three soil samples were collected from the drum area. During the soil sampling, the HNu readings ranged from background to 40 ppm above background in the boreholes. One aqueous sample was collected from the open drum containing product, however no HNu readings above background were determined in the drum. One additional sample of a dry, white powdery material was collected from the bottom of one of the empty drums.

Ramsay Motors Facility: Upon re-inspection of this facility, CDM FPC personnel observed a stained region with stressed vegetation adjacent to the fence separating the Ramsay Motors and Consolidated facilities. The oily material causing the stain apparently originated from the Consolidated Auto Parts Facility, which is topographically upgradient of the Ramsay Motors Facility. One soil sample was collected directly below the stained and stressed vegetation. During the sampling, HNu readings were detected up to 3 ppm above background in the borehole. One oil sample was also collected from the waste oil UST located in the auto mechanic shop at the facility.

Consolidated Motors Facility: CDM FPC personnel collected one grab sample of the oily material in the drainage ditch on the northern perimeter of the Consolidated Motors Facility.

Esso Tutu Car Care Center: Two oil samples were collected from this facility. One was collected from the inoperable oil/water separator, and the other from the waste oil holding tank. The capacity and integrity of the holding tank is unknown, however, it should be noted that the tank contained approximately 3 inches of material during this sampling round, and the waste oil level was at least 2 feet higher during the first 104(e) sampling round (September 1988).

Texaco Tutu Service Station: A total of 7 oil samples were collected from this facility. One of the oil samples was collected from the oil/water separator, one was collected from the floor drain of the middle work bay, and 5 oil samples were collected from drums containing waste oil located behind the facility.

SUPERCAT LAUNDROMAT AREA

Supercat Laundromat: Two water samples were collected from the Supercat Laundromat. One was collected from the potable cistern and one from the non-potable cistern. An attempt was made to collect a sample from the well located at the facility, but a leak in the discharge pipe made it impossible to purge the well and obtain the sample. One sediment sample was also collected from the drain originating behind the facility.

Caribbean Jeep Rental: A total of 5 soil samples were collected in the vicinity of this facility. Two of the samples were collected adjacent to the fence bordering the western side of the facility. HNu readings in the boreholes of these samples reached up to 10 ppm. Two soil samples were collected inside the fenced area. The final soil sample was collected adjacent to the Texaco Station sign, located adjacent to the gate of the Caribbean Jeep Rental facility. During the collection of the latter three soil samples, HNu readings substantially above background were not encountered. One aqueous sample was collected from an UST of unknown contents located approximately 20 feet west of the Caribbean Jeep Rental fence. The material was black and oily in nature, and readings exceeding 3 ppm above background were detected in the tank during sampling.

The oil samples, aqueous drum sample, and the powdery drum sample were collected for volatile organic analysis only, all other samples were collected for full TCL organic analyses, as well as EP toxicity metals and total petroleum hydrocarbons. The validated sample results and conclusions about the data will be delivered to you as soon as they are available. Should you have any questions regarding the 104(e) letter response sampling, please do not hesitate to call me at (212) 393-9634.

Sincerely,

CDM Federal Programs Corporation

Scott B. Graber
TES III Project Manager

cc:

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	Amy Chester	ORC
	CDM FPC	Document Control
	CDM FPC	NYC File

(WP14/30)

REFERENCE NO. 13

FINAL
REPORT ON RESULTS OF SOIL GAS SURVEY, TUTU, ST. THOMAS, U. S. VIRGIN ISLANDS

December 18, 1987

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1.0 EXECUTIVE SUMMARY

During November 1987, Geoscience Consultants, Ltd. (GCL) conducted a soil gas investigation in the vicinity of the Tutu service station of Texaco Caribbean, Inc., in St. Thomas, U. S. Virgin Islands. The survey results show a zone of significantly elevated total hydrocarbon concentrations (up to 690,000 micrograms per liter [ug/l] as benzene) in soil gas beneath the southwestern part of the service station site and beneath adjacent roadways west and south of the station. These values indicate the presence of hydrocarbons within the unsaturated soil zone. Another zone of moderately high soil gas total hydrocarbon values (up to 2,600 ug/l) was found 300 to 800 feet southwest of the station, within a topographic low beneath the southern part of the Four Winds Shopping Center parking lot. Moderately elevated total hydro-carbon values (up to 3,000 ug/l) were also found adjacent to an Esso service station near the southern end of the Four Winds Shopping Center parking lot. Soil gas hydrocarbons in these areas are probably a result of vaporization from hydrocarbons present in ground water.

A topographically high area around Tillett Gardens, an area of small shops, in which a relatively great depth to ground water (about 25 feet) and shallow depth to bedrock (about 5 feet) prevented adequate soil gas analysis, lies between the two mapped zones of elevated hydrocarbon values. Based on the soil gas analysis alone, it is therefore impossible to determine with certainty whether the two zones are parts of a single hydrocarbon plume or constitute two separate plumes. The presence of benzene, toluene and other hydrocarbons in the Tillett water well, which is located between the two zones, indicates that these compounds are present in ground water in at least part of the area where soil gas mapping was not feasible.

GCL also performed analyses for chlorinated compounds in soil gas at selected points in the vicinity of the Tutu service station and Tillett Gardens. Measurable concentrations of tetrachloroethylene (PCE) were found at all points sampled for chlorinated compounds, with the highest concentrations in soil gas near the LAGA building northeast of the Tutu

TUT 001 0703

service station. The LAGA building, where PCE is known to have been used extensively in the past, is a possible source of the chlorinated hydrocarbons.

TUT 001 0704

2.0 LOCATION AND HYDROGEOLOGIC BACKGROUND

2.1 LOCATION AND PURPOSE OF STUDY

During November 1987, Geoscience Consultants LTD. (GCL) conducted a soil gas survey in the vicinity of the Tutu service station of Texaco Caribbean, Inc. The purpose of the survey was to determine the range and spatial distribution of hydrocarbons present in the soil gas at the service station site, and to map the approximate extent of any hydrocarbon plume that might be encountered during the survey.

The Tutu service station is located at 18°20'31" North, 64°53'14" West, in Anna's Retreat Estate, St. Thomas, U. S. Virgin Islands (Figure 2-1). The station is on the northeast corner of the intersection of Highway 38 and Highway 384, on the eastern slope of the upper Turpentine Run basin. Nearby facilities include an auto parts store and garage north of the station, a fire station and the LAGA building (formerly a cloth manufacturing plant, now a public schools maintenance facility) uphill to the northeast of the station, and Tillett Gardens, a courtyard of small shops and a restaurant, south of the station (Figure 2-2). The Four Winds Shopping Center lies in a topographically low area along the axis of the upper Turpentine Run basin, west of the Tutu service station and Tillett Gardens.

Elevated concentrations of hydrocarbons, including benzene, toluene, and several chlorinated compounds, have been detected in water wells in the upper Turpentine Run basin (Geraghty and Miller, 1983, p. 73-74). The highest reported concentrations of benzene and toluene have been found in water from the Tillett well, located 250 feet south of the Texaco station and 300 feet northeast of an Esso service station (Figure 2-2). In August 1987, water samples from the Tillett well contained 1300 to 1400 parts per billion (ppb) of benzene and approximately 33 to 56 ppb of toluene (C. Dolan, EPA Region II, written communication). High concentrations of tetrachloroethylene (PCE) and other chlorinated compounds have also been found in the Tillett well.

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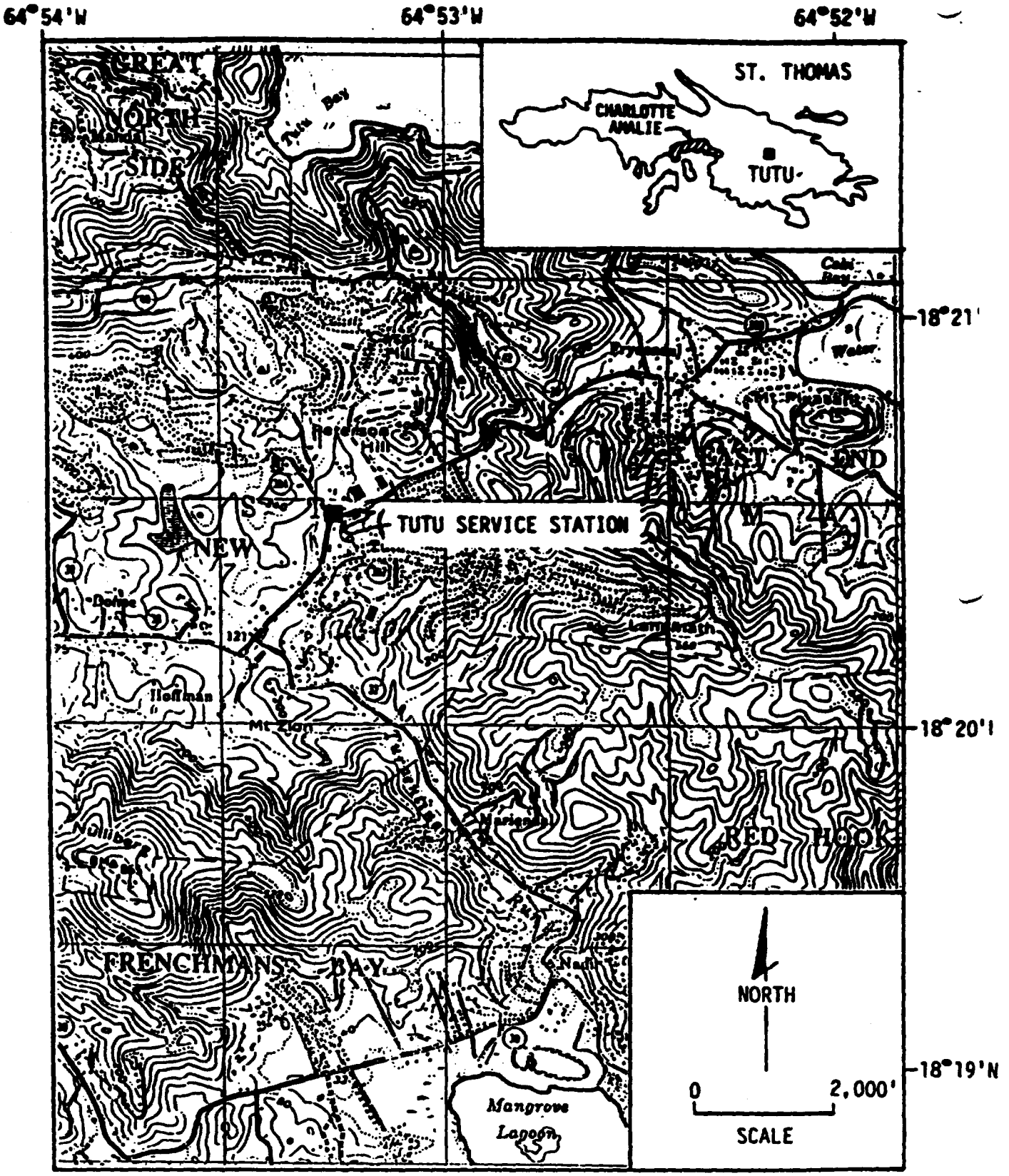

Base from USGS Eastern St.Thomas 7.5 minute quadrangle.

GCL

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FIGURE 2-1

TOPOGRAPHIC MAP SHOWING LOCATION OF TUTU SERVICE STATION, ST.THOMAS.

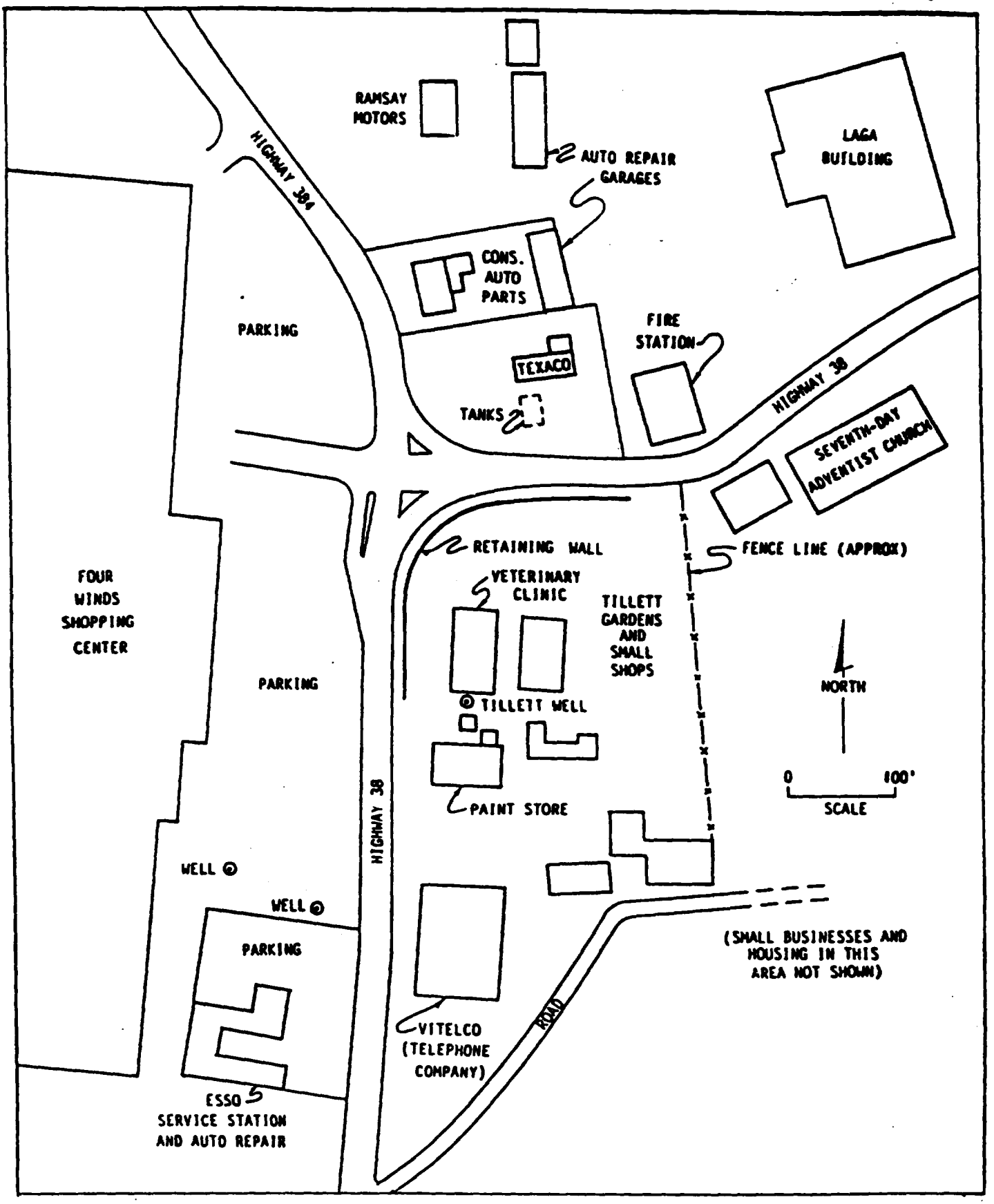

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FIGURE 2-2

MAP OF CENTRAL TUTU AREA, ST. THOMAS,

SHOWING TEXACO TUTU SERVICE STATION AND NEARBY FACILITIES.

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2.2 REGIONAL GEOLOGY

The lithology of the Virgin Islands consists dominantly of volcanic rocks, including spilites (albitized basalts), keratophyres (extrusive igneous rocks containing albite and mafic minerals), andesites, and volcanic breccias and conglomerates derived from the igneous rocks. The Louisenhoj Formation, which comprises the bedrock material throughout the upper Turpentine Run basin, consists dominantly of augite andesite tuff and associated volcanic breccias (Donnelly, 1966). The Louisenhoj Formation is tentatively dated as Albian (late Early Cretaceous) in age (Donnelly, 1966). The Louisenhoj Formation rocks in the vicinity of Tutu have been extensively deformed and fractured by tectonic activity during Late Cretaceous and Tertiary time.

2.3 REGIONAL HYDROLOGY

The upper Turpentine Run basin contains one of the most productive and heavily used aquifers on the island of St. Thomas. Stevens and others (1981) list 26 water wells in the Tutu area, and new wells have been completed since their report was prepared. In 1983, Geraghty and Miller estimated that "current pumpage in the upper basin may approach or exceed the estimated safe yield of 300,000 gpd [gallons per day] calculated by the USGS [U. S. Geological Survey]" (p. 68).

Ground water pumped from the upper Turpentine Run basin is derived primarily from fracture zones in the underlying Louisenhoj bedrock. To assure adequate supply, wells in the basin are commonly drilled to depths of 100 feet or more, although the water table is generally no more than 20 to 30 feet deep in the central part of the basin. Significant drawdowns occur in many wells due to pumping and seasonal water table fluctuations.

Ground water in the upper Turpentine Run basin contains total dissolved solids (TDS) of 700 to 1,800 milligrams per liter (mg/l), consisting dominantly of bicarbonate, sodium and chloride (Geraghty and Miller, 1983, p. 73, 76). Limited data from deep wells suggests that TDS concentration tends to increase with depth in the aquifer (Geraghty and

TUT 001 0708

Miller, 1983). Geraghty and Miller also report nitrate concentrations in excess of 10 mg/l (as nitrogen) from Virgin Islands Housing Authority (VIHA) wells 1 and 2, which are located approximately 800 feet northeast of the Tutu station, and elevated levels of chlorinated hydrocarbons in well VIHA-1.

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3.0 METHODS OF STUDY

Work performed by GCL at the Tutu service station site to date has included a preliminary site investigation, a soil gas survey, and limited hydrogeologic studies as judged appropriate for interpretation of the soil gas data. The results of the preliminary site investigation were reported in Section 3.3 of the Work Plan for Soil Gas Survey, Texaco Service Station, Tutu, St. Thomas, U. S. Virgin Islands, and were used in preparation of that work plan. The methods and results of the soil gas survey and associated hydrogeologic studies are described in this report.

3.1 SOIL GAS SURVEY

The soil gas survey at the Tutu site was conducted during November 2-18, 1987. This task consisted of soil gas sampling at points on the service station site and in nearby areas, and on-site analysis of the soil gas for selected hydrocarbons using a gas chromatograph (GC) owned and operated by Tracer Research Corporation (Tracer) of Tucson, Arizona. The gas chromatograph was equipped with detectors capable of identifying total and aromatic hydrocarbons and halogenated compounds, using flame ionization detector (FID) and electron capture detector (ECD) techniques. Soil gas sampling and analysis were performed as described in the Work Plan for Soil Gas Survey and Quality Assurance Project Plan for Soil Gas Survey dated October 1987, as approved by and with amendments requested by the U.S. Environmental Protection Agency Region II (USEPA) and the Virgin Islands Department of Planning and Natural Resources (DPNR) during discussions in the field.

The sampling and analysis were conducted in accordance with standardized procedures which have been used by GCL and Tracer at numerous sites. Soil gas samples were collected by driving a 2-cm diameter hollow galvanized steel probe to the sampling depth and evacuating 5 to 10 liters of soil gas from immediately above the drive point with a vacuum pump. A syringe was inserted through the silicone evacuation line to collect a 10-milliliter gas sample for immediate on-site analysis. Withdrawal of the sample from the evacuation line and its injection and analysis in the GC were performed by an experienced Tracer chemist.

TUT 001 0710

The initial soil gas sampling grid consisted of 20 points located on the service station property, and 3 points located north and east of the station which were selected in order to define background hydrocarbon values. Samples at each point were taken from a depth of 5 feet below the ground surface and from the greatest depth achievable by hand driving of the probe, if greater than 5 feet. Samples were analyzed for total hydrocarbons, excluding methane. Since the methane peak on the chromatogram normally includes the peaks of ethane and propane as well, the resulting "total hydrocarbon" values thus include only concentrations of molecules containing 4 or more carbon atoms, which typically comprise the major constituents of commercial gasoline and similar petroleum products. Additionally, an effort was made to quantify the amounts of benzene, toluene, ethyl benzene and xylene (BTEX) in the soil gas; however, it was found that the OV-101 column employed for the FID work failed in most cases to distinguish the individual BTEX constituents. The OV-101 column has been used by GCL and Tracer in numerous soil gas investigations, and in previous cases has adequately defined all BTEX constituents.

Because a zone of high hydrocarbon values was identified in the southwestern portion of the station site, the sampling grid was extended to the west and south in order to determine the extent of the hydrocarbon plume. Due to the need to avoid water lines, sewer lines, underground electrical lines, and other cultural features, the points of the extended grid were not spaced as regularly as had been anticipated in the work plan. Probes were driven to the greatest depth attainable, which was generally about 5 feet, and a single sample was taken from the maximum depth achieved at each point. The sampling grid was extended southward and westward to the southern part of the Four Winds Shopping Center parking lot (see Section 4.1.2 of this report). Samples were analyzed for total hydrocarbons and BTEX using the OV-101 column.

During the last few days of the hydrocarbon survey, the USEPA representative at the site requested that another column be employed in an attempt to better quantify individual BTEX constituents in the soil gas. Texaco

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Caribbean concurred with the request, and discussions were held with chemists from Tracer and from Camp Dresser and McKee Federal Programs Corporation (CDM-FPC) to identify an appropriate column. The Carbopak AT-1000 column, a much slower column than the OV-101, was selected.

During calibration of the system, it became apparent that the full-length AT-1000 column was unsuitable for field use because of its excessive retention time. The AT-1000 column required as much as an hour to analyze one sample, as compared with about 5 minutes for the OV-101. After a few attempts, the column was cut to a length of 1.5 feet (from its original 6-foot length), which shortened the run time to about 15 minutes, and was used to analyze a single sample taken from the vicinity of the underground storage tanks (USTs) at the Tutu service station. The column proved capable of quantifying benzene at this location, but toluene, ethyl benzene and xylene, if present, were still undeterminable due to interference by other peaks on the chromatogram. Due to the excessive run times required to obtain results that were little better than those obtained with the OV-101, no further attempts were made to use the AT-1000 column. The soil gas survey is intended as a preliminary screening tool to define the approximate extent of any hydrocarbons identified in the soil zone. The use of total hydrocarbon values is adequate to perform that task.

Although chlorinated compounds in significant quantities were considered unlikely to have resulted from activities at the Tutu service station, their presence in ground water is a matter of concern. GCL therefore conducted a limited soil gas sampling program which was intended to determine whether these compounds could have come from the Texaco station. Sampling for 6 chlorinated hydrocarbons was performed at 9 points near the Tutu station and upgradient from the Tillett water well, in which some of the compounds have been detected. Analyses were performed using the electron capture detector. The soil gas sample collection procedure was identical to that used in sampling for petroleum components.

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3.2 AUXILIARY HYDROGEOLOGIC STUDIES

During the soil gas survey, GCL also conducted limited investigations into the local hydrogeologic setting in order to better define potential flow paths of hydrocarbons in the subsurface. GCL hydrogeologists measured static water level in wells close to the Tutu site, determined major fracture orientations in nearby exposures of bedrock, and recorded other topographic and geologic data relevant to potential migration pathways.

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4.0 RESULTS OF SOIL GAS SURVEY

4.1 PETROLEUM HYDROCARBONS

The results of FID analyses for petroleum hydrocarbons for each soil gas point analyzed are presented in Table 4-1. Copies of all results, as recorded and supplied by the on-site chemist, are included in Appendix A of this report. Copies of chromatograms annotated by the on-site chemist will be made available, as required, in a supplement to this report.

Background concentrations were established based on analyses at three points (Background 1, Background 2, and the Drift Point) located north and northeast of the station. These points were in areas considered unlikely to be affected by any hydrocarbons which might have resulted from activities at the station. Total hydrocarbon concentrations in these locations ranged from <0.01 ug/l to 0.9 ug/l. At the Drift Point, repeat samples were taken daily by inserting separate soil gas probes within an area of less than 100 square feet, to determine whether soil gas values varied significantly over time. Daily samples taken at the Drift Point varied between 0.1 and 0.9 ug/l, with the highest value recorded at a depth of 4 feet, which was achieved on only one day. For drift samples taken at depths of 2 to 2.5 feet, total hydrocarbon concentrations varied from 0.1 to 0.4 ug/l, indicating temporal variation by up to a factor of 4 in soil gas hydrocarbon values.

The soil gas survey identified three zones in which concentrations of total hydrocarbons (excluding methane) were significantly in excess of background concentrations. These were:

- the southwestern portion of the Tutu station site and the adjacent roadways
- the southern part of the Four Winds Shopping Center parking lot
- adjacent to the Esso service station at the southern end of the Four Winds parking lot

It was not possible to verify with certainty whether these three zones in fact represent portions of the same hydrocarbon plume, or whether they

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TABLE 4-1

CONCENTRATIONS OF PETROLEUM HYDROCARBONS IN SOIL GAS, TUTU AREA

(All concentration values in micrograms per liter)

LOCATION	DEPTH	DATE	BENZENE	TOLUENE	ETHYL BENZENE	XYLENES	TOTAL HYDROCARBONS (WITHOUT CH4)
Background 1	5	11/06/87	<0.01	<0.01	<0.02	<0.01	0.2
Background 2	4	11/06/87	<0.01	<0.01	<0.02	<0.01	<0.01
A-1	5	11/04/87	<230	<260	<280	<260	38,000
A-2	4.5	11/04/87	I	I	<280	<260	110,000
A-2	8.5	11/04/87	I	I	<280	<260	690,000
A-2A	4.5	11/05/87	<0.01	<0.01	<0.01	<0.01	<0.01
A-2A	7	11/05/87	I	<13	<14	<13	7,600
A-3	5	11/05/87	I	<13	<14	<13	4,600
A-3.5	5	11/05/87	I	<13	<14	<13	3,600
A-4	4.5	11/05/87	<0.01	<0.01	<0.01	<0.01	<0.01
A-4	5.5	11/05/87	I	<0.3	<0.3	<0.3	68
B-1	5	11/04/87	I	<510	<570	<530	610,000
B-2	5	11/04/87	I	I	<280	<260	280,000
B-2	8.5	11/04/87	I	I	<280	<260	220,000
B-3	5	11/04/87	I	I	<280	<260	35,000
B-3	8	11/04/87	I	I	4,000	<110	120,000
B-3.5	5	11/04/87	I	<26	<28	<27	6,400
B-4	5	11/04/87	<0.02	<0.02	<0.03	<0.03	<0.02
B-4-C	5	11/05/87	<0.01	<0.01	<0.01	<0.01	0.1
B-4-C	5	11/06/87	<0.01	<0.01	<0.02	<0.01	<0.01
B-4-C	7	11/06/87	<0.01	<0.01	<0.02	<0.01	0.5
C-1	5	11/05/87	I	<130	<130	<130	130,000
C-2	5	11/05/87	I	<130	<140	<130	72,000
C-3	5	11/05/87	I	<0.5	<0.6	<0.5	1,000
C-4	4	11/04/87	<0.09	<0.1	<0.1	<0.1	<0.09
C-4	7	11/04/87	<0.9	<1	<1	<1	1,700
D-1	4.5	11/05/87	<0.01	<0.01	<0.01	<0.01	8
D-2	2.5	11/05/87	I	<0.5	<0.6	<0.5	1,000
D-3	5	11/05/87	<0.01	<0.01	<0.01	<0.01	<0.01
D-4	4	11/04/87	<0.09	0.5	<0.1	<0.1	4
F-1	4.5	11/10/87	<0.02	<0.02	<0.03	<0.02	0.06
F-1	8	11/10/87	<0.02	<0.02	<0.03	<0.02	<0.02
F-2	4.5	11/10/87	<0.02	<0.02	<0.03	<0.02	0.07
F-3	6.5	11/10/87	<0.02	<0.02	<0.03	<0.02	0.4
F-4	6.5	11/10/87	<0.02	<0.02	<0.03	<0.02	0.2

I = Interference with adjacent peaks

TEXC\TABLE4-1.PRN

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TABLE 4-1 (Continued)

LOCATION	DEPTH	DATE	BENZENE	TOLUENE	ETHYL BENZENE	XYLENES	TOTAL HYDROCARBONS (WITHOUT CH4)
F-4	8.5	11/10/87	<0.02	<0.02	<0.03	<0.02	0.3
F-5	5.5	11/10/87	<0.02	<0.02	<0.03	<0.02	0.2
F-6	6	11/10/87	<0.02	<0.02	<0.03	<0.02	0.4
F-7	3.5	11/11/87	<0.02	<0.03	<0.03	<0.03	10
F-8	6	11/11/87	<0.02	<0.03	<0.03	<0.03	2
F-9	2	11/12/87	<0.02	<0.02	<0.03	<0.02	6
F-10	5.5	11/12/87	I	<6	<7	<6	2,600
F-11	4	11/12/87	I	<0.5	<0.5	<0.5	120
F-12	3.5	11/12/87	0.4	<0.1	<0.1	<0.1	40
F-13	5.5	11/12/87	0.02	<0.02	<0.03	<0.02	7
F-14	2	11/12/87	I	<12	<14	<13	3,000
F-15	2.5	11/13/87	<0.02	<0.02	<0.03	<0.03	43
F-16	6	11/13/87	<0.02	<0.02	<0.03	<0.03	11
F-17	5	11/14/87	<0.02	<0.03	<0.03	<0.03	33
F-18	3.5	11/14/87	<0.02	0.07	<0.03	<0.03	0.2
F-19	5	11/14/87	I	<5	<6	<6	1,800
F-20	6	11/14/87	<0.02	<0.03	<0.03	<0.03	26
F-21	6	11/14/87	<0.02	<0.03	<0.03	<0.03	1
F-22	6	11/14/87	<0.02	<0.03	<0.03	<0.03	0.2
T-1	5	11/09/87	<0.01	<0.01	<0.01	<0.01	<0.01
T-1	7	11/09/87	<0.02	<0.02	<0.02	<0.02	<0.02
T-2	5	11/09/87	<0.02	<0.02	<0.02	<0.02	<0.02
T-2	7	11/09/87	<0.02	<0.02	<0.02	<0.02	<0.02
T-3	4	11/09/87	<0.2	<0.2	<0.3	<0.3	230
T-5	4	11/06/87	<0.01	<0.01	<0.02	<0.01	0.6
T-6	2.5	11/09/87	<0.02	<0.02	<0.02	<0.02	<0.02
T-7	5	11/09/87	<0.02	<0.02	<0.02	<0.02	<0.02
T-7	5.5	11/09/87	<0.02	<0.02	<0.02	<0.02	10
T-8	2	11/09/87	<0.02	<0.02	<0.02	<0.02	0.9
T-10	3	11/09/87	<0.02	<0.02	<0.02	<0.02	10
T-11	5	11/09/87	<0.02	<0.02	<0.02	<0.02	3
T-12	3.5	11/09/87	<0.02	<0.02	<0.02	<0.02	0.4
T-13	4.5	11/09/87	<0.02	<0.02	<0.02	<0.02	5
T-14	5.5	11/12/87	<0.02	<0.02	<0.03	<0.02	2
T-15	3.5	11/12/87	<0.02	<0.02	<0.03	<0.02	0.02

I = interference with adjacent peaks

TEXC\TABLE4-1.WK1

TUT 001 0716

TABLE 4-1 (Concluded)

LOCATION	DEPTH	DATE	BENZENE	TOLUENE	ETHYL BENZENE	XYLENES	TOTAL HYDROCARBONS (WITHOUT CH4)
T-16	5.5	11/13/87	<0.02	<0.02	<0.03	<0.03	0.4
T-17	6	11/13/87	<0.02	<0.02	<0.03	<0.03	0.2
T-17	6	11/14/87	<0.02	<0.03	<0.03	<0.03	<0.02
T-18	5.5	11/13/87	<0.02	<0.02	<0.03	<0.03	0.4
T-19	6	11/13/87	<0.02	<0.02	<0.03	<0.03	0.2
T-19	10	11/13/87	<0.02	<0.02	<0.03	<0.03	2
T-20	4.5	11/14/87	<0.02	<0.03	<0.03	<0.03	0.2
Z-1	5	11/11/87	I	<7	<7	<7	4,000
Z-2	3.5	11/11/87	I	<52	<58	<54	28,000
Z-4	6	11/11/87	I	<26	<29	<26	12,000
Z-5	5	11/11/87	I	<5	<6	<5	860
Drift 1	4	11/04/87	<0.02	<0.02	<0.03	<0.03	0.9
Drift 2	2.5	11/05/87	<0.01	<0.01	<0.01	<0.01	0.1
Drift 3	2	11/06/87	<0.01	<0.01	<0.02	<0.01	0.2
Drift 4	2	11/09/87	<0.01	<0.01	<0.01	<0.01	0.2
Drift 5	2.5	11/11/87	<0.02	<0.03	<0.03	<0.03	0.4
Drift 6	2	11/12/87	<0.02	<0.02	<0.03	<0.02	0.4
Drift 6	2	11/13/87	<0.02	<0.02	<0.03	<0.03	0.2
Drift 7	2	11/14/87	<0.02	<0.03	<0.03	<0.03	0.4

I = Interference with adjacent peaks

TEXC\TABLE4-1.WK1

TUT 001 0717

are entirely separate, because lithologic and hydrologic conditions in the intervening area prevented adequate soil gas analysis (see Section 4.1.2).

4.1.1 Service Station Site

Soil gas hydrocarbon values measured on and immediately adjacent to the Tutu service station site are shown in Figure 4-1. In cases where a hole was sampled at two different depths, both concentration values are shown, but the value from the greater depth was used in mapping the concentration contours. In all holes except B-2, the deeper point yielded the higher value; in B-2 the values determined at 5 feet and 8.5 feet were similar.

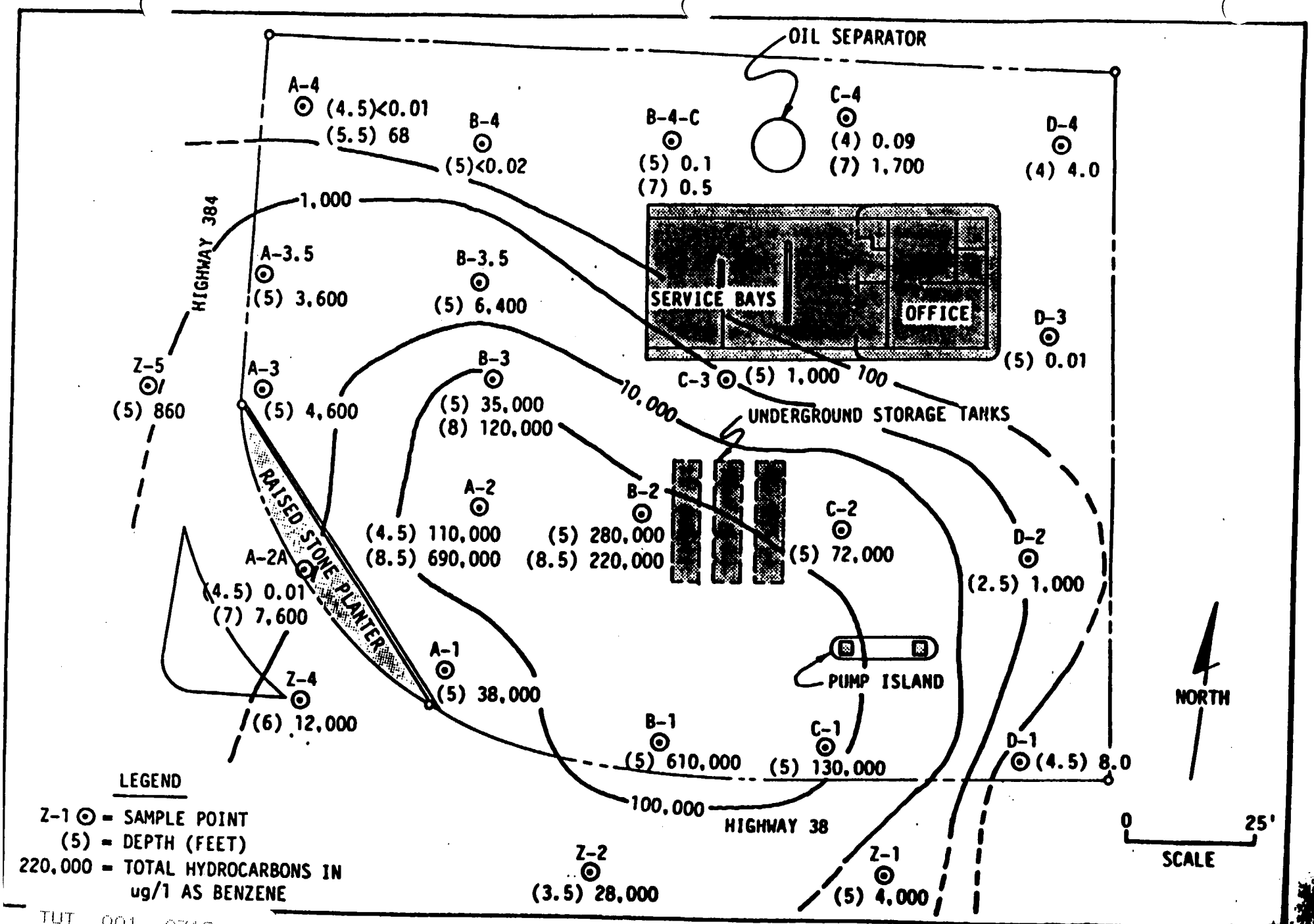
A zone of hydrocarbon concentrations significantly higher than background levels is centered southwest of the underground storage tanks and extends southward and westward beneath the highways adjacent to the station property (Figure 4-2; Zone I, Figure 4-3). Elevated hydrocarbon concentrations were found consistently at depths of about 5 feet and at depths of about 8 feet (maximum depth of probe penetration) in the central part of this area; however, at some points along the station boundaries (A-4, A-2A, C-4) hydrocarbon concentrations appear to increase significantly with depth between 4 feet and 8 feet.

There was no evidence of significant hydrocarbon presence along the northern and eastern boundaries of the station site. The value of 1,700 ug/l recorded in hole C-4 near the north boundary of the station is probably a result of hydrocarbon vapors migrating from the adjacent oil separator pit. Movement of hydrocarbons east of the station area would be inhibited by the steep southwestward topographic and water table gradients.

4.1.2 Other Areas With Hydrocarbon Concentration Above Background Levels

An attempt was made to trace the zone of elevated hydrocarbon concentrations to the south across Highway 38 from the Tutu station. However, no

TUT 001 0718



TUT 001 0719

FIGURE 4-1
CONCENTRATIONS OF TOTAL PETROLEUM HYDROCARBONS IN SOIL GAS ON TUTU SERVICE STATION SITE

GCL

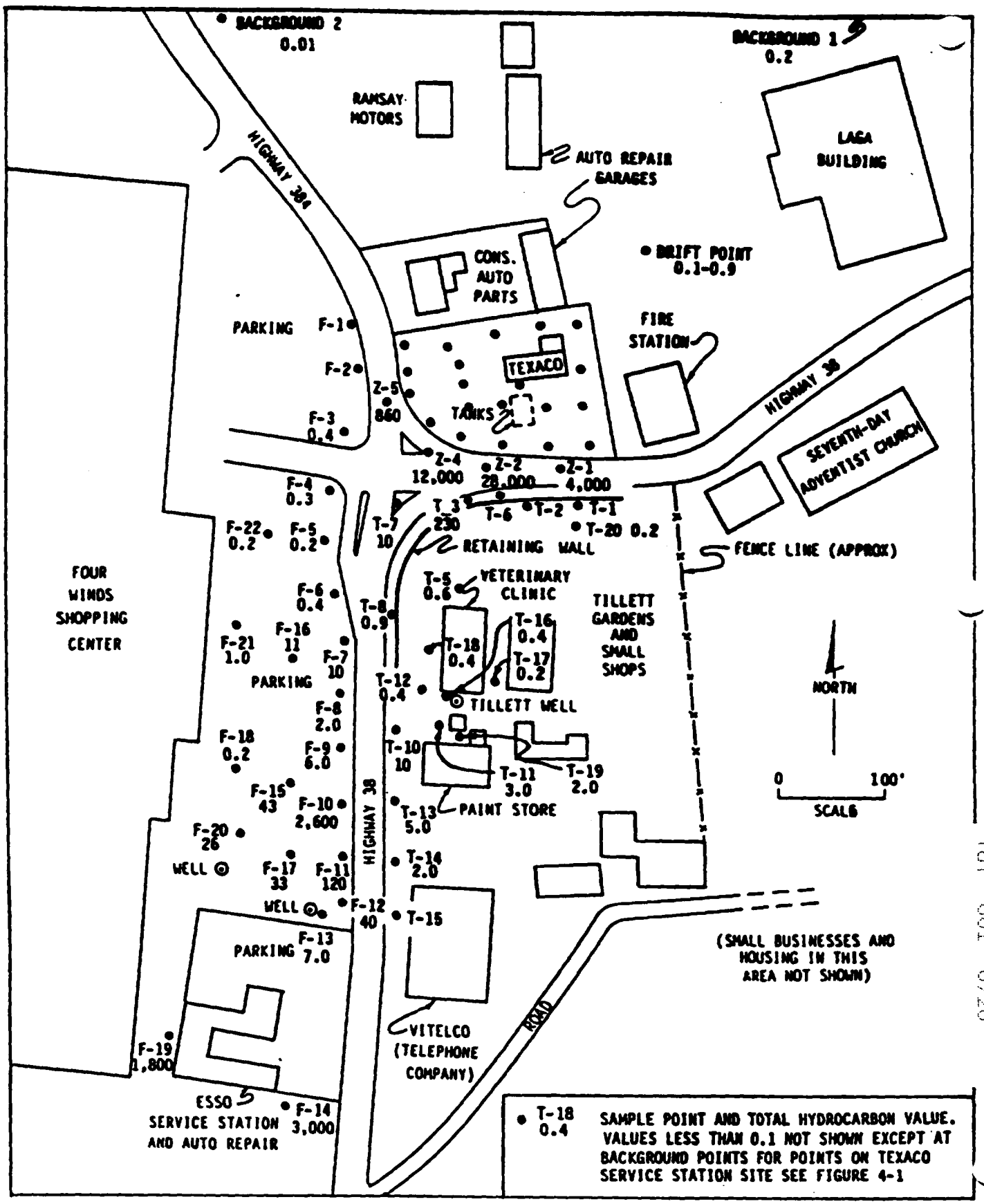
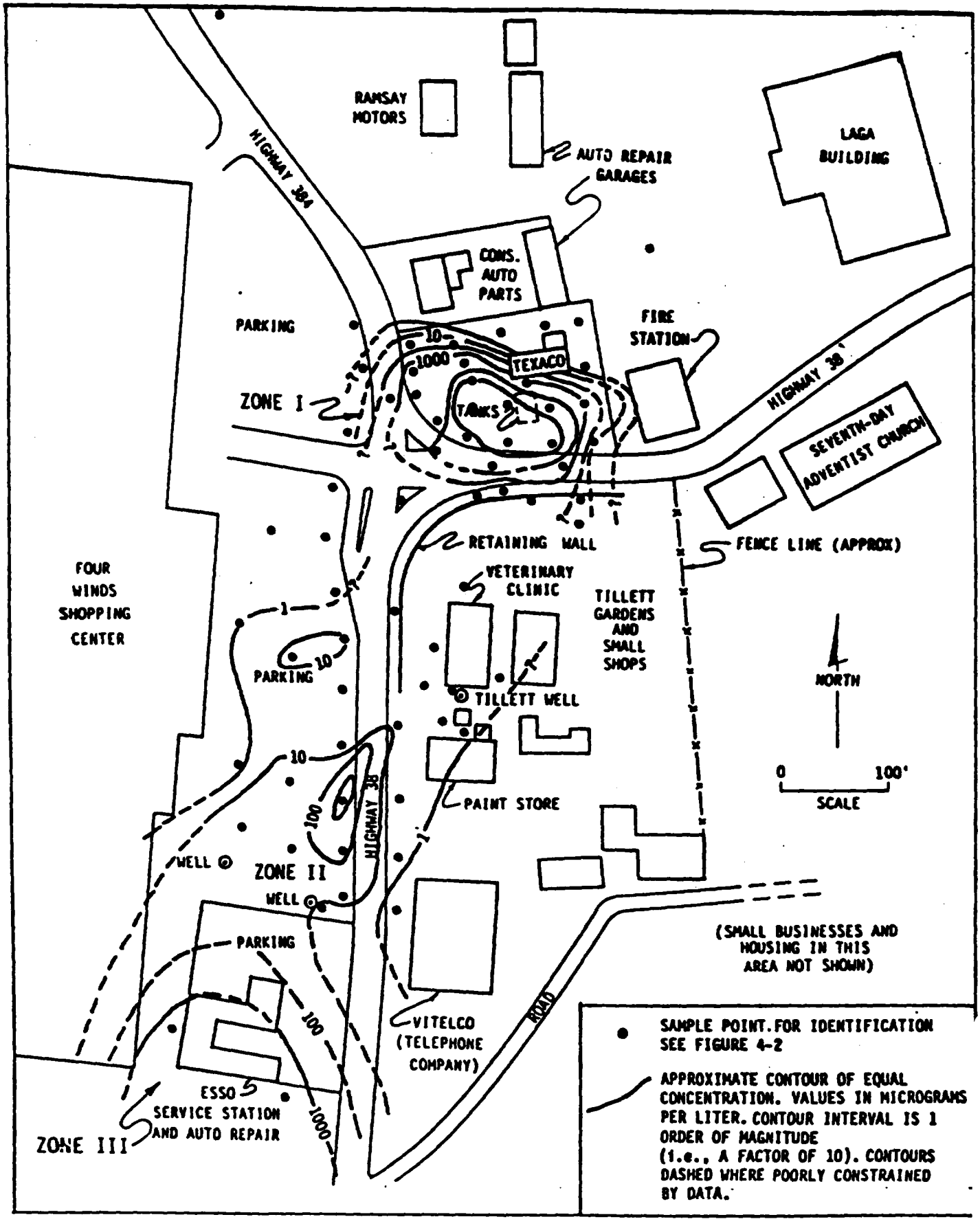


FIGURE 4-2

GCL

CONCENTRATIONS OF TOTAL PETROLEUM HYDROCARBONS IN SOIL GAS IN THE TUTU AREA, UPPER TURPENTINE RUN BASIN. ALL CONCENTRATIONS IN MICROGRAMS PER LITER, REPORTED AS BENZENE.



GCL

FIGURE 4-3
CONTOURS OF TOTAL PETROLEUM HYDROCARBON CONCENTRATIONS
IN SOIL GAS, TUTU AREA, UPPER TURPENTINE RUN BASIN

TUT 001 0721

values of hydrocarbons in excess of background levels were detected in the area between the Tillett well and the north boundary of the Tillett property at Highway 38, except at points under the sidewalk and under a traffic island (points T-3 and T-7, Figure 4-2). Topographically, the northern part of the Tillett property, southeast of the retaining wall shown in Figure 2-2, is 10 to 15 feet higher than the land surface at the service station, and it was not possible to achieve depths greater than about 5 feet in placing the soil gas probes because of the presence of bedrock at that depth. Ground water is at a depth of about 25 to 30 feet beneath the Tillett property, and thus is 20 feet or more below the greatest depth of probe penetration. Therefore, the possible presence of petroleum hydrocarbons at depths too great to be sampled beneath the Tillett property could not be determined.

South of the Tillett well, detectable concentrations of hydrocarbons were found in the southern part of the Four Winds Shopping Center parking lot, near the Esso station and locally along the east side of Highway 38 (Zones II and III, Figure 4-3). Although most of the constituents identified appear to be petroleum components, there was some admixture of other compounds (up to about 5 ug/l as benzene in some holes) which appear to have a different origin. Since significant concentrations of halogenated compounds were found in holes near this area, it is possible that the unidentified constituents identified by the FID represent some of the halogenated compounds.

It was possible to identify and map Zones II and III southwestward to and beyond the Esso service station at the south end of the Four Winds parking lot, even though bedrock in much of the area prevented probe penetration to depths greater than about 5 feet (Figure 4-3). South and west of the Esso station, increased soil gas hydrocarbon concentrations were found, relative to those which were found immediately north of the station. The soil gas survey was terminated at this location, because of

TUT 001 0722

the presence of increased hydrocarbon concentrations probably attributable to a different source. Tracing of any soil gas plume not potentially attributable to the Texaco station was outside the scope of the work plan.

4.2 CHLORINATED HYDROCARBONS

Because chlorinated hydrocarbons have been identified in water samples from the Tillett well and other wells in the Tutu area, a limited number of soil gas points were sampled and analyzed for chlorinated compounds. These points were located in the vicinity of the Tillett well, on and adjacent to the Texaco service station, and near the LAGA building (Figure 4-4). Samples were analyzed for:

- methylene chloride (dichloromethane)
- chloroform (trichloromethane)
- trichloroethane (TCA)
- carbon tetrachloride (tetrachloromethane)
- trichloroethylene (TCE)
- tetrachloroethylene (PCE)

Results of the chlorinated hydrocarbon analyses are listed in Table 4-2. No significant concentration of any chlorinated compound was identified in hole H-9, located on the Texaco station, in the center of the known petroleum hydrocarbon plume. Methylene chloride (6 ug/l) was identified in soil gas beneath the property north of the Texaco service station, and TCA was identified at several locations, with the largest value (10 ug/l) being recorded in hole H-6, south of the Tillett well.

PCE was detected in all nine of the holes sampled for chlorinated compounds. The lowest PCE concentration (0.02 ug/l) was found at the Texaco station; the highest (170 ug/l) was found adjacent to the loading dock at the LAGA building. PCE was also identified at points near the Tillett well, although benzene and toluene, known to exist in the well water, had

TUT 001 0723

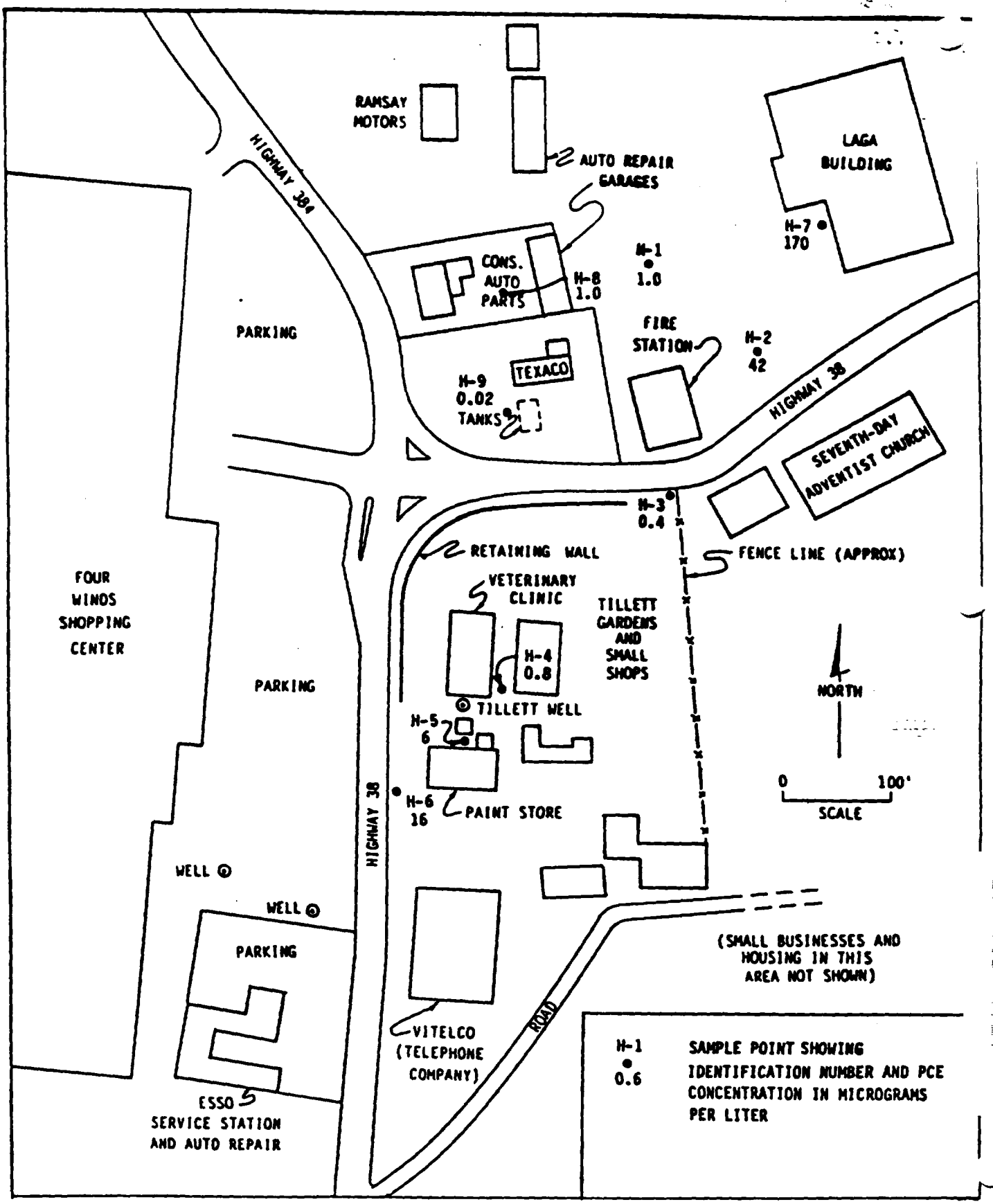


FIGURE 4-4

CONCENTRATIONS OF PCE IN SOIL GAS IN THE TUTU AREA, UPPER TURPENTINE RUN BASIN.

TABLE 4-2

CONCENTRATIONS OF CHLORINATED HYDROCARBONS IN SOIL GAS, TUTU AREA

(All concentration values in micrograms per liter)

SAMPLE	DEPTH	DATE	METHYLENE CHLORIDE	CHLOROFORM	TCA	CARBON TETRACHLORIDE	TCE	PCE
H-1	3	11/17/87	<0.9	<0.006	0.02	<0.0005	<0.004	1
H-2	3.5	11/17/87	<0.9	<0.006	0.05	<0.0005	0.5	42
H-3	4	11/17/87	<0.09	<0.0006	<0.0002	<0.00005	<0.0004	0.4
H-4	3.5	11/17/87	<0.09	<0.0006	0.005	<0.00005	<0.0004	0.8
H-5	4	11/17/87	<0.2	<0.001	<0.0004	<0.0001	0.05	6
H-6	4.5	11/17/87	<30	<0.2	10	<0.02	<0.1	16
H-7	5	11/17/87	<0.9	<0.006	0.04	<0.0005	0.6	170
H-8	5	11/17/87	6	<0.006	<0.002	<0.0005	0.3	1
H-9	5.5	11/17/87	<0.09	<0.0006	<0.0002	<0.00005	<0.0004	0.02

TEXC\TABLE4-2.PRN

TUT 001 0725

not been detectable at the same points. The greater volatility of the chlorinated compounds relative to the petroleum components explains the comparative ease with which they can be traced in soil gas, assuming both are present in ground water.

No attempt was made to delineate the boundaries of any chlorinated hydrocarbon plume, which is likely to be areally extensive. PCE has been found in water from a Virgin Islands Housing Authority well approximately 600 feet northeast of the LAGA building, as well as in the Tillett well and one of the Four Winds water wells (Geraghty and Miller, 1983, p. 74; C. Dolan, EPA Region II, written communication). A possible source of the PCE is the LAGA building, presently used as a public schools office and service facility. The LAGA building formerly housed a cloth factory, closed about 1981, in which tetrachloroethylene (also known as perchloroethylene, or "perk") is reported to have been used extensively. Unsubstantiated verbal reports of local residents indicate that the "perk" may have been disposed of to the ground surface near the building.

TUT 001 0726

5.0 PROBABLE MIGRATION PATHWAYS

5.1 GROUND-WATER DATA

The water table in the upper Turpentine Run basin is generally within 30 feet or less of the ground surface, and is influenced by the local topography.

During November 1987 the static water levels were measured by GCL in the Tillett well and the eastern Four Winds well. The western Four Winds well was not measurable because it lacked an adequate port for insertion of the water level probe. Water levels were 23.2 feet below top of casing in the Tillett well, and 14.0 feet in the eastern Four Winds well. Taking into account the difference in well head elevations (approximately 28 feet), this indicates a difference of about 19 feet in water-table elevations at the two wells, and a water-table gradient of about 0.076, if the Four Winds well is assumed to be directly downgradient from the Tillett well. The gradient along the valley axis may be less than this figure, whereas that on the eastern slope may be greater. It is not known whether the Tillett and Four Winds wells intersect the same fracture zone, or zones which are hydraulically connected.

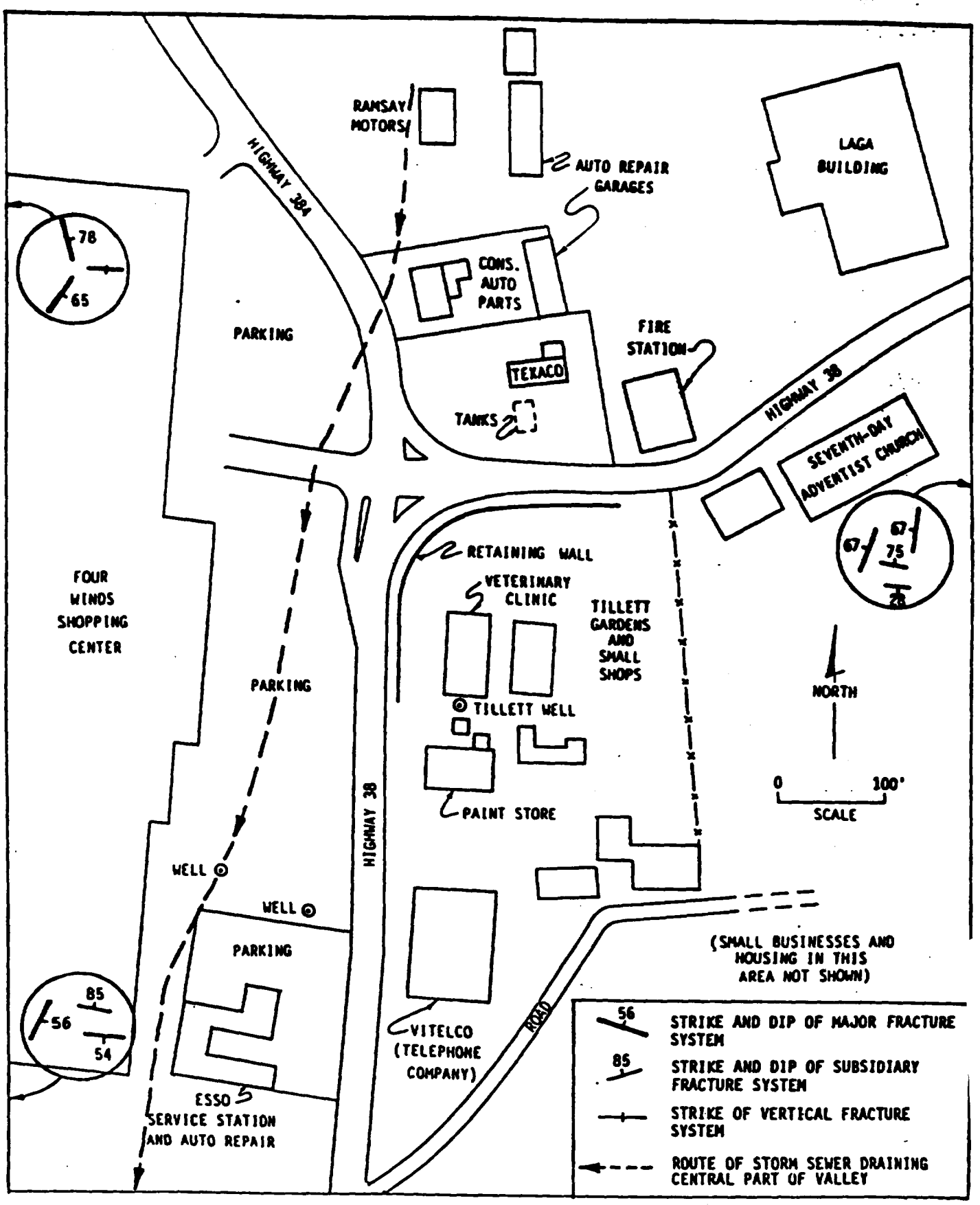
5.2 BEDROCK FRACTURE SYSTEMS

Most ground water in the upper Turpentine Run basin is contained within fracture systems of the Louisenhoj bedrock. Only minimal flow is expected in the matrix of this fine-grained volcanic unit. Observations of the soil profile, where it is exposed in road cuts and construction excavations, indicated that the zone of significant weathering extends to only about 6 feet below the surface in most areas, with fractured bedrock below that level. These observations were confirmed by the difficulty encountered in driving soil gas probes deeper than about 5 or 6 feet in most of the study area. Consequently, the direction of local ground-water flow will be strongly influenced by the orientation of the bedrock fracture systems through which the water is moving.

TUT 001 0727

Bedrock fracture orientations are not consistent throughout the upper Turpentine Run basin. Orientations measured on outcrops exposed west of the Four Winds Shopping center (west side of valley) and east of the Seventh-Day Adventist Church and School (east side of valley) are shown schematically in Figure 5-1. There are major fracture systems striking north-northeast on both sides of the valley; however, those on the west side of the valley dip to the southeast, while these on the east side dip to the northwest. Consequently, these two systems differ by about 60° in actual fracture orientation. It is not known whether there is an abrupt transition along a defined boundary between these two systems at some point within the valley, or whether the orientation of the fractures rotates gradually from one position to the other as one moves across the valley.

TUT 001 0728



GCL

FIGURE 5-1
ORIENTATIONS OF MAJOR FRACTURE SYSTEMS
IN THE TUTU AREA, UPPER TURPENTINE RUN BASIN.

TUT 001 0729

6.0 CONCLUSIONS

The soil gas survey conducted by Texaco Caribbean, Inc., and GCL in the Tutu area of St. Thomas identified a zone of elevated petroleum hydrocarbon values in the subsurface on the southwestern part of the Texaco Tutu service station site (Zone I). The very high soil gas hydrocarbon values in this area (up to 690,000 ug/l) indicate the probability that hydrocarbons have migrated through the unsaturated soil zone, leaving large residual concentrations. The source of the hydrocarbons appears to be the USTs at the Texaco station.

Elevated hydrocarbon values were traced southward to the south side of Highway 38 and westward to the center of Highway 384. Points located on the west side of Highway 384 indicate no significant hydrocarbon presence in that area. Due to elevated bedrock and greater depth to water (25 to 30 feet), it was not possible to determine the extent of petroleum hydrocarbon presence in the vicinity of the Tillett well, in which the presence of benzene and toluene has been reported in ground water. The same constraints limited complete mapping of the hydrocarbon plume on the south side of Highway 38 across from the Texaco service station.

Moderately elevated concentrations of hydrocarbons were found in soil gas beneath the southern part of the Four Winds Shopping Center parking lot (Zone II) and adjacent to the Esso station (Zone III), 300 to 800 feet downgradient from the Texaco station. The hydrocarbons encountered in soil gas in this zone are probably derived by volatilization from a plume of hydrocarbons moving with the ground water in the upper Turpentine Run aquifer. However, based on the soil gas data, it was not possible to determine with certainty whether Zones I, II and III are discontinuous or whether they in fact represent parts of a single plume. It is not possible to delineate such a plume by soil gas methods beneath the bedrock high which underlies the Tillett property. Other direct methods of sampling ground water and vadoze zone will be required to define the relationship between the two areas of elevated soil gas concentrations.

Elevated levels of PCE were found in much of the study area, and other chlorinated hydrocarbons were found in some locations. The source of these compounds appears to be northeast of the Texaco service station, and is possibly the LAGA building, where PCE is known to have been used extensively in the past.

TUT 001 0731

APPENDIX A

TRACER RESEARCH CORPORATION REPORT OF ANALYTICAL RESULTS

GEOSCIENCE CONSULTANTS/TEXACO/TUTU, VIRGIN ISLANDS

Tracer Research Corporation

Sample	Depth	Date	Benzene (ug/l)	Toluene (ug/l)	Ethyl Benzene (ug/l)	Xylenes (ug/l)	Total Hydroc.u/o CH4 (ug/l)
S6-A1	5'	11/04	<230	<260	<280	<260	38,000
S6-A2	4.5'	11/04	I	I	<280	<260	110,000
S6-A2	8.5'	11/04	I	I	<280	<260	690,000
S6-A2A	4.5'	11/05	<0.01	<0.01	<0.01	<0.01	<0.01
S6-A2A	7'	11/05	I	<13	<14	<13	7,600
S6-A3	5'	11/05	I	<13	<14	<13	4,600
S6-A3.5	5'	11/05	I	<13	<14	<13	3,600
S6-A4	4.5'	11/05	<0.01	<0.01	<0.01	<0.01	<0.01
S6-A4	5.5'	11/05	I	<0.9	<0.9	<0.9	68
S6-B1	5'	11/04	I	<510	<570	<530	610,000
S6-B2	5'	11/04	I	I	<280	<260	280,000
S6-B2	8.5'	11/04	I	I	<280	<260	220,000
S6-B3	5'	11/04	I	I	<280	<260	85,000
S6-B3	8'	11/04	I	I	4,000	<110	120,000
S6-B3.5	5'	11/05	I	<26	<28	<27	6,400
S6-B4	5'	11/04	<0.02	<0.02	<0.03	<0.03	<0.02
S6-B4C	5'	11/05	<0.01	<0.01	<0.01	<0.01	0.1
S6-B4C	5'	11/06	<0.01	<0.01	<0.02	<0.01	<0.01
S6-B4C	7'	11/06	<0.01	<0.01	<0.02	<0.01	0.5
S6-BG1	5'	11/06	<0.01	<0.01	<0.02	<0.01	0.2
S6-BG2	4'	11/06	<0.01	<0.01	<0.02	<0.01	<0.01
S6-C1	5'	11/05	I	<130	<130	<130	190,000
S6-C2	5'	11/05	I	<130	<140	<130	72,000
S6-C3	5'	11/05	I	<0.5	<0.6	<0.5	1,000
S6-C4	4'	11/04	<0.09	<0.1	<0.1	<0.1	<0.09
S6-C4	7'	11/04	<0.9	<1	<1	<1	1,700
S6-D1	4.5'	11/05	<0.01	<0.01	<0.01	<0.01	8
S6-D2	2.5'	11/05	I	<0.5	<0.6	<0.5	1,000
S6-D3	5'	11/05	<0.01	<0.01	<0.01	<0.01	<0.01
S6-D4	4'	11/04	<0.09	0.5	<0.1	<0.1	4
S6F-01	4.5'	11/10	<0.02	<0.02	<0.03	<0.02	0.06
S6F-01	6'	11/10	<0.02	<0.02	<0.03	<0.02	<0.02
S6F-02	4.5'	11/10	<0.02	<0.02	<0.03	<0.02	0.07
S6F-03	6.5'	11/10	<0.02	<0.02	<0.03	<0.02	0.4
S6F-04	6.5'	11/10	<0.02	<0.02	<0.03	<0.02	0.2

A-1

Notations:
I interference with adjacent peaks
NA not analyzed

Analyzed by M. Krotenberg

Checked by M. Krotenberg

GEOSCIENCE CONSULTANTS/TEXACO/TUTU, VIRGIN ISLANDS

Tracer Research Corporation

Sample	Depth	Date	Benzene (ug/l)	Toluene (ug/l)	Ethyl Benzene (ug/l)	Xylenes (ug/l)	Total Hydroc.w/o CH4 (ug/l)
SGF-04	9.5'	11/10	<0.02	<0.02	<0.03	<0.02	0.3
SGF-05	5.5'	11/10	<0.02	<0.02	<0.03	<0.02	0.2
SGF-06	6'	11/10	<0.02	<0.02	<0.03	<0.02	0.4
SGF-07	3.5'	11/11	<0.02	<0.03	<0.03	<0.03	10
SGF-08	6'	11/11	<0.02	<0.03	<0.03	<0.03	2
SGF-09	2'	11/12	<0.02	<0.02	<0.03	<0.02	6
SGF-10	5.5'	11/12	I	<6	<7	<6	2,600
SGF-11	4'	11/12	I	<0.5	<0.5	<0.5	120
SGF-12	3.5'	11/12	0.4	<0.1	<0.1	<0.1	40
SGF-13	5.5'	11/12	0.02	<0.02	<0.03	<0.02	7
SGF-14	2'	11/12	I	<12	<14	<13	3,000
SGF-15	2.5'	11/13	<0.02	<0.02	<0.03	<0.03	43
SGF-16	6'	11/13	<0.02	<0.02	<0.03	<0.03	11
SGF-17	5'	11/14	<0.02	<0.03	<0.03	<0.03	33
SGF-18	3.5'	11/14	<0.02	0.07	<0.03	<0.03	0.2
SGF-19	5'	11/14	I	<5	<6	<6	1,800
SGF-20	6'	11/14	<0.02	<0.03	<0.03	<0.03	26
SGF-21	6'	11/14	<0.02	<0.03	<0.03	<0.03	1
SGF-22	6'	11/14	<0.02	<0.03	<0.03	<0.03	0.2
SGT-01	5'	11/09	<0.01	<0.01	<0.01	<0.01	<0.01
SGT-01	7'	11/09	<0.02	<0.02	<0.02	<0.02	<0.02
SGT-02	5'	11/09	<0.02	<0.02	<0.02	<0.02	<0.02
SGT-02	7'	11/09	<0.02	<0.02	<0.02	<0.02	<0.02
SGT-03	4'	11/09	<0.2	<0.2	<0.3	<0.3	230
SGT-05	4'	11/06	<0.01	<0.01	<0.02	<0.01	0.6
SGT-06	2.5'	11/09	<0.02	<0.02	<0.02	<0.02	<0.02
SGT-07	5'	11/09	<0.02	<0.02	<0.02	<0.02	<0.02
SGT-07	5.5'	11/09	<0.02	<0.02	<0.02	<0.02	10
SGT-08	2'	11/09	<0.02	<0.02	<0.02	<0.02	0.9
SGT-10	9'	11/09	<0.02	<0.02	<0.02	<0.02	10
SGT-11	5'	11/09	<0.02	<0.02	<0.02	<0.02	3
SGT-12	3.5'	11/09	<0.02	<0.02	<0.02	<0.02	0.4
SGT-13	4.5'	11/09	<0.02	<0.02	<0.02	<0.02	5
SGT-14	5.5'	11/12	<0.02	<0.02	<0.03	<0.02	2
SGT-15	3.5'	11/12	<0.02	<0.02	<0.03	<0.02	0.02

Notation:
I interference with adjacent peaks
NA not analyzed

Analyzed by M. Krotenberg

Checked by M. Krotenberg

GEOSCIENCE CONSULTANTS/TEXACO/TUTU, VIRGIN ISLANDS

Tracer Research Corporation

Sample	Depth	Date	Benzene (ug/l)	Toluene (ug/l)	Ethyl Benzene (ug/l)	Xylenes (ug/l)	Total Hydroc.w/o CH4 (ug/l)
SGT-16	5.5'	11/13	<0.02	<0.02	<0.03	<0.03	0.4
SGT-17	6'	11/13	<0.02	<0.02	<0.03	<0.03	0.2
SGT-17	6'	11/14	<0.02	<0.03	<0.03	<0.03	<0.02
SGT-18	5.5'	11/13	<0.02	<0.02	<0.03	<0.03	0.4
SGT-19	6'	11/13	<0.02	<0.02	<0.03	<0.03	0.2
SGT-19	10'	11/13	<0.02	<0.02	<0.03	<0.03	2
SGT-20	4.5'	11/14	<0.02	<0.03	<0.03	<0.03	0.2
SGZ-01	5'	11/11	I	<7	<7	<7	4,000
SGZ-02	3.5'	11/11	I	<52	<58	<54	28,000
SGZ-04	6'	11/11	I	<26	<29	<26	12,000
SGZ-05	5'	11/11	I	<5	<6	<5	860
Drift 1	4'	11/04	<0.02	<0.02	<0.03	<0.03	0.9
Drift 2	2.5'	11/05	<0.01	<0.01	<0.01	<0.01	0.1
Drift 3	2'	11/06	<0.01	<0.01	<0.02	<0.01	0.2
Drift 4	2'	11/09	<0.01	<0.01	<0.01	<0.01	0.2
Drift 5	2.5'	11/11	<0.02	<0.03	<0.03	<0.03	0.4
Drift 6	2'	11/12	<0.02	<0.02	<0.03	<0.02	0.4
Drift 6	2'	11/13	<0.02	<0.02	<0.03	<0.03	0.2
Drift 7	2'	11/14	<0.02	<0.03	<0.03	<0.03	0.4

A.3

TUT 001 0735

Notations:
I interference with adjacent peaks
NA not analyzed

Analyzed by M. Krotenberg

Checked by M. Krotenberg

GEOSCIENCE CONSULTANTS/TEXACO/TUTU, VIRGIN ISLANDS

Tracer Research Corporation

Sample	Depth	Date	Ch2Cl2 (ug/l)	CHCl3 (ug/l)	TCA (ug/l)	CCl4 (ug/l)	TCE (ug/l)	PCE (ug/l)
SGH-01	3'	11/17	<0.9	<0.006	0.02	<0.0005	<0.004	1
SGH-02	3.5'	11/17	<0.9	<0.006	0.05	<0.0005	0.5	42
SGH-03	4'	11/17	<0.09	<0.0006	<0.0002	<0.00005	<0.0004	0.4
SGH-04	3.5'	11/17	<0.09	<0.0006	0.005	<0.00005	<0.0004	0.8
SGH-05	4'	11/17	<0.2	<0.001	<0.0004	<0.0001	0.05	6
SGH-06	4.5'	11/17	<30	<0.2	10	<0.02	<0.1	16
SGH-07	5'	11/17	<0.9	<0.006	0.04	<0.0005	0.6	170
SGH-08	5'	11/17	6	<0.006	<0.002	<0.0005	0.8	1
SGH-09	5.5'	11/17	<0.09	<0.0006	<0.0002	<0.00005	<0.0004	0.02

TUT 001 0726

Notations:
I interference with adjecent peaks
NA not analyzed

Analyzed by M. Krotenberg

Checked by M. Krotenberg

APPENDIX B

FIELD SYSTEM QUALITY ASSURANCE AUDIT OF OPERATIONAL PROCEDURES

TUT 001 0737

GCL

FIELD SYSTEM AUDIT OF OPERATIONAL PROCEDURES, SOIL GAS INVESTIGATION AT TEXACO TUTU SERVICE STATION, TUTU, ST. THOMAS, U.S. VIRGIN ISLANDS

Introduction

On November 6, 1987, a Field System Audit of the work being conducted by Geoscience Consultants, Ltd. (GCL) and Tracer Research Corporation (TRC) at the Tutu service station of Texaco Caribbean, Inc., on the island of St. Thomas, was performed by the GCL Quality Assurance (QA) Officer, Randall T. Hicks. The Field System Audit was conducted on the third day of soil gas sampling and analysis conducted by GCL and TRC at the Tutu site. Observations, recommendations, and corrective actions performed during the Field System Audit are described in this report.

Project History and Procedures

Texaco Caribbean, Inc. has contracted with GCL to conduct a soil gas investigation at the Tutu site in St. Thomas, U.S. Virgin Islands. The Tutu survey is designed to determine the levels of hydrocarbons which are found in soil gas from the areas surrounding underground storage tanks at the facility, to determine if a release has occurred from the tanks, and to assist in the definition of any soil or ground water contamination plumes.

Soil gas hydrocarbon values are determined by inserting a steel probe into the soil, withdrawing soil gas by use of a vacuum pump, and analyzing the gas for hydrocarbons using an on-site gas chromatograph (GC). Detailed descriptions for sampling and analytical procedures are in GCL's Work Plan and Quality Assurance Project Plan for the Tutu site (October 1987).

TUT 001 0738

Field sampling and analytical procedures commenced at the Tutu site on November 3, 1987.

Purpose of Field System Audit

The Field System Audit was conducted to verify that procedures described in the Work Plan (WP) and Quality Assurance Project Plan (QAPP) were being adhered to in the field at the Tutu site, to determine whether any procedures required modification based on experience in the field, and to recommend any other procedural changes in field activities that might be necessary or desirable to improve the final work product.

Field Observations

No major technical problems were found with the work performed at the Tutu site. It was determined that significant difficulty exists using the current column and detector (OV-101 Column, Flame Ionization Detector) in the GC, as called for in the approved Work Plan and QAPP, to quantify benzene and toluene in soil gas. This could be the result of one of two situations:

- Benzene and toluene have selectively been flushed or biodegraded in the vadose zone, even in areas with significant total hydrocarbons as detected by the FID.
- Benzene and toluene are obscured by interference peak(s) and therefore not quantifiable with the presently used column in the GC.

In order to resolve this problem and to quantify the presence or absence of benzene and toluene in soil gas it was recommended, based on discussions between GCL, TRC, EPA and CDM-FPC (J. Appel - GCL; A.A. Gutierrez - GCL; Dan Evans - TRC; John Mihalich - CDM-FPC; Jim Ockalini-CDM - Boston), that a Carbopak 1000 column that will have a much longer retention time and allow a clean determination of the presence or

TUT 001 0739

absence of benzene and toluene be used at the Tutu site. It was agreed by all concerned that if this procedure failed to identify and quantify benzene and toluene, these constituents would be considered absent in soil gas. It must be noted, however, that this can be the case even though these constituents may be present in ground water, due to the biodegradation and flushing of the vadose zone and restriction of ground water to fractured bedrock. Furthermore it must be noted that, although the individual constituents have not been detected, the plume mapping using total hydrocarbons and detectable halocarbons on the electron capture detector (ECD) has been extremely successful over the majority of the site.

The principal technical problems were not encountered with the site work, but instead, with the site Work Plan and QAPP. Portions of the plans are not appropriate for actual site conditions. Other portions of the plans do not significantly add to accomplishing the goals of the project or were not being done routinely by TRC, and we recommended deletion of these practices from the QAPP and Work Plan. These recommended changes are summarized in Table 1.

Conclusions and Recommendations

The Field System Audit indicated that not all the procedures described in the WP and QAPP are followed exactly as planned previously due to site-specific conditions. The reasons for these discrepancies are valid and summarized in Table 1. Since the proposed changes to the Work Plan and QAPP tend to improve the quality and/or speed at which data can be collected during the project, it is recommended that the revised procedures, presently in use, be continued during further sampling and analysis and be incorporated into the Work Plan and QAPP for the Tutu site.

TUT 001 0740

GCL is confident that the procedural revisions to the QAPP described in this report will result in improved data quality and a better final work product.

TABLE 1

RECOMMENDATIONS FOR CHANGES TO WORK PLAN AND QAPP

RECOMMENDED CHANGE	JUSTIFICATION FOR THE CHANGE	PAGE
Remove Russ Erbes from TRC.	Schlayer and Hicks will serve adequately for TRC.	1 (Q) Figure 2-1 (Q)
Do not employ PID Detectors in the Gas Chromatograph to conform with actual practice.	High humidity coupled with high levels of hydrocarbons will result in operational problems (clouding the window).	2 (Q) p.8 (WP)
Utilize a Carbopack 1000 column on selected samples.	BTEX concentrations were not determined with existing columns.	Appendix B, p.5 (Q)
Reference to NBS Standards should be deleted.	Standards are prepared by Chem Services, Inc pursuant to procedures outlined in Appendix B, p. 5.	5 (Q) 7 (Q)
The purpose of the control point should be stated in more detail.	It was unclear to field personnel. The control point is utilized to test for variability in analysis due to factors not related to any contamination (e.g., weather conditions, smog, etc.)	8 (Q)
Indicate that "preliminary" evaluation of data is conducted in the field.	Any statistical tests, detailed mapping and correlation of soil gas data with other hydrogeologic features will be conducted after all data are assembled into a logical format.	8 (Q)
Utilize a "one-point" Calibration for the GC, not a three point calibration as described. Justify the adequacy of this calibration which is presently being used in the field.	The one-point calibration is appropriate for soil gas surveys.	7 (Q)
The text addressing sample splits should be re-written for clarity.	Only one sample is taken from each point. After 10 samples, a selected point is repeated, sampled and analyzed.	p.9 (Q)
Appendix A should be retitled to read Tracer Research Corporation Methods of Operation for Soil Gas Analyses Using TRC's Mobile Laboratory and Probe Driver.	The title may suggest that the methods discussed will be used at Tutu. Most of the specific methods were modified to suit this remote location.	Appendix A (Q)
Appendix B should be modified throughout to reflect Actual Site Procedures.	Although this could not be fully anticipated, site conditions dictated special methods not described in the appendix (e.g., driving probes by hand, refrigeration of the standards).	Appendix B (Q)
Delete references to a second sample for each point to conform to actual practice.	It is not done and is not necessary.	Appendix B, p.1 (Q)
"Observations" should be made by GCL staff not TRC.	GCL staff is in a better position and it is GCL's responsibility to describe the site conditions for each sample point.	Appendix B, p.3 (Q)

TUT 001 0742

TABLE 1 (CONTINUED)

RECOMMENDED CHANGE	JUSTIFICATION FOR THE CHANGE	PAGE
Obtain QA data on Chem Services Inc standards.	No data are provided.	Appendix B, p.8 (Q)
Dilute field standards should be refrigerated.	During field work variation of the standard was significant when not refrigerated.	Appendix B, p.6 (Q)
The water used to prepare the standard should be analyzed daily.	Distilled water from grocery stores has been found to contain hydrocarbons or halocarbons at other locations.	Appendix B, p.6 (Q)
Primary standards may be kept at the site to conform with actual practice.	No technical reason for keeping such standards off site was presented by site personnel.	Appendix B, p.7 (Q)
The syringe blank procedure should reflect field practice.	Field method is equivalent. A 10 ml syringe is filled with Nitrogen 2. Then a "micro" syringe is used to obtain a sample from the 1st syringe, the smaller sample is analyzed.	Appendix B, p.8, p.12 (Q)
System blanks may be run daily to conform with actual practice.	System blanks after every 10 samples is excessive and not necessary to assume quality of analytical results.	Appendix B, p.8, p.14 (Q)
Syringes and other equipment may be baked for 1/2 hour at 80°C rather than overnight at 70° to conform with actual practice.	The level of "Cleaning" is sufficient.	Appendix B, p.9, p.12 (Q)

note: (Q) = QAPP
(WP) = Work Plan

TUT 001 0743

REFERENCE NO. 14

TAT-02-F-04393

SUMMARY OF LABORATORY RESULTS FOR OIL AND WATER SAMPLES COLLECTED FROM TANKS, STORM DRAINS AND SUMPS AT GASOLINE STATIONS AND AUTO BODY SHOPS IN TUTU, ST. THOMAS, U.S. VIRGIN ISLANDS ON AUGUST 17, 1987

Prepared For:
Carlos O'Neill
Bruce Sprague
Response and Prevention Branch
U.S. EPA, Region II
Edison, New Jersey 08837

Prepared By:
Isabelle Allgood, TAT II PM
Cris D'Onofrio, TAT II QC
Region II Technical Assistance Team
Weston/SPER Division
Edison, New Jersey 08837

February 23, 1988

DRAFT

TUT 001 0745

SUMMARY OF LABORATORY RESULTS
FOR OIL AND WATER SAMPLES
COLLECTED FROM TANKS, STORM DRAINS
AND SUMPS AT GASOLINE STATIONS
AND AUTO BODY SHOPS IN
TUTU, ST. THOMAS,
U.S. VIRGIN ISLANDS
ON AUGUST 17, 1987

Personnel from the Region II Technical Assistance Team (TAT) and the St. Thomas Department of Planning and Natural Resources (DPNR) collected eleven oil and water samples on August 17, 1987, from various storage tanks, storm drains and sumps at gasoline stations and auto body shops in Tutu, St. Thomas, as directed by TDD Numbers 02-8708-16 and 02-8708-32. Table I provides descriptions of all samples.

The Tutu oil samples were taken from waste oil storage tanks, sumps and storm drains. Sample numbers one through eleven were analyzed for polychlorinated biphenyls (PCBs) and numbers twelve through twenty-two were analyzed for volatile organic compounds (VOCs). Split samples were provided for Tutu Texaco and Tutu Esso.

VOC analysis was performed in an attempt to match the VOCs found in the contaminated Tutu Wells with those found in these samples. Note that sample numbers one through eleven correspond to sample numbers twelve through twenty-two.

The samples were shipped on August 26, 1987 to S-Cubed Laboratories in San Diego, California. The samples were detained in customs and not received by the laboratory until September 15, 1987. The sample analysis was conducted through the Contract Laboratory Program (CLP).

The CLP designated holding times for VOCs were exceeded, and the samples were warm upon arrival at the laboratory. The PCB samples, however, do not require preservation and did not exceed their designated holding times. The PCB data meets the EPA quality assurance/quality control (QA/QC) requirements and is acceptable. The results indicate that all samples analyzed for PCBs were below the method detection limits of 80 and 160 ug/kg.

Table II illustrates the volatile organic compounds (VOCs) identified in the samples. Some samples show very high levels of VOCs typical for samples collected from gasoline stations and auto body shops. In addition to those compounds found in Table II, several unknowns were detected as tentatively identified compounds.

Attachments

DRAFT

TABLE I

Sample Number	Description
32393-1	Bay #1 sump, Tutu Texaco
32393-2	Bay #2 sump, Tutu Texaco
32393-3	Bay #3 sump, Tutu Texaco
32393-4	Oil and water separator, Tutu Texaco
32393-5	Waste oil tank, Tutu Texaco
32393-6	Storm drain, Tutu Texaco
32393-7	Gutter, Consolidated Auto Parts
32393-8	Storm drain, Consolidated Auto Parts
32393-9	Waste oil storage tank, Ramsey Motor
32393-10	Virgin Islands Housing Authority (VIHA) waste oil Underground Storage Tank (UST)
32393-11	Oil and water separator, Tutu Esso
32393-12	Bay #1 sump, Tutu Texaco
32393-13	Bay #2 sump, Tutu Texaco
32393-14	Bay #3 sump, Tutu Texaco
32393-15	Oil and water separator, Tutu Texaco
32393-16	Waste oil tank, Tutu Texaco
32393-17	Storm drain, Tutu Texaco
32393-18	Gutter, Consolidated Auto Parts
32393-19	Storm drain Consolidated Auto Parts
32393-20	Waste oil storage tank, Ramsey Motor
32393-21	VIHA waste oil UST
32393-22	Oil and water separator, Tutu Esso

DRAFT

: II

'ILE

CONCENTRATION: ug/kg

IC COMPOUND	SAMPLE NUMBERS 3239B-12	3239B-13	3239B-14	3239B-15	3239B-16	3239B-17	3239B-18	3239B-19	3239-20	3239B-21	3239B-22
ne	1400	1500	2200		1900	2200	2100				
anone	3000	3100	4100	5300	6300	4000	4200	2600	150000		
ne		270		2800					210000	97000	59000
ne		2300	870	43000		1100	780	100J	1400000	98000	970000
benzene		1300	960	14000	1000	660	390		290000	500000	200000
xylenes		9100	7000	110000	9300	4400	2600		1700000	2900000	1200000
oform			260								
Trichloroethane				2400							58000
chloroethene											110000
imated Value											

TLT 001 0748

SAS 3239B II - IV - V VIII

CHAIN OF CUSTODY RECORD

ENVIRONMENTAL PROTECTION AGENCY – REGION II
Environmental Services Division
EDISON, NEW JERSEY 08817

Name of Individual Address: US EPA / TAT (Carlos O'Neill)
c/o Roy F. Weston Inc
Region II TAT
Edison, NJ 08817

Tutu Well Site
St. Thomas, U.S.V.I.

Sample Number	Number of Containers	Description of Sample			
3239B-1	1	TAT	ID # OW-001	Bay #1 Sump, Tutu Texaco	1 x 40 ml VOA Bottle
3239B-2	1	TAT	ID # OW-002	Bay #2 Sump, Tutu-Texaco	" "
3239B-3	1	TAT	ID # OW-003	Bay #3 Sump, Tutu Texaco	" "
3239B-4	1	TAT	ID # OW-004	Oil & H2O Separator, Tutu Texaco	" "
3239B-5	1	TAT	ID # OW-005	Waste oil tank, Tutu, Texaco	" "
3239B-6	1	TAT	ID # OW-006	storm Drain Tutu Texaco	" "
3239B-7	1	TAT	ID # OW-007	Gutter, Consolidated Autoparts	" "
3239B-8	1	TAT	ID # OW-008	Storm Drain, Consolidated Autoparts	" "
3239B-9	1	TAT	ID # OW-009	Ramsey Motor Waste oil Storage Tank	" "
3239B-10	1	TAT	ID # OW-010	VITA Waste oil UST	" "
3239B-11	1	TAT	ID # OW-011	Oil Separator, Tutu ESSO	" "
3239B-12	1	TAT	ID # OW-001A	Bay #1 Sump Tutu Texaco	" "
3239B-13	1	TAT	ID # OW-002A	Bay #2 Sump Tutu Texaco	" "
3239B-14	1	TAT	ID # OW-003A	Bay #3 Sump Tutu Texaco	" "
3239B-15	1	TAT	ID # OW-004A	Oil & H2O Separator Tutu Texaco	" "
3239B-16	1	TAT	ID # OW-005A	Waste oil tank Tutu Texaco	" "
3239B-17	1	TAT	ID # OW-006A	Storm drain Tutu Texaco	" "
3239B-18	1	TAT	ID # OW-007A	Gutter, Consolidated Autoparts	" "
3239B-19	1	TAT	ID # OW-008A	Storm Drain Consolidated Auto Parts	" "

Person Assuming Responsibility for Sample: Cris D'Orsi

Time: 1600 Date: 8/25/87

Sample Number	Relinquished By:	Received By:	Time	Date	Reason for Change of Custody
#S1-F1	Cris D'Orsi	Elaine Walters	0000hrs	9/26/87	SHIP TO LAB
Sample Number	Relinquished By:	Received By:	Time	Date	Reason for Change of Custody
		Elaine Walters	12:15	9-15-87	Rec'd by Lab
Sample Number	Relinquished By:	Received By:	Time	Date	Reason for Change of Custody
Sample Number	Relinquished By:	Received By:	Time	Date	Reason for Change of Custody

TUT 001 0749

CHAIN OF CUSTODY RECORD

ENVIRONMENTAL PROTECTION AGENCY - REGION II
Environmental Services Division
EDISON, NEW JERSEY 08817

Name of Unit and Address: USEPA/TAT
c/o Roy F. Weston Inc
Region II TAT
Edison, NJ 08817

(Carlos O'Neill) Tutu Well Site
St. Thomas, USVI

Sample Number	Number of Containers	Description of Samples		
39B-20	1	TAT ID# CW-009A	Ramsey motor waste oil storage tank	Iodomi VOA
39B-21	1	TAT ID# CW-010A	VIHA waste oil UST	" "
39B-22	1	TAT ID# CW-011A	oil separator, Tutu Esso	" "

Person Assuming Responsibility for Samples: Cin D'Onofrio — Time: 1600 hrs — Date: 8/25/87

Sample Number	Relinquished By:	Received By:	Time	Date	Reason for Change of Custody
39B-20 thru 39B-22	Cin D'Onofrio	[illegible]	1000 hrs	8/26/87	SHIP TO LAB
Sample Number	Relinquished By:	Received By:	Time	Date	Reason for Change of Custody
		Elaine Dalton	12:15	9-8-87	Rec'd by Lab
Sample Number	Relinquished By:	Received By:	Time	Date	Reason for Change of Custody
Sample Number	Relinquished By:	Received By:	Time	Date	Reason for Change of Custody

Rec'd Date 1/7/88

U.S. ENVIRONMENTAL PROTECTION AGENCY
CLP Sample Management Office
P.O. Box 818 - Alexandria, Virginia 22313
Phone: 703/557-2490 - FTS/557-2490

SAS Number

SPECIAL ANALYTICAL SERVICE

PACKING LIST

Sampling Office:	Sampling Date(s):	Ship To:	For Lab Use Only
REF E WESTON, INC (TAT2)	8/17/87	S-CUBED LABORATORIES	
Sampling Contact:	Date Shipped:	3398 CARMEL MT. RD.	Date Samples Rec'd:
CRIS D'ONOFRIO (name)	8/26/87	SAN DIEGO, CALIFORNIA 92121	9-15-87
(201) 225-6116 (phone)	Site Name/Code: TUTU WELL SITE U.S.V.I, ST. THOMAS	Attn: LAB MANAGER	Received By: Elaine Walter

(PCB SAMPLES)

Sample Numbers	Sample Description i.e., Analysis, Matrix, Concentration	Sample Condition on Receipt at Lab
1. 3239B-1	PCB; WATER; UNKNOWN	OK
2. 3239B-2	PCB; WATER; UNKNOWN	
3. 3239B-3	PCB; WATER; UNKNOWN	
4. 3239B-4	PCB; OIL; UNKNOWN	
5. 3239B-5	PCB; OIL; UNKNOWN	
6. 3239B-6	PCB; WATER; UNKNOWN	
7. 3239B-7	PCB; WATER; UNKNOWN	
8. 3239B-8	PCB; WATER; UNKNOWN	
9. 3239B-9	PCB; OIL (POSSIBLE H2O); UNKNOWN	
10. 3239B-10	PCB; OIL; UNKNOWN	
11. 3239B-11	PCB; OIL/H2O; UNKNOWN	
12.		
13.		
14.		
15.		
16.		
17.		
18.		
19.		
20.		

For Lab Use Only

White - SMO Copy, Yellow - Region Copy, Pink - Lab Copy for return to SMO

2 cpl Duplicate
1/7/88

5. ENVIRONMENTAL PROTECTION AGENCY
CLP Sample Management Office
P.O. Box 818 - Alexandria, Virginia 22313
Phone: 703/557-2490 - FTS/557-2490

SAS Number

SPECIAL ANALYTICAL SERVICE
PACKING LIST

Sampling Office:	Sampling Date(s):	Ship To:	For Lab Use Only
TAT II (Roy Ellestad)	8/17/87	S-CUBED LABORATORIES 3398 CARMEL MOUNTAIN RD SAN DIEGO, CALIFORNIA 92121	Date Samples Rec'd: 9-15-87
Sampling Contact: CRIS D'ONOFRIO (name)	Date Shipped: 8/26/87		Received By: Elaine Walters
(801) 225-6116 (phone)	Site Name/Code: TUTUILA HELI SOAK US VIRGIN ISLANDS	Attn: LAB MANAGER	

(VOA SAMPLES)

Sample Numbers	Sample Description i.e., Analysis, Matrix, Concentration	Sample Condition on Receipt at Lab
1. 3239B-12	VOA; WATER/OIL; UNKNOWN	OK
2. 3239B-13	VOA; WATER; UNKNOWN	
3. 3239B-14	VOA; WATER; UNKNOWN	
4. 3239B-15	VOA; OIL; UNKNOWN	
5. 3239B-16	VOA; OIL; UNKNOWN	
6. 3239B-17	VOA; WATER; UNKNOWN	
7. 3239B-18	VOA; WATER; UNKNOWN	
8. 3239B-19	VOA; WATER; UNKNOWN	
9. 3239B-20	VOA; OIL (POSSIBLE H2O); UNKNOWN	
10. 3239B-21	VOA; OIL; UNKNOWN	
11. 3239B-22	VOA; OIL/WATER; UNKNOWN	
12.		
13.		
14.		
15.		
16.		
17.		
18.		
19.		
20.		

For Lab Use Only

White - SMO Copy, Yellow - Region Copy, Pink - Lab Copy for return to SMC

S-CUBED
A Division of Maxwell Laboratories, Inc.

September 25, 1987

TUTU WELLS Volume 1 of 1

VOA's PCB's
11 11
(2 clm, 10 1,5 w) (2 clm 3, 1 1, 6 w)

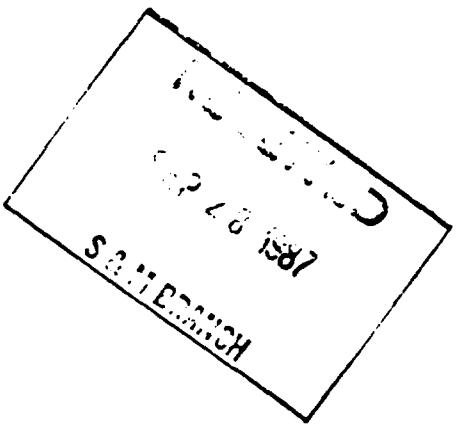
NARRATIVE CASE SAS 3239B
S-CUBED CONTRACT NO. 68-01-7261

This case consists of 11 water, oil/water, and oil samples for VOA analysis, and 11 water, oil/water, and oil samples for PCB analysis. The VOA analyses were performed using the EPA CLP method for medium level soil samples. The PCB analyses were done after cleanup according to the EPA method 600/4-81-045 for determination of PCBs in transformer fluid and waste oils.

No PCBs were found in the samples. Sample weight for waters was 1.0 g and for oil samples 0.1 g. For laboratory bank, 10 mL of hexane was utilized. The SAS packing list specified water as matrix for Samples 3239B-3, 3239B-6, and 3239B-7. However, the samples consisted of oil and thus sample weight of 0.1 g was used.

The volatile samples were analyzed using sample weight of 4 g which was extracted by 10 mL of methanol. A 250 µL aliquot was then analyzed for most samples by GC/MS. However, the methanol aliquot volume for 3239B-15 was 60 µL, for 3239B-20 and 3239B-22 it was 2 µL and for 3239B-21 it was 1 µL. The dilutions were required due to high concentrations of toluene, ethylbenzene, and xylenes. Alkyl substituted benzenes were found as TICs in most samples.

All surrogate recoveries and MS/MSD results were found within QC limits, and analyses were straight forward.



Annina Lukiini-Johnson
Annina Lukiini-Johnson
Acting Project Manager

TUT 001 0753

P.O. Box 1620, La Jolla, California 92038-1620 3398 Carmel Mountain Road, San Diego, California 92121-1096
Telephone: (619) 453-0060 TWX: 910-337-1253 Telecopier: (619) 755-0474

SOIL SURROGATE PERCENT RECOVERY SUMMARY

Case No. SAS3239B Contract Laboratory S-CUBED Contract No. 68-01-7261

Low _____ Medium ✓

	SMO TRAFFIC NO.	VOLATILE: TOLUENE-D8 (81-117)	VOLATILE: BFB (74-121)	VOLATILE: 1,2 DICHLOROETHANE-D4 (70-121)	SEMI-VOLATILE: NITRO-BENZENE-D5 (23-120)	SEMI-VOLATILE: 2-FLUORO-BIPHENYL (30-115)	SEMI-VOLATILE: TERPHENYL-D14 (18-137)	SEMI-VOLATILE:	SEMI-VOLATILE:	SEMI-VOLATILE: PHENOL-D6 (24-113)	SEMI-VOLATILE: 2-FLUORO-PHENOL (25-121)	SEMI-VOLATILE: 2,4,6 TRIBROMO-PHENOL (19-122)	PESTICIDE: DIBUTYL-CHLORENDATE (D-120)
	32398-12	104	103	109									
	32398-12MS	100	96	97									
	32398-12MSD	101	98	96									
	32398-13	104	106	116									
	32398-14	109	107	112									
	32398-15	106	102	112									
	32398-16	105	95	81									
	32398-17	106	103	117									
	32398-18	100	95	114									
	32398-19	107	102	116									
	32398-20	106	108	107									
	32398-21	102	101	99									
	32398-22	100	98	99									
(1)	S16V1011	97	97	98									
(2)	17SV1021	109	103	97									
(3)	17SPV031	104	103	76									
(4)	19SV1061	102	99	101									

NA

* VALUES ARE OUTSIDE OF CONTRACT REQUIRED QC LIMITS

** ADVISORY LIMITS ONLY

Volatiles: 0 out of 51 ; outside of QC limits

Semi-Volatiles: NA out of NA ; outside of QC limits

Pesticides: NA out of NA ; outside of QC limits

7/86

Comments: (1)(2)(3)(4) VOA LAB BLANKS

FORM II

TUT 001 07754

SOIL MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

Case No. SAS32396 Contractor S-CUBED Contract No. 68-01-7261

Low Level _____ Medium Level ✓

FRACTION	COMPOUND	CONC. SPIKE ADDED (ug/Kg)	SAMPLE RESULT	CONC. MS	% REC	CONC. MSD	% REC	RPD	QC LIMITS * RPD	QC LIMITS * RECOVERY
VOA SMO SAMPLE NO. 32396-12	1,1-Dichloroethene	2200	0	3000	107	3000	107	0	22	59-172
	Trichloroethene	2200	0	2200	100	2200	100	0	24	62-137
	Chlorobenzene	2600	0	2600	100	2600	100	0	21	60-133
	Toluene	2600	59	2900	105	2900	105	0	21	59-139
	Benzene	2600	0	2600	100	2600	100	0	21	66-142
B/N SMO SAMPLE NO. NA	1,2,4-Trichlorobenzene								23	38-107
	Acenaphthene								19	31-137
	2,4 Dinitrotoluene								47	28-89
	Pyrene								36	35-142
	N-Nitrosodi-n-Propylamine			NA	NA				38	41-126
	1,4-Dichlorobenzene								27	28-104
ACID SMO SAMPLE NO. NA	Pentachlorophenol								47	17-109
	Phenol								35	26-90
	2-Chlorophenol								50	25-102
	4-Chloro-3-Methylphenol								33	26-103
	4-Nitrophenol								50	11-114
PEST SMO SAMPLE NO. _____	Lindane								50	46-127
	Heptachlor								31	35-130
	Aldrin		NA		NA			NA	43	34-132
	Dieldrin								38	31-134
	Endrin								45	42-139
	4,4'-DDT								50	23-134

*ASTERISKED VALUES ARE OUTSIDE QC LIMITS.

RPD: VOAs 0 out of 5 ; outside QC limits
B/N NA out of NA ; outside QC limits
ACID NA out of NA ; outside QC limits
PEST NA out of NA ; outside QC limits

RECOVERY: VOAs 0 out of 10 ; outside QC limits
B/N NA out of NA ; outside QC limits
ACID NA out of NA ; outside QC limits
PEST NA out of NA ; outside QC limits

Comments: _____

0755 001 TUT

MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

Case No. 3239 B Contractor S-CUBED Contract No. 68-01-7261 ~~3215-04~~ MB

	COMPOUND	CONC. SPIKE ADDED (ug/L)	SAMPLE RESULT	CONC. MS	% REC	CONC. MSD	% REC	RPD
SMO SAMPLE NO.								
3239B-1	PCB 1254	100	0	76.0	76	71.7	71.7	5.8

Comments:

FORM III 8/86

TUT 001 0756

METHOD BLANK SUMMARY

Case No. SAS3239B Region 2 Contractor S-CUBED Contract No. 68-01-7261 6868

FILE ID	DATE OF ANALYSIS	FRACTION	MATRIX	CONC. LEVEL	INST. ID	CAS NUMBER	COMPOUND (NBS, TIC OR UNKNOWN)	CONC.	UNITS	CRQL
S16V1011	9-16-87	VOA	H_2O ①		V61	75-09-2	Methylene Chloride	3	µg/L	5
17SV1021	9-17-87					75-09-2	Methylene Chloride	4		5
17SPV031	9-17-87					75-09-2	Methylene Chloride	1		5
↓	↓					67-64-1	Acetone	4		10
19SV1061	9-19-87					75-09-2	Methylene Chloride	3		5
						67-64-1	Acetone	15		10
↓	↓	↓	↓	↓	↓	78-93-3	2-Butanone	11	↓	10
LAB BLANK	9-16-87	PCB	Hexane ②	M	HP5890E	—	Nothing found			

Comments: ① 5ml of H_2O was utilized. Same equipment used for this blank and the samples.

② 10 ml of Hexane was utilized for the PCB Blank and put through same analysis sequence as the samples.

TUT 001 0757

GC/MS TUNING AND MASS CALIBRATION

Bromofluorobenzene (BFB)

Case No. ~~3199~~ SAS32396 Contractor S-CUBED Contract No 68-01-~~6865~~ 7261

Instrument ID VG1 Date 18 Aug 87 Time 8:00

Lab ID BFB18AV Data Release Authorized By: AM

m/e	ION ABUNDANCE CRITERIA	%RELATIVE ABUNDANCE	
95	15.0 - 40.0% of the base peak	18.7	
75	30.0 - 60.0% of the base peak	43.9	
95	Base peak, 100% relative abundance	100	
96	5.0 - 9.0% of the base peak	6.84	
173	Less than 1.0% of the base peak	0.30	
174	Greater than 50.0% of the base peak	61.2	
175	5.0 - 9.0% of mass 174	4.38	(7.16)[1]
176	Greater than 95.0%, but less than 101.0% of mass 174	60.1	(98.2)[1]
177	5.0 - 9.0% of mass 176	3.73	(6.2)[2]

THIS PERFORMANCE TUNE APPLIES TO THE FOLLOWING SAMPLES, BLANKS AND STANDARDS.

[1]Value in parenthesis is % mass 174
[2]Value in parenthesis is % mass 176.

SAMPLE ID	LAB ID	DATE OF ANALYSIS	TIME OF ANALYSIS
150 pg ICAL	18AV02	18AUG87	10:40
100 pg ICAL	18AV03		11:20
200 pg ICAL	18AV04		12:10
70 pg ICAL	18AV05		12:56
50 pg ICAL	18AV06		13:41
LAB BLANK	18AV07		14:26
001	18AV08		15:11
002	18AV09		15:56
003	18AV11		17:26
006	18AV12		18:11
007	18AV13		18:56
009	18AV14		19:40

'Cal' curve

TUT 001 0758

GC/MS TUNING AND MASS CALIBRATION

Bromofluorobenzene (BFB)

Case No. 32398 Contractor S-CUBED Contract No 68-01-7261

Instrument ID VG1 Date 16 Sep 1987 Time 10:06

Lab ID 16SV1BFB (16SV1BFB) Data Release Authorized By: AJX

m/e	ION ABUNDANCE CRITERIA	%RELATIVE ABUNDANCE
50	15.0 - 40.0% of the base peak	25.2
75	30.0 - 60.0% of the base peak	~~56.3~~ 56.4
95	Base peak, 100% relative abundance	100
96	5.0 - 9.0% of the base peak	6.84
173	Less than 1.0% of the base peak	no peak
174	Greater than 50.0% of the base peak	52.2
175	5.0 - 9.0% of mass 174	3.76 - (7.20)[1]
176	Greater than 95.0%, but less than 101.0% of mass 174	51.9 - (99.4)[1]
177	5.0 - 9.0% of mass 176	3.60 - (6.93)[2]

THIS PERFORMANCE TUNE APPLIES TO THE FOLLOWING SAMPLES, BLANKS AND STANDARDS.

[1]Value in parenthesis is % mass 174
[2]Value in parenthesis is % mass 176.

	SAMPLE ID	LAB ID	DATE OF ANALYSIS	TIME OF ANALYSIS
NA	50 ng cal	16SV101	16Sep87	10:27
NA	Med Low Lab blank	16SV101		11:38
32398-12	~~32398-12 ms~~	16SV102		12:21
32398-13	~~32398-13 ms~~	16SV103		13:06
32398-15	~~32398-15 ms~~	16SV105		14:36

FORM V 7/85

GC/MS TUNING AND MASS CALIBRATION

Bromofluorobenzene (BFB)

Change 32156 4

Case No. ~~46339B~~ SAS32398 Contractor S-CUBED Contract No 68-01-7261

Instrument ID V61 Date 17Sep07 Time 9:49 -

Lab ID 17SV1BFB Data Release Authorized By:

m/e	ION ABUNDANCE CRITERIA	%RELATIVE ABUNDANCE
50	15.0 - 40.0% of the base peak	24.5 ✓
75	30.0 - 60.0% of the base peak	55.1 ✓
95	Base peak, 100% relative abundance	100 ✓
96	5.0 - 9.0% of the base peak	6.73 ✓
173	Less than 1.0% of the base peak	no peak ✓
174	Greater than 50.0% of the base peak	50.3 ✓
175	5.0 - 9.0% of mass 174	3.58 - (7.12)[1]
176	Greater than 95.0%, but less than 101.0% of mass 174	50.2 - (99.8)[1]
177	5.0 - 9.0% of mass 176	3.45 - (6.87)[2]

THIS PERFORMANCE TUNE APPLIES TO THE FOLLOWING SAMPLES, BLANKS AND STANDARDS.

[1]Value in parenthesis is % mass 174.
[2]Value in parenthesis is % mass 176.

SAMPLE ID	LAB ID	DATE OF ANALYSIS	TIME OF ANALYSIS
NA (Spot CCAL)	17SV011	17Sep07	10:53 ✓
NA (Med level lab blank)	17SV1021	↓	11:52 ✓
32398-14	17SV1031		12:37 ✓
32398-17	17SV1041		13:22 ✓
32398-18	17SV1051		14:27 ✓
32398-16	17SV1061	↓	15:33 ✓

FORM V 7/85

GC/MS TUNING AND MASS CALIBRATION

Bromofluorobenzene (BFB)

32154_4

Case No. SAS32395 (7261) Contractor S-CUBED Contract No. 68-01-8868

Instrument ID HP1 Date 17 Sep 87 Time 20:07

Lab ID 17SPBFB Data Release Authorized By: [signature]

m/e	ION ABUNDANCE CRITERIA	%RELATIVE ABUNDANCE
50	15.0 - 40.0% of the base peak	20.7 ✓
75	30.0 - 60.0% of the base peak	52.3 ✓
95	Base peak, 100% relative abundance	100 ✓
96	5.0 - 9.0% of the base peak	6.94 ✓
173	Less than 1.0% of the base peak	no peak ✓
174	Greater than 50.0% of the base peak	56.5 ✓ (was 56.3)
175	5.0 - 9.0% of mass 174	3.76 - 6.65 ✓ (was 6.68) [1]
176	Greater than 95.0%, but less than 101.0% of mass 174	56.1 - 99.3 ✓ (was 99.6) [1]
177	5.0 - 9.0% of mass 176	3.59 - (6.40) [2]

THIS PERFORMANCE TUNE APPLIES TO THE FOLLOWING SAMPLES, BLANKS AND STANDARDS.

[1] Value in parenthesis is % mass 174.
[2] Value in parenthesis is % mass 176.

SAMPLE ID	LAB ID	DATE OF ANALYSIS	TIME OF ANALYSIS
NA (50PPM CCAL)	17SPV011	17SEP87	20:47 ✓
NA (Med Level Lab Blank)	17SPV031		21:37 ✓
32398-19	17SPV041		22:42 ✓
32398-20	17SV011		23:34 ✓

FORM V 7/87

GC/MS TUNING AND MASS CALIBRATION

Bromofluorobenzene (BFB)

7261

SAS 3239B

Case No. 3239A4 Contractor S-CUBED Contract No 68-01-6868

Instrument ID VG1 Date 19Sep87 Time 11:07

Lab ID 19SV1BFB Data Release Authorized By: AM

m/e	ION ABUNDANCE CRITERIA	%RELATIVE ABUNDANCE
50	15.0 - 40.0% of the base peak	25.8 ✓
75	30.0 - 60.0% of the base peak	58.3 ✓
95	Base peak, 100% relative abundance	100 ✓
96	5.0 - 9.0% of the base peak	6.77 ✓
173	Less than 1.0% of the base peak	no peak ✓
174	Greater than 50.0% of the base peak	57.0 ✓
175	5.0 - 9.0% of mass 174	5.95 (6.93)[1]
176	Greater than 95.0%, but less than 101.0% of mass 174	56.5 (99.1)[1]
177	5.0 - 9.0% of mass 176	3.80 (6.73)[2]

THIS PERFORMANCE TUNE APPLIES TO THE FOLLOWING SAMPLES, BLANKS AND STANDARDS.

[1]Value in parenthesis is % mass 174.
[2]Value in parenthesis is % mass 176.

SAMPLE ID	LAB ID	DATE OF ANALYSIS	TIME OF ANALYSIS
200pt ICAL	19SV101	19Sep87	11:48 ✓
150pt ICAL	19SV102		12:37 ✓
100pt ICAL	19SV103		13:23 ✓
30pt ICAL	19SV104		14:08 ✓
5pt ICAL	19SV105		14:53 ✓
NA Med Level Lab Blank	19SV106		15:38 ✓
MATRIX SPIKE	19SV107		16:23
3239B-12MS	19SV108		17:08 ✓
3239B-12MSD	19SV109		17:53 ✓
3239B-21	19SV111		18:23 ✓
3239B-22	19SV113		20:53 ✓

TUT 001 0762

U.S. ENVIRONMENTAL PROTECTION AGENCY
CLP Sample Management Office
P.O. Box 818 - Alexandria, Virginia 22313
Phone: 703/557-2490 - FTS/557-2490

SAS Number: 3239B

SPECIAL ANALYTICAL SERVICE
PACKING LIST

Sampling Office:	Sampling Date(s):	Ship To:	For Lab Use Only
Ray F. Weston, Inc. (TAT2)	8/17/87	S-Cubed Laboratories	
Sampling Contact:	Date Shipped:	3398 Mt. Carmel Mt. Rd.	Date Samples Rec'd:
Lou D'Onofrio (name)	8/26/87	San Diego, California 92121	9-15-87
(201) 225-6116 (phone)	Site Name/Code:	Attn:	Received By:
	Tutu Well Site U.S.V.I., St. Thomas	LAB MANAGER	Elaine Walling

(PCB SAMPLES)

Sample Numbers	Sample Description Le., Analysis, Matrix, Concentration	Sample Condition on Receipt at Lab
1. 3239B-1	PCB; Water; Unknown	OK
2. 3239B-2	PCB; Water; Unknown	
3. 3239B-3	PCB; Water, Oil; Unknown	
4. 3239B-4	PCB; Oil; Unknown	
5. 3239B-5	PCB; Oil; Unknown	
6. 3239B-6	PCB; Water, Oil; Unknown	
7. 3239B-7	PCB; Water, Oil; Unknown	
8. 3239B-8	PCB; Water; Unknown	
9. 3239B-9	PCB; Oil (Possible H2O); Unknown	
10. 3239B-10	PCB; Oil; Unknown	
11. 3239B-11	PCB; Oil/H2O; Unknown	
12.		
13.		
14.		
15.		
16.		
17.		
18.		
19.		
20.		

For Lab Use Only

White - SMO Copy, Yellow - Region Copy, Pink - Lab Copy for return to SMO, Gold - Lab Copy

U.S. ENVIRONMENTAL PROTECTION AGENCY
CLP Sample Management Office
P.O. Box 818 - Alexandria, Virginia 22313
Phone: 703/557-2490 - FTS/557-2490

SAS Number
32398

SPECIAL ANALYTICAL SERVICE
PACKING LIST

Sampling Office:	Sampling Date(s):	Ship To:	For Lab Use Only
TAT II (Roy F. Weston Inc.)	8/17/87	S-CUBED LABORATORIES 3398 CARMEL MOUNTAIN RD SAN DIEGO, CALIFORNIA 92121	Date Samples Rec'd: 9-15-87
Sampling Contact: CARL D'ONOFRIO (name)	Date Shipped: 8/26/87	Attn: LAB MANAGER	Received By: Elaine Walters
(201) 225-6116 (phone)	Site Name/Code: TRUK ISLAND SOUTH U.S. TRUST TERRITORIES		

VOA SAMPLES

	Sample Numbers	Sample Description i.e., Analysis, Matrix, Concentration	Sample Condition on Receipt at Lab
1.	32398-12	VOA; WATER/OIL; UNKNOWN	OK
2.	32398-13	VOA; WATER; UNKNOWN	
3.	32398-14	VOA; WATER; UNKNOWN	
4.	32398-15	VOA; OIL; UNKNOWN	
5.	32398-16	VOA; OIL; UNKNOWN	
6.	32398-17	VOA; WATER; UNKNOWN	
7.	32398-18	VOA; WATER; UNKNOWN	
8.	32398-19	VOA; WATER; UNKNOWN	
9.	32398-20	VOA; OIL (POSSIBLE H_2O); UNKNOWN	
10.	32398-21	VOA; OIL; UNKNOWN	
11.	32398-22	VOA; OIL/WATER; UNKNOWN	
12.			
13.			
14.			
15.			
16.			
17.			
18.			
19.			
20.			

For Lab Use Only

White - SMO Copy, Yellow - Region Copy, Pink - Lab Copy for return to SMO, Gold - Lab Copy

IDENTIFICATION OF NAMES OF INTERNAL STANDARD (IS) AND SURROGATES (SURR) ON RIC SHEET

VOLATILE	IS1	:	BROMOCHLOROMETHANE
	IS2	:	1,4-DIFLUOROBENZENE
	IS3	:	D5-CHLOROBENZENE
	SURR1	:	D8-TOLUENE
	SURR2	:	D4-1,2-DICHLOROETHANE
	SURR3	:	BROMOFLUOROBENZENE
SEMI-VOLATILE	IS1	:	D4-DICHLOROBENZENE
	IS2	:	D8-NAPHTHALENE
	IS3	:	D10-ACENAPHTHENE
	IS4	:	D10-PHENANTHRENE
	IS5	:	D12-CHRYSENE
	IS6	:	D12-PERYLENE
	SURR3	:	D5-NITROBENZENE
	SURR2	:	D5-PHENOL
	SURR1	:	2-FLUOROPHENOL
	SURR4	:	2-FLUOROBIPHENYL
	SURR5	:	2,4,6-TRIBROMOPHENOL
	SURR6	:	D14-TERPHENYL

ORGANICS ANALYSIS DATA SHEET
(Page 1)

Sample Number:
3239B-12

Laboratory Name: S-CUBED
Lab Sample ID No: S16V1021 (VOA)
Sample Matrix: ~~SOIL~~ WATER/OIL
Data Release Authorized By: ___

Case No: SAS3239B
QC Report No: N.R
Contract No: 68-01-7261
Date Sample Received: 09-15-87

VOLATILE COMPOUNDS

Concentration: Low (Medium) (Circle One)
Date Extracted/Prepared: 09-16-87
Date Analyzed: 09-16-87
Conc/Dil Factor: 2.6 pH: N.R
Percent Moisture (Not Decanted): N.R %

CAS Number		ug/l or ug/kg (Circle One)	CAS Number		ug/l or ug/kg (Circle One)
74-87-3	CHLOROMETHANE	490 U	78-87-5	1,2-DICHLOROPROPANE	240 U
74-83-9	BROMOMETHANE	490 U	10061-02-6	TRANS-1,3-DICHLOROPROPENE	240 U
75-01-4	VINYL CHLORIDE	490 U	79-01-6	TRICHLOROETHENE	240 U
75-00-3	CHLOROETHANE	490 U	124-48-1	DIBROMOCHLOROMETHANE	240 U
75-09-2	METHYLENE CHLORIDE	~~990~~ B	79-00-5	1,1,2-TRICHLOROETHANE	240 U
67-64-1	ACETONE	1400	71-43-2	BENZENE	240 U
75-15-0	CARBON DISULFIDE	240 U	10061-01-5	CIS-1,3-DICHLOROPROPENE	240 U
75-35-4	1,1-DICHLOROETHENE	240 U	110-75-8	2-CHLOROETHYLVINYLETHER	490 U
75-34-3	1,1-DICHLOROETHANE	240 U	75-25-2	BROMOFORM	240 U
156-60-5	TRANS-1,2-DICHLOROETHENE	240 U	591-78-6	2-HEXANONE	490 U
67-66-3	CHLOROFORM	240 U	108-10-1	4-METHYL-2-PENTANONE	490 U
107-06-2	1,2-DICHLOROETHANE	240 U	127-18-4	TETRACHLOROETHENE	240 U
78-93-3	2-BUTANONE	3000	79-34-5	1,1,2,2-TETRACHLOROETHANE	240 U
71-55-6	1,1,1-TRICHLOROETHANE	240 U	108-88-3	TOLUENE	~~69 J~~ 240U
56-23-5	CARBON TETRACHLORIDE	240 U	108-90-7	CHLOROBENZENE	240 U
108-05-4	VINYL ACETATE	490 U	100-41-4	ETHYLBENZENE	240 U
75-27-4	BROMODICHLOROMETHANE	240 U	100-42-5	STYRENE	240 U
				TOTAL XYLENES	240 U

Data Reporting Qualifiers

For reporting results to EPA, the following results qualifier are used. Additional flags or footnotes explaning results are encouraged. However, the definition of each flag must be explicit.

Value: If the result is a value greater than or equal to the detection limit, report the value.

U Indicates compound was analyzed for but not detected. Report the minimum detection limit for the sample with the U (eg. 10U) based on necessary concentration/dilution action. (this is not necessarily the instrument detection limit.) The footnotes should read: U-Compound was analyzed for but not detected. The number is the minimum attainable detection limit for the sample.

J Indicates an estimated value: This flag is used either when estimating a concentration for tentatively identified compounds where a 1:1 response is assumed or when the mass spectral data indicated the presence of a compound that meets the identification criteria but the result is less than the specified detection limit but greater than zero (eg 10J). If limit of detection is 10 ug/L and a concentration of 3ug/L is calculated, report as 3J.

C This flag applies to pesticide parameters where the identification has been confirmed by GC/MS. Single component pesticides > or = 10 ng/ul in the final extract should be confirmed by GC/MS.

B This flag is used when analyte is found in the blank as well as sample. It indicates possible/probable blank contamination and warns the data user to take appropriate action.

S Matrix spiked compound.

(+) No Percent Moisture Required.

U

ORGANICS ANALYSIS DATA SHEET
(Page 1)

Sample Number: 32398-13

Laboratory Name: S-CUBED
Lab Sample ID No: SJ6V1031 (VOA)
Sample Matrix: AQUEOUS WATER
Data Release Authorized By: AM

Case No: SAS3239B
QC Report No: N.R
Contract No: 68-01-7261
Date Sample Received: 09-15-87

VOLATILE COMPOUNDS
Concentration: Low (Medium) (Circle One)
Date Extracted/Prepared: 09-16-87
Date Analyzed: 09-16-87
Conc/Dil Factor: 2.5 pH: N.R
Percent Moisture (Not Decanted): N.R (s)

CAS Number		ug/l or ug/kg (Circle One)	CAS Number		ug/l or ug/kg (Circle One)
74-87-3	CHLOROMETHANE	490 U	78-87-5	1,2-DICHLOROPROPANE	250 U
74-83-9	BROMOMETHANE	490 U	10061-02-6	TRANS-1,3-DICHLOROPROPENE	250 U
75-01-4	VINYL CHLORIDE	490 U	79-01-6	TRICHLOROETHENE	250 U
75-00-3	CHLOROETHANE	490 U	124-48-1	DIBROMOCHLOROMETHANE	250 U
75-09-2	METHYLENE CHLORIDE	390 B	79-00-5	1,1,2-TRICHLOROETHANE	250 U
67-64-1	ACETONE	1500	71-43-2	BENZENE	270
75-15-0	CARBON DISULFIDE	250 U	10061-01-5	CIS-1,3-DICHLOROPROPENE	250 U
75-35-4	1,1-DICHLOROETHENE	250 U	110-75-8	2-CHLOROETHYLVINYLETHER	490 U
75-34-3	1,1-DICHLOROETHANE	250 U	75-25-2	BROMOFORM	250 U
156-60-5	TRANS-1,2-DICHLOROETHENE	250 U	591-78-6	2-HEXANONE	490 U
67-66-3	CHLOROFORM	250 U	108-10-1	4-METHYL-2-PENTANONE	490 U
107-06-2	1,2-DICHLOROETHANE	250 U	127-18-4	TETRACHLOROETHENE	250 U
78-93-3	2-BUTANONE	3100	79-34-5	1,1,2,2-TETRACHLOROETHANE	250 U
71-55-6	1,1,1-TRICHLOROETHANE	250 U	108-88-3	TOLUENE	2300
56-23-5	CARBON TETRACHLORIDE	250 U	108-90-7	CHLOROBENZENE	250 U
108-05-4	VINYL ACETATE	490 U	100-41-4	ETHYLBENZENE	1300
75-27-4	BROMODICHLOROMETHANE	250 U	100-42-5	STYRENE	250 U
				TOTAL XYLENES	9100

Data Reporting Qualifiers

For reporting results to EPA, the following results qualifier are used. Additional flags or footnotes explaning results are encouraged.However,the definition of each flag must be explicit.

Value: If the result is a value greater than or equal to the detection limit,report the value.

U Indicates compound was analyzed for but not detected.Report the minimum detection limit for the sample with the U (eg.10U) based on necessary concentration/dilution action.(this is not necessarily the instrument detection limit.)The footnotes should read:U-Compound was analyzed for but not detected.The number is the minimum attainable detection limit for the sample.

J Indicates an estimated value:This flag is used either when estimating a concentration for tentatively identified compounds where a 1:1 response is assumed or when the mass spectral data indicated the presence of a compound that meets the identification criteria but the result is less than the specified detection limit but greater than zero (eg 10J) .If limit of detection is 10 ug/L and a concentration of 3ug/L is calculated,report as 3J.

C This flag applies to pesticide parameters where the identification has been confirmed by GC/MS.Single component pesticides > or = 10 ng/ul in the final extract should be confirmed by GC/MS.

B This flag is used when analyte is found in the blank as well as sample. It indicates possible/probable blank contamination and warns the data user to take appropriate action.

S Matrix spiked compound.

(s) No Percent Moisture Required.

ORGANICS ANALYSIS DATA SHEET
(Page 1)

Sample Number: 3239B-14

Laboratory Name: S-CUBED
Lab Sample ID No: 17SV1031 (VOA)
Sample Matrix: ~~Aqueous~~ WATER
Data Release Authorized By: Ag

Case No: SAS3239
GC Report No: N.R
Contract No: 68-01-7261
Date Sample Received: 09-15-87

VOLATILE COMPOUNDS
Concentration: Low (Medium) (Circle One)
Date Extracted/Prepared: 09-17-87
Date Analyzed: 09-17-87
Conc/Dil Factor: 2.6 pH: N.R
Percent Moisture (Not Decanted): N.R (*)

CAS Number		ug/l or ug/kg (Circle One)	CAS Number		ug/l or ug/kg (Circle One)
74-87-3	CHLOROMETHANE	490 U	78-87-5	1,2-DICHLOROPROPANE	240 U
74-83-9	BROMOMETHANE	490 U	10061-02-6	TRANS-1,3-DICHLOROPROPENE	240 U
75-01-4	VINYL CHLORIDE	490 U	79-01-6	TRICHLOROETHENE	240 U
75-00-3	CHLOROETHANE	490 U	124-48-1	DIBROMOCHLOROMETHANE	240 U
75-09-2	METHYLENE CHLORIDE	~~880~~ B	79-00-5	1,1,2-TRICHLOROETHANE	240 U
67-64-1	ACETONE	2200	71-43-2	BENZENE	240 U
75-15-0	CARBON DISULFIDE	240 U	10061-01-5	CIS-1,3-DICHLOROPROPENE	240 U
75-35-4	1,1-DICHLOROETHENE	240 U	110-75-8	2-CHLOROETHYLVINYLETHER	490 U
75-34-3	1,1-DICHLOROETHANE	240 U	75-25-2	BROMOFORM	240 U
156-60-5	TRANS-1,2-DICHLOROETHENE	240 U	591-78-6	2-HEXANONE	490 U
67-66-3	CHLOROFORM	260	108-10-1	4-METHYL-2-PENTANONE	490 U
107-06-2	1,2-DICHLOROETHANE	240 U	127-18-4	TETRACHLOROETHENE	240 U
78-93-3	2-BUTANONE	4100	79-34-5	1,1,2,2-TETRACHLOROETHANE	240 U
71-55-6	1,1,1-TRICHLOROETHANE	240 U	108-88-3	TOLUENE	870
56-23-5	CARBON TETRACHLORIDE	240 U	108-90-7	CHLOROBENZENE	240 U
108-05-4	VINYL ACETATE	490 U	100-41-4	ETHYLBENZENE	960
75-27-4	BROMODICHLOROMETHANE	240 U	100-42-5	STYRENE	240 U
				TOTAL XYLENES	7000

Data Reporting Qualifiers

For reporting results to EPA, the following results qualifier are used. Additional flags or footnotes explaning results are encouraged. However, the definition of each flag must be explicit.

Value: If the result is a value greater than or equal to the detection limit, report the value.

U Indicates compound was analyzed for but not detected. Report the minimum detection limit for the sample with the U (eg. 10U) based on necessary concentration/dilution action. (this is not necessarily the instrument detection limit.) The footnotes should read: U-Compound was analyzed for but not detected. The number is the minimum attainable detection limit for the sample.

J Indicates an estimated value: This flag is used either when estimating a concentration for tentatively identified compounds where a 1:1 response is assumed or when the mass spectral data indicated the presence of a compound that meets the identification criteria but the result is less than the specified detection limit but greater than zero (eg 10J). If limit of detection is 10 ug/L and a concentration of 3ug/L is calculated, report as 3J.

C This flag applies to pesticide parameters where the identification has been confirmed by GC/MS. Single component pesticides > or = 10 ng/ul in the final extract should be confirmed by GC/MS.

B This flag is used when analyte is found in the blank as well as sample. It indicates possible/probable blank contamination and warns the data user to take appropriate action.

S Matrix spiked compound.

(*) No Percent Moisture Required.

U

ORGANICS ANALYSIS DATA SHEET
(Page 1)

Sample Number:
32398-15

Laboratory Name: S-CUBED
Lab Sample ID No: S16V1051 (VOA)
Sample Matrix: ~~SOIL~~ OIL
Data Release Authorized By: MJ

Case No: SAS3239B
QC Report No: N.R
Contract No: 68-01-7261
Date Sample Received: 09-15-87

VOLATILE COMPOUNDS
Concentration: Low (Medium) (Circle One)
Date Extracted/Prepared: 09-16-87
Date Analyzed: 09-16-87
Conc/Dil Factor: 0.61 pH: N.R
Percent Moisture (Not Decanted): N.R.(*)

CAS Number		ug/l or (ug/kg) (Circle One)	CAS Number		ug/l or (ug/kg) (Circle One)
74-87-3	CHLOROMETHANE	2000 U	78-87-5	1,2-DICHLOROPROPANE	1000 U
74-83-9	BROMOMETHANE	2000 U	10061-02-6	TRANS-1,3-DICHLOROPROPENE	1000 U
75-01-4	VINYL CHLORIDE	2000 U	79-01-6	TRICHLOROETHENE	1000 U
75-00-3	CHLOROETHANE	2000 U	124-48-1	DIBROMOCHLOROMETHANE	1000 U
75-09-2	METHYLENE CHLORIDE	~~2000~~ B	79-00-5	1,1,2-TRICHLOROETHANE	1000 U
67-64-1	ACETONE	2000 U	71-43-2	BENZENE	2800
75-15-0	CARBON DISULFIDE	1000 U	10061-01-5	CIS-1,3-DICHLOROPROPENE	1000 U
75-35-4	1,1-DICHLOROETHENE	1000 U	110-75-8	2-CHLOROETHYLVINYLETHER	2000 U
75-34-3	1,1-DICHLOROETHANE	1000 U	75-25-2	BROMOFORM	1000 U
156-60-5	TRANS-1,2-DICHLOROETHENE	1000 U	591-78-6	2-HEXANONE	2000 U
67-66-3	CHLOROFORM	1000 U	108-10-1	4-METHYL-2-PENTANONE	2000 U
107-06-2	1,2-DICHLOROETHANE	1000 U	127-18-4	TETRACHLOROETHENE	1000 U
78-93-3	2-BUTANONE	5300	79-34-5	1,1,2,2-TETRACHLOROETHANE	1000 U
71-55-6	1,1,1-TRICHLOROETHANE	2400	108-88-3	TOLUENE	43000
56-23-5	CARBON TETRACHLORIDE	1000 U	108-90-7	CHLOROBENZENE	1000 U
108-05-4	VINYL ACETATE	2000 U	100-41-4	ETHYLBENZENE	14000
75-27-4	BROMODICHLOROMETHANE	1000 U	100-42-5	STYRENE	1000 U
				TOTAL XYLENES	110000

Data Reporting Qualifiers

For reporting results to EPA, the following results qualifier are used. Additional flags or footnotes explaning results are encouraged.However,the definition of each flag must be explicit.

Value: If the result is a value greater than or equal to the detection limit,report the value.

U Indicates compound was analyzed for but not detected.Report the minimum detection limit for the sample with the U (eg.10U) based on necessary concentration/dilution action.(this is not necessarily the instrument detection limit.)The footnotes should read:U-Compound was analyzed for but not detected.The number is the minimum attainable detection limit for the sample.

J Indicates an estimated value:This flag is used either when estimating a concentration for tentatively identified compounds where a 1:1 response is assumed or when the mass spectral data indicated the presence of a compound that meets the identification criteria but the result is less than the specified detection limit but greater than zero (eg 10J) .If limit of detection is 10 ug/L and a concentration of 3ug/L is calculated,report as 3J.

C This flag applies to pesticide parameters where the identification has been confirmed by GC/MS.Single component pesticides > or = 10 ng/ul in the final extract should be confirmed by GC/MS.

B This flag is used when analyte is found in the blank as well as sample. It indicates possible/probable blank contamination and warns the data user to take appropriate action.

S Matrix spiked compound.

(*) No Percent Moisture Required.

ORGANICS ANALYSIS DATA SHEET
(Page 1)

Sample Number:
32398-16

Laboratory Name: S-CUBED
Lab Sample ID No: 17SV1061(VOA)
Sample Matrix: ~~WATER~~ SOIL-016
Data Release Authorized By: [signature]

Case No: SAS32398
QC Report No: N.R
Contract No: 68-01-7261
Date Sample Received: 09-15-87

VOLATILE COMPOUNDS

Concentration: Low (Medium) (Circle One)
Date Extracted/Prepared: 09-17-87
Date Analyzed: 09-17-87
Conc/Dil Factor: 2.5 pH: N.R
Percent Moisture (Not Decanted): N.R (*)

CAS Number		ug/l or (ug/kg) (Circle One)	CAS Number		ug/l or (ug/kg) (Circle One)
74-87-3	CHLOROMETHANE	500 U	78-87-5	1,2-DICHLOROPROPANE	250 U
74-83-9	BROMOMETHANE	500 U	10061-02-6	TRANS-1,3-DICHLOROPROPENE	250 U
75-01-4	VINYL CHLORIDE	500 U	79-01-6	TRICHLOROETHENE	250 U
75-00-3	CHLOROETHANE	500 U	124-48-1	DIBROMOCHLOROMETHANE	250 U
75-09-2	METHYLENE CHLORIDE	~~1900~~ B	79-00-5	1,1,2-TRICHLOROETHANE	250 U
67-64-1	ACETONE	1900	71-43-2	BENZENE	250 U
75-15-0	CARBON DISULFIDE	250 U	10061-01-5	CIS-1,3-DICHLOROPROPENE	250 U
75-35-4	1,1-DICHLOROETHENE	250 U	110-75-8	2-CHLOROETHYLVINYLETHER	500 U
75-34-3	1,1-DICHLOROETHANE	250 U	75-25-2	BROMOFORM	250 U
156-60-5	TRANS-1,2-DICHLOROETHENE	250 U	591-78-6	2-HEXANONE	500 U
67-66-3	CHLOROFORM	250 U	108-10-1	4-METHYL-2-PENTANONE	500 U
107-06-2	1,2-DICHLOROETHANE	250 U	127-18-4	TETRACHLOROETHENE	250 U
78-93-3	2-BUTANONE	6300	79-34-5	1,1,2,2-TETRACHLOROETHANE	250 U
71-55-6	1,1,1-TRICHLOROETHANE	250 U	108-88-3	TOLUENE	~~840~~
56-23-5	CARBON TETRACHLORIDE	250 U	108-90-7	CHLOROBENZENE	250 U
108-05-4	VINYL ACETATE	500 U	100-41-4	ETHYLBENZENE	1000
75-27-4	BROMODICHLOROMETHANE	250 U	100-42-5	STYRENE	250 U
				TOTAL XYLENES	9300

Data Reporting Qualifiers

For reporting results to EPA, the following results qualifier are used. Additional flags or footnotes explaining results are encouraged. However, the definition of each flag must be explicit.

Value: If the result is a value greater than or equal to the detection limit, report the value.

U Indicates compound was analyzed for but not detected. Report the minimum detection limit for the sample with the U (eg. 10U) based on necessary concentration/dilution action. (this is not necessarily the instrument detection limit.) The footnotes should read: U-Compound was analyzed for but not detected. The number is the minimum attainable detection limit for the sample.

J Indicates an estimated value: This flag is used either when estimating a concentration for tentatively identified compounds where a 1:1 response is assumed or when the mass spectral data indicated the presence of a compound that meets the identification criteria but the result is less than the specified detection limit but greater than zero (eg 10J). If limit of detection is 10 ug/L and a concentration of 3ug/L is calculated, report as 3J.

C This flag applies to pesticide parameters where the identification has been confirmed by GC/MS. Single component pesticides > or = 10 ng/ul in the final extract should be confirmed by GC/MS.

B This flag is used when analyte is found in the blank as well as sample. It indicates possible/probable blank contamination and warns the data user to take appropriate action.

S Matrix spiked compound.

(*) No Percent Moisture Required.

ORGANICS ANALYSIS DATA SHEET
(Page 1)

Sample Number:
32398-17

Laboratory Name: S-CUBED
Lab Sample ID No: 17SV1041 (VOA)
Sample Matrix: AQUEOUS WATER
Data Release Authorized By: [signature]

Case No: SAS32398
QC Report No: N.R
Contract No: 68-01-7261
Date Sample Received: 09-15-87

VOLATILE COMPOUNDS

Concentration: Low (Medium) (Circle One)
Date Extracted/Prepared: 09-17-87
Date Analyzed: 09-17-87
Conc/Dil Factor: 2.5 pH: N.R
Percent Moisture (Not Decanted): N.R (*)

CAS Number		ug/l or (ug/kg) (Circle One)	CAS Number		ug/l or (ug/kg) (Circle One)
74-87-3	CHLOROMETHANE	500 U	78-87-5	1,2-DICHLOROPROPANE	250 U
74-83-9	BROMOMETHANE	500 U	10061-02-6	TRANS-1,3-DICHLOROPROPENE	250 U
75-01-4	VINYL CHLORIDE	500 U	79-01-6	TRICHLOROETHENE	250 U
75-00-3	CHLOROETHANE	500 U	124-48-1	DIBROMOCHLOROMETHANE	250 U
75-09-2	METHYLENE CHLORIDE	940 B	79-00-5	1,1,2-TRICHLOROETHANE	250 U
67-64-1	ACETONE	2200	71-43-2	BENZENE	250 U
75-15-0	CARBON DISULFIDE	250 U	10061-01-5	CIS-1,3-DICHLOROPROPENE	250 U
75-35-4	1,1-DICHLOROETHENE	250 U	110-75-8	2-CHLOROETHYLVINYLETHER	500 U
75-34-3	1,1-DICHLOROETHANE	250 U	75-25-2	BROMOFORM	250 U
156-60-5	TRANS-1,2-DICHLOROETHENE	250 U	591-78-6	2-HEXANONE	500 U
67-66-3	CHLOROFORM	250 U	108-10-1	4-METHYL-2-PENTANONE	500 U
107-06-2	1,2-DICHLOROETHANE	250 U	127-18-4	TETRACHLOROETHENE	250 U
78-93-3	2-BUTANONE	4000	79-34-5	1,1,2,2-TETRACHLOROETHANE	250 U
71-55-6	1,1,1-TRICHLOROETHANE	250 U	108-88-3	TOLUENE	1100
56-23-5	CARBON TETRACHLORIDE	250 U	108-90-7	CHLOROBENZENE	250 U
108-05-4	VINYL ACETATE	500 U	100-41-4	ETHYLBENZENE	660
75-27-4	BROMODICHLOROMETHANE	250 U	100-42-5	STYRENE	250 U
				TOTAL XYLENES	4400

Data Reporting Qualifiers

For reporting results to EPA, the following results qualifier are used. Additional flags or footnotes explaing results are encouraged. However, the definition of each flag must be explicit.

Value: If the result is a value greater than or equal to the detection limit, report the value.

U Indicates compound was analyzed for but not detected. Report the minimum detection limit for the sample with the U (eg. 10U) based on necessary concentration/dilution action. (this is not necessarily the instrument detection limit.) The footnotes should read: U-Compound was analyzed for but not detected. The number is the minimum attainable detection limit for the sample.

J Indicates an estimated value: This flag is used either when estimating a concentration for tentatively identified compounds where a 1:1 response is assumed or when the mass spectral data indicated the presence of a compound that meets the identification criteria but the result is less than the specified detection limit but greater than zero (eg 10J). If limit of detection is 10 ug/L and a concentration of 3ug/L is calculated, report as 3J.

C This flag applies to pesticide parameters where the identification has been confirmed by GC/MS. Single component pesticides > or = 10 ng/ul in the final extract should be confirmed by GC/MS.

B This flag is used when analyte is found in the blank as well as sample. It indicates possible/probable blank contamination and warns the data user to take appropriate action.

S Matrix spiked compound.

(*) No Percent Moisture Required.

Sample Number: 32399-18

ORGANICS ANALYSIS DATA SHEET
(Page 1)

Laboratory Name: S-CUBED
Sample ID No: 17SV1051 (VOA)
Sample Matrix: ~~AQ-SOIL~~ WATER
Data Release Authorized By: [signature]

Case No: SAS32390
QC Report No: N.R
Contract No: 68-01-7261
Date Sample Received: 09-15-87

VOLATILE COMPOUNDS

Concentration: Low (Medium) (Circle One)
Date Extracted/Prepared: 09-17-87
Date Analyzed: 09-17-87
Conc/Dil Factor: 2.5 pH: N.R
Percent Moisture (Not Decanted): N.R

CAS Number		ug/l or ug/kg (Circle One)	CAS Number		ug/l or ug/kg (Circle One)
74-87-3	CHLOROMETHANE	500 U	78-87-5	1,2-DICHLOROPROPANE	250 U
74-83-9	BROMOMETHANE	500 U	10061-02-6	TRANS-1,3-DICHLOROPROPENE	250 U
75-01-4	VINYL CHLORIDE	500 U	79-01-6	TRICHLOROETHENE	250 U
75-00-3	CHLOROETHANE	500 U	124-48-1	DIBROMOCHLOROMETHANE	250 U
75-09-2	METHYLENE CHLORIDE	[redacted] B	79-00-5	1,1,2-TRICHLOROETHANE	250 U
67-64-1	ACETONE	2100	71-43-2	BENZENE	250 U
75-15-0	CARBON DISULFIDE	250 U	10061-01-5	CIS-1,3-DICHLOROPROPENE	250 U
75-35-4	1,1-DICHLOROETHENE	250 U	110-75-8	2-CHLOROETHYLVINYLETHER	500 U
75-34-3	1,1-DICHLOROETHANE	250 U	75-25-2	BROMOFORM	250 U
156-60-5	TRANS-1,2-DICHLOROETHENE	250 U	591-78-6	2-HEXANONE	500 U
67-66-3	CHLOROFORM	250 U	108-10-1	4-METHYL-2-PENTANONE	500 U
107-06-2	1,2-DICHLOROETHANE	250 U	127-18-4	TETRACHLOROETHENE	250 U
78-93-3	2-BUTANONE	4200	79-34-5	1,1,2,2-TETRACHLOROETHANE	250 U
71-55-6	1,1,1-TRICHLOROETHANE	250 U ~~120 J~~	108-88-3	TOLUENE	780
56-23-5	CARBON TETRACHLORIDE	250 U	108-90-7	CHLOROBENZENE	250 U
108-05-4	VINYL ACETATE	500 U	100-41-4	ETHYLBENZENE	390
75-27-4	BROMODICHLOROMETHANE	250 U	100-42-5	STYRENE	250 U
				TOTAL XYLENES	2600

Data Reporting Qualifiers

For reporting results to EPA, the following results qualifier are used. Additional flags or footnotes explaning results are encouraged. However, the definition of each flag must be explicit.

Value: If the result is a value greater than or equal to the detection limit, report the value.

U Indicates compound was analyzed for but not detected. Report the minimum detection limit for the sample with the U (eg. 10U) based on necessary concentration/dilution action. (this is not necessarily the instrument detection limit.) The footnotes should read: U-Compound was analyzed for but not detected. The number is the minimum attainable detection limit for the sample.

J Indicates an estimated value: This flag is used either when estimating a concentration for tentatively identified compounds where a 1:1 response is assumed or when the mass spectral data indicated the presence of a compound that meets the identification criteria but the result is less than the specified detection limit but greater than zero (eg 10J). If limit of detection is 10 ug/L and a concentration of 3ug/L is calculated, report as 3J.

C This flag applies to pesticide parameters where the identification has been confirmed by GC/MS. Single component pesticides > or = 10 ng/ul in the final extract should be confirmed by GC/MS.

B This flag is used when analyte is found in the blank as well as sample. It indicates possible/probable blank contamination and warns the data user to take appropriate action.

S Matrix spiked compound.

(o) No Percent Moisture Required.

ORGANICS ANALYSIS DATA SHEET
(Page 1)

Sample Number:
32398-19

Laboratory Name: S-CUBED
Lab Sample ID No: 17SPV041(VOA)
Sample Matrix: ~~AQUEOUS~~ WATER
Data Release Authorized By: AG

Case No: SAS32398
QC Report No: N.R
Contract No: 68-01-7261
Date Sample Received: 09-15-87

VOLATILE COMPOUNDS
Concentration: Low (Medium) (Circle One)
Date Extracted/Prepared: 09-17-87
Date Analyzed: 09-17-87
Conc/Dil Factor: 2.5 pH: N.R
Percent Moisture (Not Decanted): N.R *

CAS Number		ug/l or (ug/kg) (Circle One)	CAS Number		ug/l or (ug/kg) (Circle One)
74-87-3	CHLOROMETHANE	490 U	78-87-5	1,2-DICHLOROPROPANE	250 U
74-83-9	BROMOMETHANE	490 U	10061-02-6	TRANS-1,3-DICHLOROPROPENE	250 U
75-01-4	VINYL CHLORIDE	490 U	79-01-6	TRICHLOROETHENE	250 U
75-00-3	CHLOROETHANE	490 U	124-48-1	DIBROMOCHLOROMETHANE	250 U
75-09-2	METHYLENE CHLORIDE	~~1600~~ B	79-00-5	1,1,2-TRICHLOROETHANE	250 U
67-64-1	ACETONE	490 U	71-43-2	BENZENE	250 U
75-15-0	CARBON DISULFIDE	250 U	10061-01-5	CIS-1,3-DICHLOROPROPENE	250 U
75-35-4	1,1-DICHLOROETHENE	250 U	110-75-8	2-CHLOROETHYLVINYLETHER	490 U
75-34-3	1,1-DICHLOROETHANE	250 U	75-25-2	BROMOFORM	250 U
156-60-5	TRANS-1,2-DICHLOROETHENE	250 U	591-78-6	2-HEXANONE	490 U
67-66-3	CHLOROFORM	250 U	108-10-1	4-METHYL-2-PENTANONE	490 U
107-06-2	1,2-DICHLOROETHANE	250 U	127-18-4	TETRACHLOROETHENE	250 U
78-93-3	2-BUTANONE	2600	79-34-5	1,1,2,2-TETRACHLOROETHANE	250 U
71-55-6	1,1,1-TRICHLOROETHANE	250 U	108-88-3	TOLUENE	100 J
56-23-5	CARBON TETRACHLORIDE	250 U	108-90-7	CHLOROBENZENE	250 U
108-05-4	VINYL ACETATE	490 U	100-41-4	ETHYLBENZENE	250 U
75-27-4	BROMODICHLOROMETHANE	250 U	100-42-5	STYRENE	250 U
				TOTAL XYLENES	250 U

Data Reporting Qualifiers

For reporting results to EPA, the following results qualifier are used. Additional flags or footnotes explaning results are encouraged. However, the definition of each flag must be explicit.

Blank If the result is a value greater than or equal to the detection limit, report the value.

U Indicates compound was analyzed for but not detected. Report the minimum detection limit for the sample with the U (eg. 10U) based on necessary concentration/dilution action. (this is not necessarily the instrument detection limit.) The footnotes should read: U-Compound was analyzed for but not detected. The number is the minimum attainable detection limit for the sample.

J Indicates an estimated value: This flag is used either when estimating a concentration for tentatively identified compounds where a 1:1 response is assumed or when the mass spectral data indicated the presence of a compound that meets the identification criteria but the result is less than the specified detection limit but greater than zero (eg 10J). If limit of detection is 10 ug/L and a concentration of 3ug/L is calculated, report as 3J.

C This flag applies to pesticide parameters where the identification has been confirmed by GC/MS. Single component pesticides > or = 10 ng/ul in the final extract should be confirmed by GC/MS.

B This flag is used when analyte is found in the blank as well as sample. It indicates possible/probable blank contamination and warns the data user to take appropriate action.

S Matrix spiked compound.

(*) No Percent Moisture Required.

ORGANICS ANALYSIS DATA SHEET
(Page 1)

Sample Number: 32398-20

Laboratory Name: S-CUBED
Lab Sample ID No: 175V011 (VOA)
Sample Matrix: ~~SOIL~~ WATER
Data Release Authorized By: AVG

Case No: SAS3239B
QC Report No: N.R
Contract No: 68-01-7261
Date Sample Received: 09-15-87

VOLATILE COMPOUNDS
Concentration: Low (Medium) (Circle One)
Date Extracted/Prepared: 09-17-87
Date Analyzed: 09-17-87
Conc/Dil Factor: 0.02 pH: N.R
Percent Moisture (Not Decanted): N.R *

CAS Number		ug/l or ug/kg (Circle One)	CAS Number		ug/l or ug/kg (Circle One)
74-87-3	CHLOROMETHANE	62000 U	78-87-5	1,2-DICHLOROPROPANE	31000 U
74-83-9	BROMOMETHANE	62000 U	10061-02-6	TRANS-1,3-DICHLOROPROPENE	31000 U
75-01-4	VINYL CHLORIDE	62000 U	79-01-6	TRICHLOROETHENE	31000 U
75-00-3	CHLOROETHANE	62000 U	124-48-1	DIBROMOCHLOROMETHANE	31000 U
75-09-2	METHYLENE CHLORIDE	31000 U	79-00-5	1,1,2-TRICHLOROETHANE	31000 U
67-64-1	ACETONE	62000 U	71-43-2	BENZENE	210000
75-15-0	CARBON DISULFIDE	31000 U	10061-01-5	CIS-1,3-DICHLOROPROPENE	31000 U
75-35-4	1,1-DICHLOROETHENE	31000 U	110-75-8	2-CHLOROETHYLVINYLETHER	62000 U
75-34-3	1,1-DICHLOROETHANE	31000 U	75-25-2	BROMOFORM	31000 U
156-60-5	TRANS-1,2-DICHLOROETHENE	31000 U	591-78-6	2-HEXANONE	62000 U
67-66-3	CHLOROFORM	31000 U	108-10-1	4-METHYL-2-PENTANONE	62000 U
107-06-2	1,2-DICHLOROETHANE	31000 U	127-18-4	TETRACHLOROETHENE	31000 U
78-93-3	2-BUTANONE	150000	79-34-5	1,1,2,2-TETRACHLOROETHANE	31000 U
71-55-6	1,1,1-TRICHLOROETHANE	31000 U	108-88-3	TOLUENE	1400000
56-23-5	CARBON TETRACHLORIDE	31000 U	108-90-7	CHLOROBENZENE	31000 U
108-05-4	VINYL ACETATE	62000 U	100-41-4	ETHYLBENZENE	290000
75-27-4	BROMODICHLOROMETHANE	31000 U	100-42-5	STYRENE	31000 U
				TOTAL XYLENES	1700000

Data Reporting Qualifiers

For reporting results to EPA, the following results qualifier are used. Additional flags or footnotes explaning results are encouraged. However, the definition of each flag must be explicit.

Value If the result is a value greater than or equal to the detection limit, report the value.

U Indicates compound was analyzed for but not detected. Report the minimum detection limit for the sample with the U (eg. 10U) based on necessary concentration/dilution action. (this is not necessarily the instrument detection limit.) The footnotes should read: U-Compound was analyzed for but not detected. The number is the minimum attainable detection limit for the sample.

J Indicates an estimated value: This flag is used either when estimating a concentration for tentatively identified compounds where a 1:1 response is assumed or when the mass spectral data indicated the presence of a compound that meets the identification criteria but the result is less than the specified detection limit but greater than zero (eg 10J). If limit of detection is 10 ug/L and a concentration of 3ug/L is calculated, report as 3J.

C This flag applies to pesticide parameters where the identification has been confirmed by GC/MS. Single component pesticides > or = 10 ng/ul in the final extract should be confirmed by GC/MS.

B This flag is used when analyte is found in the blank as well as sample. It indicates possible/probable blank contamination and warns the data user to take appropriate action.

S Matrix spiked compound.

(*) No Percent Moisture Required.

ORGANICS ANALYSIS DATA SHEET
(Page 1)

Sample Number:
32398-21

Laboratory Name: S-CUBED
Sample ID No: 19SV1111(VOA)
Sample Matrix/Type: SOIL OIL
Person Authorized By:

Case No: SAS32398
QC Report No: N.R
Contract No: 68-01-7261
Date Sample Received: 09-15-87

VOLATILE COMPOUNDS

Concentration: Low (Medium) (Circle One)
Date Extracted/Prepared: 09-19-87
Date Analyzed: 09-19-87
Conc/Dil Factor: 0.01 pH: N.R
Percent Moisture (Not Decanted): N.R

		ug/l or ug/kg (Circle One)	CAS Number		ug/l or ug/kg (Circle One)
	CHLOROMETHANE	120000 U	74-87-5	1,2-DICHLOROPROPANE	61000 U
	BROMOMETHANE	120000 U	10061-02-6	TRANS-1,3-DICHLOROPROPENE	61000 U
	VINYL CHLORIDE	120000 U	79-01-6	TRICHLOROETHENE	61000 U
	CHLOROETHANE	120000 U	124-48-1	DIBROMOCHLOROMETHANE	61000 U
	METHYLENE CHLORIDE	[redacted] B	79-00-5	1,1,2-TRICHLOROETHANE	61000 U
	ACETONE	[redacted] B	71-43-2	BENZENE	97000
	CARBON DISULFIDE	61000 U	10061-01-5	CIS-1,3-DICHLOROPROPENE	61000 U
	1,1-DICHLOROETHENE	61000 U	110-75-8	2-CHLOROETHYLVINYLETHER	120000 U
	1,1-DICHLOROETHANE	61000 U	75-25-2	BROMOFORM	61000 U
	TRANS-1,2-DICHLOROETHENE	61000 U	591-78-6	2-HEXANONE	~~270000~~ 120000 U
	CHLOROFORM	61000 U	108-10-1	4-METHYL-2-PENTANONE	120000 U
	1,2-DICHLOROETHANE	61000 U	127-18-4	TETRACHLOROETHENE	61000 U
	2-BUTANONE	[redacted] J B	79-34-5	1,1,2,2-TETRACHLOROETHANE	61000 U
	1,1,1-TRICHLOROETHANE	61000 U	108-88-3	TOLUENE	980000
	CARBON TETRACHLORIDE	61000 U	108-90-7	CHLOROBENZENE	~~34000 J B~~ 61000 U
	VINYL ACETATE	120000 U	100-41-4	ETHYLBENZENE	500000
	BROMODICHLOROMETHANE	61000 U	100-42-5	STYRENE	61000 U
				TOTAL XYLENES	2900000

Data Reporting Qualifiers

For reporting results to EPA, the following results qualifier are used. Additional flags or footnotes explaning results are encouraged. However, the definition of each flag must be explicit.

U If the result is a value greater than or equal to the detection limit, report the value.

U Indicates compound was analyzed for but not detected. Report the minimum detection limit for the sample with the U (eg. 10U) found as necessary concentration/dilution actions. (this is not necessarily the instrument detection limit.) The footnotes should read: U-Compound was analyzed for but not detected. The number is the minimum attainable detection limit for the sample.

J Indicates an estimated value: This flag is used either when estimating a concentration for tentatively identified compounds where a 1:1 response is assumed or when the mass spectral data indicated the presence of a compound that meets the identification criteria but the result is less than the specified detection limit but greater than zero (eg 10J). If limit of detection is 10 ug/L and a concentration of 3ug/L is calculated, report as 3J.

C This flag applies to pesticide parameters where the identification has been confirmed by GC/MS. Single component pesticides > or = 10 ng/ul in the final extract should be confirmed by GC/MS.

B This flag is used when analyte is found in the blank as well as sample. It indicates possible/probable blank contamination and warns the data user to take appropriate action.

S Matrix spiked compound.

(a) No Percent Moisture Required.

ORGANICS ANALYSIS DATA SHEET
(Page 1)

Sample Number: 3239B-22

Laboratory Name: S-CUBED
Sample ID No: 19SV1131 (VOA)
Sample Matrix: ~~SOIL~~ OIL/WATER
Release Authorized By: AG

Case No: SAS3239B
QC Report No: N.R
Contract No: 68-01-7261
Date Sample Received: 09-15-87

VOLATILE COMPOUNDS

Concentration: Low (Medium) (Circle One)
Date Extracted/Prepared: 09-19-87
Date Analyzed: 09-19-87
Conc/Dil Factor: 0.02 pH: N.R
Percent Moisture (Not Decanted): N.R

		ug/l or (ug/kg) (Circle One)	CAS Number		ug/l or (ug/kg) (Circle One)
	CHLOROMETHANE	61000 U	74-87-5	1,2-DICHLOROPROPANE	30000 U
	BROMOMETHANE	61000 U	10061-02-6	TRANS-1,3-DICHLOROPROPENE	30000 U
	VINYL CHLORIDE	61000 U	79-01-6	TRICHLOROETHENE	30000 U
	CHLOROETHANE	61000 U	124-48-1	DIBROMOCHLOROMETHANE	30000 U
	METHYLENE CHLORIDE	~~57000~~ B	79-00-5	1,1,2-TRICHLOROETHANE	30000 U
	ACETONE	61000 U ~~44000 J B~~	71-43-2	BENZENE	59000
	CARBON DISULFIDE	30000 U	10061-01-5	CIS-1,3-DICHLOROPROPENE	30000 U
	1,1-DICHLOROETHENE	30000 U	110-75-8	2-CHLOROETHYLVINYLETHER	61000 U
	1,1-DICHLOROETHANE	30000 U	75-25-2	BROMOFORM	30000 U
	TRANS-1,2-DICHLOROETHENE	30000 U	591-78-6	2-HEXANONE	61000 U ~~140000 J C~~
	CHLOROFORM	30000 U	108-10-1	4-METHYL-2-PENTANONE	61000 U
	1,2-DICHLOROETHANE	30000 U	127-18-4	TETRACHLOROETHENE	110000
	2-BUTANONE	~~25000 J B~~	79-34-5	1,1,2,2-TETRACHLOROETHANE	30000 U
	1,1,1-TRICHLOROETHANE	58000	108-88-3	TOLUENE	970000
	CARBON TETRACHLORIDE	30000 U	108-90-7	CHLOROBENZENE	30000 U
	VINYL ACETATE	61000 U	100-41-4	ETHYLBENZENE	200000
	BROMODICHLOROMETHANE	30000 U	100-42-5	STYRENE	30000 U
				TOTAL XYLENES	1200000

Data Reporting Qualifiers

For reporting results to EPA, the following results qualifier are used. Additional flags or footnotes explaning results are encouraged. However, the definition of each flag must be explicit.

- If the result is a value greater than or equal to the detection limit, report the value.
- Indicates compound was analyzed for but not detected. Report the minimum detection limit for the sample with the U (eg. 10U) based on necessary concentration/dilution action. (this is not necessarily the instrument detection limit.) The footnotes should read: U-Compound was analyzed for but not detected. The number is the minimum attainable detection limit for the sample.
- Indicates an estimated value: This flag is used either when estimating a concentration for tentatively identified compounds where a 1:1 response is assumed or when the mass spectral data indicated the presence of a compound that meets the identification criteria but the result is less than the specified detection limit but greater than zero (eg 10J). If limit of detection is 10 ug/L and a concentration of 3ug/L is calculated, report as 3J.

C This flag applies to pesticide parameters where the identification has been confirmed by GC/MS. Single component pesticides > or = 10 ng/ul in the final extract should be confirmed by GC/MS.

B This flag is used when analyte is found in the blank as well as sample. It indicates possible/probable blank contamination and warns the data user to take appropriate action.

S Matrix spiked compound.

(a) No Percent Moisture Required.

U.S. ENVIRONMENTAL PROTECTION AGENCY
CLP Sample Management Office
P.O. Box 818 - Alexandria, Virginia 22313
Phone: 703/557-2490 - FTS/557-2490

SAS Number
323715

33 of 57

5-Client

SPECIAL ANALYTICAL SERVICES

Client Request

☐ Regional Transmittal ☐ Telephone Request

A. EPA Region/Client: II / TAT

B. RSCC Representative: Sharon Stiltz

C. Telephone Number: (201) 321-6705

D. Date of Request: 8/13/87

E. Site Name: Tutu Wells - St. Thomas Virgin Islands

Please provide below description of your request for Special Analytical Services under the Contract Laboratory Program. In order to most efficiently obtain laboratory capability for your request, please address the following considerations, if applicable. Incomplete or erroneous information may result in a delay in the processing of your request. Please continue response on additional sheets, or attach supplementary information as needed.

1. General description of analytical service requested:
15 waste oil samples for PCB analysis

2. Definition and number of work units involved (specify whether whole samples or fractions; whether organics or inorganics; whether aqueous or soil and sediments; and whether low, medium or high concentration):
15 waste oil samples for PCB analysis

3. Purpose of analysis (specify whether Superfund (enforcement or remedial action), RCRA, NPDES, etc.):
Emergency Response

TUT 001 0777

4. Estimated date(s) of collection: 5/18/87

5. Estimated date(s) and method of shipment:
5/18/87 Federal Express

6. Number of days analysis and data required after laboratory receipt of samples:
30 days.

7. Analytical protocol required (attach copy if other than a protocol currently used in this program):
Test method -
The Determination of Polychlorinated Biphenyls in Transformer Fluid & Waste Oils - attached.

8. Special technical instructions (if outside protocol requirements, specify compound names, CAS numbers, detection limits, etc.):

Note: any recommended QC requirements must be done even though the method may state "should"

9. Analytical results required (if known, specify format for data sheets, QA/QC reports, Chain-of-Custody documentation, etc.) If not completed, format of results will be left to program discretion.
CLP format, report detection limits

10. Other (use additional sheets or attach supplementary information, as needed):
Submit all documentation associated with the analyses.

11. Name of sampling/shipping contact: Therese Perrette
Phone: (201) 225-6116

12. Data Requirements

Parameter	Detection Limit	Precision Desired (±% or Concentration)
pcl method		

13. QC Requirements

Audits Required	Frequency of Audits	Limits (Percent or Concentration)
per method		

14. Action Required if Limits are Exceeded

contact RSCC

Please return this request to the Sample Management Office as soon as possible to expedite processing of your request for special analytical services. Should you have any questions or need any assistance, please contact your Regional representative at the Sample Management Office.

RECORD OF COMMUNICATION

☐ OTHER (SPECIFY)

(Record of item checked above)

TO: Leon Lazarus

FROM: Regina Odubo-Sullivan

DATE 10/20/87

TIME 8:30 A.M.

SUBJECT: Inorganic Data Packages for Quality Assurance Review

SUMMARY OF COMMUNICATION

Attached are the following CLP Inorganic Data Packages to be reviewed for Quality Assurance:

SITE	CASE #/ SAS #	LABORATORY	ANALYSIS/ MATRIX	NUMBER OF SAMPLES	BLANK NUMBER(S)	DUPLICATE NUMBER(S)
Fibers Pub.Well R3/Oversite	7948/ 3255B	Weyerhaeuser	SAS-TDS Water	6	None	3225B-002 3225B-002A
CIC R3/RI	3175B	EMSI	SAS-Pest. Air	12* *Total of 13 samples sent. 1 sample used for MS/MSD	3175B-311(FB) 3175B-312(FB) 3175B-313(FB)	None
Myers R2/RI	3022B	Cenref	SAS-Pest/PCBs Fish	32* *33 samples sent. Sample #15 lost during extraction.	None	3022B-26 3022B-31 3022B-27 3022B-32 3022B-29 3022B-33
S-Area LF. Fleming/Enf.	3266B	Triangle	SAS-TCDD's Water	2	None	3266B-1 3266B-2
Vineland R2/RI	3097B	RMAL	SAS-Perm.& Atterberg Soil	4	None	None
Sossett LF.	3086B	SAI	SAS-Soil Gas VOA's Only Soil	6	3086B-6(FB)	3086B-4 3086B-5
Putu Wells TAT/ER	7923/ 3239B	S-Cubed	SAS-PCB's/VOA's Water Oil Oil/Water	11 7 4	None	None

RECEIVED [illegible] SAS BRANCH

CONCLUSIONS, ACTION TAKEN OR REQUIRED

INFORMATION COPIES TO: File

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EPA Form 1900-4 (7-72) REPLACES EPA HQ FORM 5300-8 WHICH MAY BE USED UNTIL SUPPLY IS EXHAUSTED.

STANDARD OPERATING PROCEDURES

Title: APPENDIX A - CHECK LIST AND REPORT FORM.

Date:
Number:
Revision: 0

A.1 This section must be completed by the Surveillance and Monitoring Section.

A.1.1 Project Name/Site: Tutu wells

A.1.2 Contract No. 68-01-7261 Case No. 3239B

A.1.3 Objective of Study (Specify data used) TAT / Emergency Response

Please contact ESCO for Acct # 8TFA02.PUID

A.1.4 Name of Analytical Laboratory 1: S-CUBED

A.1.4.1 Sample Matrix: Water ✓ Soil/Sediment _____

Other (Describe) Oil

A.1.4.2 Concentration Requested: Low ✓ Medium _____

A.1.4.3 Sample Nos.: 3239S-1 — 22

A.1.5 Name of Analytical Laboratory 2: _____

A.1.5.1 Sample Matrix: Water _____ Soil/Sediment _____

Other (Describe) _____

A.1.5.2 Concentration Requested: Low _____ Medium _____

A.1.5.3 Sample Nos.: _____

A.1.6 Name of Laboratory 3: _____

A.1.6.1 Sample Matrix: Water _____ Soil/Sediment _____

Other (Describe) _____

A.1.6.2 Concentration Requested: Low _____ Medium _____

A.1.6.3 Sample Nos.: _____

STANDARD OPERATING PROCEDURE

DR Review

Date:

Number: HW-4

Revision: ~~2~~ 3

Title: Attachment 1 - CLP Data Assessment Checklist (GC and GC/MS Analyses)

SURVEILLANCE AND MONITORING BRANCH REVIEW

Project Name/Site: 7923/SAS3239B

Case Number: ~~68-01-7261~~ Tutu Wells.

Type Investigation (Circle One): Remedial Site Other TAT/ Emergency Response

Contract No.: 68-01-7261

Laboratory: S-Cubed

Sample Identification Numbers:

Aqueous: 3239B-1, B-2, B-8, B-13, B-14, B17, B-18 and B-19

Water/oil: 3239B-11, B-12, B-22

~~Soil/Sediment~~ Oil: 3239B-3 thru ~~B-7~~, B-9, B-10, B-15, B-16, B-20, and B-21

Superfund Account No.: 8TFA02PU1D

Comments:

STANDARD OPERATING PROCEDURE

Date:
Number: HW-4
Revision: ~~2~~ 2

Title: Attachment 2 - CLP Data Assessment Checklist (GC and GC/MS Analysis) - [redacted] REVIEW DR

[redacted] MONITORING MANAGEMENT BRANCH REVIEW

PART I: ~~Contractor and Preliminary Review~~

	YES	NO	N/A
1.0 Data Completeness and Deliverables SAS 3239B			
1.1 Are any deliverables missing? PCB/VOA in water, water/oil and oil samples	[ ]	[✓]	[ ]
1.2 Was SMO CCS checklist included with package?	[ ]	[✓]	[ ]

CONTRACTOR ACTION: If incomplete, list any missing data on the Missing Data Tracking Form (Attachment 5), and request missing information from laboratory by phone.

I. COVER LETTER/NARRATIVE

2.0 Cover Letter/Case Narrative			
2.1 Is the Narrative or Cover Letter present?	[✓]	[ ]	[ ]
2.2 Are the following items contained in the Narrative or Cover Letter:			
a. Case Number and/or SAS Number	[✓]	[ ]	[ ]
b. Contract Number	[✓]	[ ]	[ ]

II. QC SUMMARY

3.0 Surrogate Percent Recovery Summaries (Form II)			
3.1 Are the Surrogate Percent Recovery Summaries present for each of the following matrix:			
a. Water	[✓]	[ ]	[ ]
~~b. Soil~~ oil VOA only	[✓]	[ ]	[ ]
3.2 Are all the samples listed on the Surrogate Percent Recovery Summaries for each of the following matrix:			
a. Water	[✓]	[ ]	[ ]
b. ~~Soil~~ oil	[ ]	[ ]	[ ]

	YES	NO	N/A
3.3 Were outliers marked correctly with an asterisk?	[ ]		✓
CONTRACTOR ACTION: Circle all outliers in red.			
3.4 Were two or more BN surrogates outside of contract specifications (or one surrogate less than 10% recovery) for any samples?		[ ]	✓
Method Blanks?		[ ]	✓
If yes, were samples reanalyzed?	[ ]		✓
Were blanks reanalyzed?	[ ]		✓

MMB ACTION: If Initial analysis and reanalysis both have 2 or more surrogate recoveries less than contract QC requirements (or one surrogate less than 10%) red-line all the detection limits (u's) and flag all positive data (hits) with a J.

If initial analysis and reanalysis both have two or more surrogate recoveries above contract QC requirements do not red-line detection limits (u's) but flag all positive values with a J.

When two or more surrogates for the blank are below contract QC requirements red-line all positive values, but not detection limits, for the associated samples, if sample surrogates are within or above QC limits; but if two or more sample surrogates are below contract QC limits, red-lined all sample data (Detection limits and positive data).

When two or more surrogates for the blank exceed contract QC requirements, validate sample data considering sample surrogate recoveries alone.

3.5 Were two or more acid surrogates outside of contract specifications (or one surrogate less than 10% recovery) for any samples?		[ ]	✓
Method Blanks?		[ ]	✓
If yes, were samples reanalyzed?	[ ]		✓
Were blanks reanalyzed?	[ ]		✓

MMB ACTION: If initial analysis and reanalysis both have 2 or more surrogate recoveries less than contract QC requirements (or one surrogate less than 10%) red-line all the detection limits (u's) and flag all positive data (hits) with a J.

If initial analysis and reanalysis both have two or more surrogate recoveries above contract QC requirements do not red-line detection limits (u's) but flag all positive values with a J.

When two or more surrogates for the blank are below contract QC requirements red-line all positive values, but not detection limits, for the associated samples, if sample surrogates are within or above QC limits; but if two or more sample surrogates are below contract QC limits, red-lined all sample data (Detection limits and positive data).

When two or more surrogates for the blank exceed contract QC requirements, validate sample data considering sample surrogate recoveries alone.

	YES	NO	N/A
3.6 Was one or more VOA surrogates outside of contract specifications for any samples?	___	[✓]	___
Blanks?	___	[✓]	___
If yes, were samples reanalyzed?	[___]	___	✓
Were blanks reanalyzed?	[___]	___	✓

MMB ACTION: If initial analysis and reanalysis both have one or more surrogate recoveries below contract QC requirements red-line all detection limits (u's) and flag all positive values (hits) with a J.

If initial analysis and reanalysis both have one or more surrogate recoveries above contract QC requirements do not red-line detection limits but flag all positive values with a J.

When one or more surrogate recoveries for the blank are below contract QC requirements red-line all positive values but not the detection limits for the associated samples if sample surrogates are within or above contract QC limits; but if one or more sample surrogate recoveries are below QC limits red-line all data (Detection limits and positive values).

When one or more surrogate recoveries for the blank exceed contract requirement validate data for the associated samples considering sample surrogate recoveries alone.

3.7 Was pesticides/PCB surrogate outside of contract specifications for any samples?	___	[___]	✓
Method Blanks?	___	[___]	✓

MMB ACTION: If recoveries are below contract requirement flag all associated positive results with a J and red-line all detection limits. If the recoveries are above contract requirement do not red-line the detection limits but flag all positive value with a J. However professional judgement should be used to determine whether a high bias exists due to coeluting interferences.

	YES	NO	N/A
5.0 Blanks			
5.1 Is the Reagent Blank Summary present? (Form IV)	[✓]	—	—
5.2 Frequency of Analysis: for the analysis of VOA HSL compounds, has an reagent/method blank been analyzed for each set of samples or every 20 samples of similar matrix (e.g. - water, low soil, medium soil, etc.), whichever is more frequent?	[✓]	—	—
5.3 For VOA's, has an instrument blank been analyzed at least once every 12 hours for each GC/MS system used?	[✓]	—	—
5.4 For B/N/A's and Pesticides/PCB's, has a method blank been extracted and analyzed for each set of samples or every 20 samples of similar matrix and similar extraction technique?			
B/N/A's	[ ]	—	✓
Pesticides/PCB's	[ ]	—	—
5.5 Has the method blank for B/N/As and Pesticides/PCBs been run on the same GC/MS or GC system as the samples?	[ ]	—	✓
6.0 Contamination (Reagent Blank Summary - Form IV)			
6.1. Do any method/instrument/reagent blanks have positive results for: HSL +/or TIC VOA's?	✓	[ ]	—
B/N?	—	[ ]	✓
Acids?	—	[ ]	✓
Pesticides?	—	[ ]	✓
PCBs?	—	[✓]	—
6.2 Do any field/trip blanks have positive results for: HLS and/or TIC VOA's?	—	[ ]	✓
B/N?	—	[ ]	✓
Acids?	—	[ ]	✓
Pesticides?	—	[ ]	✓
PCBs?	—	[ ]	✓

	YES	NO	N/A

CONTRACTOR ACTION: Prepare a list of the samples associated with each of the contaminated and/or missing method blanks (attach a separate sheet).

MMB ACTION: For common ~~VOA~~ blank contaminants found (e.g., methylene chloride, acetone, toluene and 2-butanone), phthalate esters reject (red-line) all associated positive results present at less than 10 times the blank contaminant levels; for all other contaminants reject (red-line) when all associated positive results are present at less than 5 times the blank contaminant levels. Do not reject any values reported with a "U" (detection limit values).

III SAMPLE DATA

9.0 Are the Traffic Report Forms present for all samples? [ ] ✓ ___

CONTRACTOR ACTION: List missing Traffic Reports on Missing Data Tracking Form. (See 1.1)

last SAS form was used.

10.0 Organic Analysis Data (FORM I)

10.1 Are the four (4) Organic Analysis Data Sheets (VOA, BNA, Pesticides and Tentatively Identified Compounds) with completed header information required on each page of Form I, present for each of the following.

a. Samples and/or fractions as appropriate [✓] ___ ___

b. Matrix spikes and matrix spike duplicates [✓] ___ ___

c. Blanks [✓] ___ ___

CONTRACTOR ACTION: List Missing or incomplete Data Sheets on missing Data Tracking Form. (See 1.1)

10.2 Are the VOA/BNA Reconstructed Ion Chromatograms for each sample, the mass spectra for the identified compounds, and the Data System Printouts (Quant. list) included in the sample package for each of the following?

a. Samples and/or fractions as appropriate [✓] ___ ___

b. Matrix spikes and matrix spike duplicates (Mass spectra not required) [✓] ___ ___

c. Blanks [✓] ___ ___

Title: Attachment 1 - CLP Data Assessment Checklist (GC and GC/MS Analysis) Part I: [redacted] DR [redacted] REVIEW

	YES	NO	N/A
10.3 Are the response factors shown in the Quant Lists?	[ ]	✓	

CONTRACTOR ACTION: List Missing or incomplete Reconstructed Ion Chromatograms, mass spectra and Data System printouts on the Missing Data Tracking Form (See 1.1).

10.4 Are the Tentatively Identified Compounds (Form I, Part B) present and include scan number and estimated concentration?	[✓]		

CONTRACTOR ACTION: List missing TICs, Form I on Missing Data Tracking Form (See 1.1).

10.5 Are the lab generated standard mass spectra of the identified compounds for each sample present?			
a. Volatile standard spectra	[✓]		
b. Semi-volatile standard spectra	[ ]		✓

CONTRACTOR ACTION: List missing mass spectra on Missing Data Tracking Form (See 1.1).

11.0 GC/MS Evaluation

11.1 Are the mass spectra for the tentatively identified compounds and associated "best match" spectra included in the sample package for each of the following.			
a. Samples and/or fractions as appropriate	[✓]		
b. Blanks	[✓]		

CONTRACTOR ACTION: If no, list the missing numbers on the Missing Data Tracking Form (See 1.1)

12.0 Holding Times

12.1 Have any holding times from date of collection been exceeded for:

a. Volatiles			
Aqueous: 10 days* from time the lab receives the sample with 24 hours allowed from time of collection to lab receipt.		[✓]	

STANDARD OPERATING PROCEDURE

Title: Attachment 1 - CLP Data Assessment Checklist (GC and GC/MS Analysis) Part I: [redacted] DR [redacted] REVIEW

Date:
Number: HW-4
Revision: 2

	YES	NO	N/A
[redacted] Soil/Sediment: 10 days from time the lab receives the sample with 24 hours allowed from time of collection to lab receipt. *14 days if preserved with HCl (pH<2).	___	[✓]	___
b. NVOA's and Pesticides/PCBs:			
Aqueous (5 days from time of lab receipt to extraction, 40 days after extraction)	___	[___]	✓
[redacted] (10 days from time of lab receipt to extraction, 40 days after extraction)	___	[✓]	___

Allow 24 hours from time of collection to lab receipt.

CONTRACTOR ACTION: List the samples and their respective fractions with exceedances below. (Attach additional sheets if necessary.)

Table of Holding Time Exceedances

Sample	Sample Matrix	Fraction(s)	(See Traffic Report) Date Sampled	Date Lab Received	(See Form I) Date Extracted	(See Form I & Form V) Date Analyzed

NO

MMB ACTION: If these holding times are exceeded, red-line detection limits and flag all positive values with a J.

13.0 Standards Data (GC/MS)

13.1 Are the Reconstructed Ion Chromatograms, Data System Printouts (Quant. list), and work sheet calculations present for the following:

a. Semi-volatiles (initial and continuing calibrations)	[___]	___	✓
b. Volatiles (initial and continuing calibrations)	[✓]	___	___

	YES	NO	N/A
13.2 Are the response factors also present in the Quan List?	[ ]	✓	

CONTRACTOR ACTION: List missing or incomplete RICs, Quant. lists and work sheet calculations on Missing Data Tracking Form (See 1.1).

15.4 Internal Standard Area Summary (Form VIII)

15.4.1 Are the internal standard summary sheets (Form VIII) present and complete with all the required information?

VOA	[ ]	✓	
BNA	[ ]	✓	

CONTRACTOR: List missing or incomplete summary sheets on missing tracking form (see 1.1).

15.4.2 Are the internal standard areas within the upper and lower limits for each sample and blank analyzed under a given continuing calibration?

VOA	[ ]	✓	
BNA	[ ]	✓	

CONTRACTOR: List all the outliers.

Sample #	Internal Std	Area	Lower Limit	Upper Limit

(Attach additional sheets if necessary.)

MMB ACTION: Use professional judgement to determine effect on data. Acceptance or rejection should not be based solely on the internal standard areas but should be determined in conjunction with other QA/QC data.

Title: Attachment 1 - CLP Data Assessment Checklist (GC and GC/MS Analysis) Part I: [redacted] DR [redacted] REVIEW

Date:
Number: HW-4
Revision: 2

	YES	NO	N/A
18.0 GC Evaluation (Form X-PEST)			
18.1 Pesticide/PCB Identification - Are retention times of standard and sample compounds within the calculated retention time windows for the:			
Quantitation Column?	[✓]	___	___
Confirmation Column?	[✓]	___	___

CONTRACTOR ACTION: Circle all outliners in red.

19.0 Package Copies			
19.1 Are all the xeroxing of readable quality?	[✓]	___	___

CONTRACTOR ACTION: If not, list appropriate page numbers on Missing Data Tracking Form (See 1.1).

[redacted]

II QC SUMMARY RESULTS

3.0 Surrogate Spikes			
3.1 Were any transcription/calculation errors found between raw data and Surrogate Per Cent Recovery Form?	___	[✓]	___

MMB ACTION: Make any necessary corrections, and note errors under Conclusions.

5.0 Blanks			
5.1 Chromatography - review the blank raw data - chromatograms, RICs, quan reports or data system printouts and spectra. Is chromatographic performance for each instrument acceptable for:			
VOA's?	[✓]	___	___
B/N & Acids?	[___]	___	___ ✓
Pest/PCB's?	[✓]	___	

	YES	NO	N/A
10.0 GC/MS Evaluation			
10.1 HSL Compounds			
10.1.1 Is the RRT of reported compounds within 0.06 RRT units of the standard RRT?	[✓]	—	—
10.1.2 Are all ions present in the standard mass spectrum at a relative intensity greater than 10% also present in the sample mass spectrum?	[✓]	—	—
10.1.3 Are all ions present in the sample, but not present in the standard accounted for?	[✓]	—	—
10.1.4 Do relative intensities specified above agree within 20% between the sample and standard spectra?	[✓]	—	—
MMB ACTION: Use professional judgment to determine acceptability of data: if it is determined that incorrect ID's were made, all such data should be red-lined and changed to ~~an estimated (J), quantita-tion~~ appropriate detection limit. Ions greater than 10% in the sample spectrum but not present in the standard spectrum must be considered and accounted for.			
10.1.5 Check at least 2 of all positive values. Were any errors found in: Transcriptions?	—	[✓]	—
Calculations?	—	[✓]	—
MMB ACTION: Make any necessary corrections and note errors under Conclusions.			
10.2 Tentative ID - Non-HSL Compounds			
10.2.1 Are all ions present in the reference mass spectrum with a relative intensity greater than 10% present in the sample mass spectrum?	[✓]	—	—
10.2.2 Do relative intensities specified above agree within 20% between the sample and reference spectra?	[✓]	—	—
10.2.3 Are molecular ions present in reference spectrum present in sample spectrum?	[✓]	—	—

	YES	NO	N/A
10.2.4 Are all non-HSL compounds classified as tentatively identified reported with estimated quantitation and detection limits?	[✓]		

MMB ACTION: Use professional judgment to determine acceptability of data. If data is considered to be unacceptable, the tentative ID should be changed to "unknown".

11.0 Holding Times

11.1 Have all associated sample data which have exceeded holding times been red-lined on the data sheet (including detection limits) indicating rejection?	[ ]		✓

MMB ACTION: Make any necessary corrections.

12.0 GC Evaluation

12.1 Do chromatograms and data system printouts confirm retention times, retention time windows, and reported values (Forms IX-PEST 1 and X-PEST 2)?	[ ]		✓
12.2 Do positive identifications have proper dissimilar column analysis?	[✓]		
12.3 Are retention times of standard and sample compounds within the calculated retention times windows for the:			
Quantitation Column?	[✓]		
Confirmation Column?	[✓]		
12.4 If concentration is sufficient, is GC/MS confirmation provided? (C > 10 µg/mL in the extract)	[ ]		✓

MMB ACTION: Reject (red-line) all positive results (meeting quantitation column criteria, but missing confirmation by a second column or GC/MS (if appropriate). Also reject (red-line) all positive results not meeting retention time windows unless associated standard compounds are similarly biased.

	YES	NO	N/A
12.5 Check 10% of all positive values. Were any errors found in:			
Transcriptions?	___	[ ]	___
Calculations?	___	[✓]	___

MMB ACTION: Make any necessary corrections and note errors under Conclusions.

III SAMPLE DATA PACKAGE

8.0 Traffic Report

	YES	NO	N/A
8.1 Do the Traffic Reports indicate any problems with sample receipt, condition of samples or special notations affecting the quality of the data?	___	[✓]	___

MMB ACTION: Use professional judgment in evaluating any effect on the quality of the data.

STANDARD OPERATING PROCEDURE

Date:
Number: HW-4
Revision: 2

Title: Attachment 2 - CLP Data Assessment Checklist (GC and GC/MS Analysis) DR
PART II: MMB Review - [redacted] REVIEW

CASE # 7923/SAS3239B LAB S-CUBED SITE Tutu Well~~s~~

19.0 Conclusions: (NOTE: Reviewers must red-line unacceptable data on sample data (FORM I) sheets; red-line data does not imply the compound is not present). Only the MMB reviewer has the authority to red-line unacceptable data. The letter J indicates an estimated value. In addition to the two definitions stated in the contract it also implies that the analyte is present but the quantitative value contains an unspecified degree of error. If an accurate quantity is desired, resampling/~~analysis~~ and reanalysis is recommended.

19.1 Data Assessment Method blank measures laboratory contamination caused by dirty glassware, etc. In order to be valid, the concentration of an analyte in a sample must be at least 5 or 10 times (depending on the analyte) the concenration of that analyte present in the method blank. The following compounds were red-lined as method blank contamination: methylene chloride in 3239B-12 thru 3239B-22; acetone in 3239B-21 and 2-butanone in 3239B-21 thru 3239B-22.

Identification of compounds are made by comparison of the suspected mass spectrum to the mass spectrum of a standard of the suspected compound. A mass spectrum is a fingerprint of a compound which shows the mass of the compound and the masses of pieces (ions) from it. Compounds reported to be present by the laboratory in which the relative intensities of major ions are not within plus or minus 20% between standard and sample spectra are red-lined as false positive identification(e.g. For an ion abundance of 50% in the standard spectrum, the corresponding sample ion abundance must be between 30 and 70 percent). Red-lined toluene in 3239B-16 as false positive identification.

PCB/oil matrix spike and matrix spike duplicate recoveries were low, 76% and 71.7%. No PCB data was rejected.

19.2 Contract Problems/Non-compliance

Reviewer's Signature: George Karras Date: 01/4/88

Verified By: [signature] Date: 1/5/88

APPENDIX A

REJECTION SUMMARY FORM
(No. of Compounds/No. of Fractions (Samples)

Type of Review: DR Date: 1/4/87 Case #: 7923/3239G

Project: Tutu Wells Lab Name: S-Cubed

Reviewer's Initials: _____ Number of Samples: 11

Analyt s Rejected Due to Exceeding Review Criteria:

	Surrogates	Holding Time	Calibration	Method Blank Contamination	ID	Other	Total # Samples	Total # Rejected/ Total # in all Samples
Acids (15)	NA	→	→	→	→	→	→	→
B/N (50)	NA	→	→	→	→	→	→	→
VOA (35)	%	%		13/10	Y1	NA	11	14/385
PEST (20)	NA	→	→	→	→	→	→	→
PCB (7)	~~NA~~	%	%	%	%	NA	11	0/77
TCDD (1)	NA	→	→	→	→	→	→	→

Analytes Estimated Due to Exceeding Review Criteria for:

Acids (15)								
B/N (50)	NA	NA	→	→	→	→	→	→
VOA (35)								
PEST (20)			→	→	→	→	→	→
PCB (7)								
TCDD (1)								

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TUT 001 0796

REFERENCE NO. 15

WA 648

CDM Federal Programs Corporation

October 31, 1988

Ms. Caroline Kwan
U.S. Environmental Protection Agency
26 Federal Plaza
New York, New York 10278

Contract No.: 68-01-7331
Document No.: T648-C02-EP-CRFX-1

Subject: Overview of the Tutu Texaco Service Station Tank Excavation

Dear Ms. Kwan:

The purpose of this letter is to provide you with our comments on the tank excavation, at the Tutu Texaco service station, St. Thomas, Virgin Islands.

As part of the remodeling operations being performed at the service station, three 4,000 gallon steel underground storage tanks, once containing motor fuel, were excavated from the south end of the station. Three new double-walled steel tanks (two 10,000 and one 6,000 gallon) equipped with leak detection systems were installed at the west end of the station. Upon removal of the old tanks, samples were taken from the underlying soil to determine the extent of contamination on the Texaco station premises.

Based on the results of a soil gas survey conducted at the Texaco station during November 1987, the soil was believed to be extensively contaminated by petroleum hydrocarbons as well as some chlorinated hydrocarbons. Due to this contamination, Texaco chose to treat the soil excavated from both the old and new tank areas using a forced ventilation system to rid the soil of volatile compounds. This is accomplished by piling the excavated soil on top of slotted PVC pipe and withdrawing air through the pipe via a high vacuum pump. Samples from the piles were taken prior to start-up of the ventilation system. The system will be monitored weekly using a HNu photoionization detector at selected points. Upon completion of the treatment according to the Texaco Action Plan cleanup standards, the piles will again be sampled to determine if the soil will be disposed as hazardous waste.

All soil sampling operations conducted at the Texaco station were performed by Lebron Associates, Inc. (Lebron). Construction and operation of the soil venting system was conducted by Groundwater Technology, Inc. and excavation and installation operations was performed by local contractors. All of the contractors were contracted by Texaco. Field work was done on September 7-16, 1988, with 100% field oversight by CDM Federal Programs Corporation (CDM-FPC).

The removal of the three underground tanks from the south end of the station began on Sept. 7, 1988 and was completed by Sept. 9, 1988. Air monitoring was performed continuously during the intrusive activities. The

(JJM1/22) 59 John Street, Eighth Floor New York, NY 10038 212 393-9634

highest readings were obtained when soil surrounding the sides of the tanks was being removed. HNu readings taken at the excavation were 20-30 ppm with peaks as high as 80 ppm at shoulder height during peak intrusive activity. HNu background readings were 0.2 to 1.0 ppm. Benzene levels were also monitored with Draeger tubes. The levels were as high as 1-2 ppm during the peak activity. During excavation, strong odors of petroleum hydrocarbons were detected throughout the site. However, readings were generally at background levels within the clean zones surrounding the exclusion zone. The levels of protection were level D in the clean zone and level C in the exclusion zone during intrusive activities. Level D was observed during non-intrusive activities.

As the soil was being removed from the excavation, it was deposited on top of polyethylene sheeting along the eastern boundry of the site where concurrently the soil ventilation system was being constructed. HNu readings obtained directly above the soil pile surface ranged from 80-150 ppm. Breathing zone readings ranged from 5 to 10 ppm.

Prior to removal of the tanks from the pit, the tanks were first degassed using carbon dioxide. This procedure was done to avoid possible ignition of vapors within the tank during removal operations. The three tanks were removed and placed on flat bed trucks and transported to the Texaco terminal outside of Charlotte Amalie, St. Thomas. The entire removal and transportation of the tanks were monitored by the U.S. Virgin Islands Department of Planning and Natural Resourses (DPNR). Initial investigation of the excavated tanks revealed large holes in one of the tanks (Tank T2). Holes in the remaining two tanks were not readily visible however further investigation is warranted.

Sampling of the excavation was to have commenced on Sept. 9, 1988. However, a storm passed through the island on the evening of Sept. 8 and lasted through the next day. Heavy downpours during the storm caused massive flooding in the area. The heavy drainage from the mountainside had entered the site and eventually filled the entire excavation pit with water overnight. Efforts to divert the drainage away from the excavation via soil berms built around the pit were insufficient. The soil piles had been covered with the plastic sheeting and weathered the storm without any significant damage. Texaco was informed by CDM-FPC that the water contained in the pit had to be pumped out immediately to avoid infiltration through the excavation walls into the groundwater system thus further spreading contamination. CDM-FPC also requested that samples be taken from the pit water prior to its removal. This was agreed to by Texaxo.

Texaco could not get a tanker to the site until Sept. 10. By this time the water level within the pit had dropped approximately 3 feet (total excavation depth was approximately 6.5 feet). Two 55 gallon drums, claimed to be clean by Texaco, were filled with water from the pit to await later sampling. By mid-day, a tanker truck (approximately 4,000 gallons) had arrived from the Texaco terminal and was filled with the pit water. Activity during the day was complicated by the fact that a hurricane warning (Hurricane Gilbert) was in effect for the evening. Due to the increasing severity of the weather, operations were shut down and preparations were made for the storm. The excavation was heavily barracaded, tarped, and bermed.

Activity began again on Sept. 12, 1988. There was considerable damage to

the site due to high winds, however the storm dropped little rain. The site was cleaned up and a third 55 gallon drum was filled with the pit water for later sampling. Two additional tankers were filled, thus emptying the pit. To be conservative due to pit flooding, CDM-FPC requested that soil samples be taken downgradient a minimum of 10 feet from the excavation. Three holes were drilled in the concrete at the south to southwest portion of the excavation which is in the direction of the contaminate plume (downstream) based on the result of the prior soil gas survey.

On September 13-14, soil samples were taken from the excavation pit, three soil samples from downstream locations, four samples from the pit floor at each courner (about a foot of mud was removed from each location prior to sampling) and four samples from the center of each wall face. Also, on September 14, the three drums of pit water were sampled.

The excavation at the new tank area began on September 14. The first 4 feet of soil removed from the new excavation area was used to backfill the old tank area. The remaining excavated soil from the new tank area was piled at the eastern and northern boundries of the station.

Two soil venting piles were sampled on September 15. A three point composite sample (top, middle, and bottom) was taken at each sampling location. Separate vials were filled from each composite point for volatile organics analysis. The sampling plan was originally based on two soil piles along the eastern boundry as indicated during the startup meeting with Texaco. Three samples would be taken from each pile for a total of six samples.

Following the first pile sampling (three samples), it became apparent to Texaco that a third pile would be needed due to the unanticipated quantity of soil removed. CDM-FPC requested that this additional pile also be sampled. Since Lebron only had enough sample bottles for the original six soil pile samples (two piles), CDM-FPC agreed that two of the three remaining samples would be taken from the second pile situated along the eastern boundry of the station which originated from the southeast portion of the new tank area (nearest the old tank area). This area consequently had shown higher concentrations during the soil gas survey. The last sample would be taken from the pile along the northern boundry originating from the northwest end of the new tank area.

Two samples were taken from the second pile on the same day as the first pile. However, the sample from the third soil pile was not taken until the following week. On September 15 the three new tanks were installed. Texaco had inquired about the use of the soil piled at the north (third pile) as backfill for the new tanks, but due to readings of 10-15 ppm on the HNu, Texaco was not able to use the soil. According to the original work plan, clean fill was to be used and this is what was followed.

On September 16, 1988, some of the soil excavated from the new tank area was piled between the two piles along the eastern boundry, thus creating one long pile. Prior to this, there were three distinct piles, two along the eastern boundry and one along the northern boundry. At present, there are two piles with the following dimensions: eastern pile - 105 feet x 17 feet x 5.5 feet, northern pile - 61 feet x 17 feet x 6.5 feet.

Groundwater Technology had planned to use chemicals such as sodium tripolyphosphate and ammonium chloride as nutrients to enhance natural biodegradation in the soil piles. Since this was not part of the EPA approved work plan, Goundwater Technology could not use the nutrients until CDM-FPC received a full chemical breakdown of the nutrient powders and a full process description. At present, they will only vent the piles as agreed to in the approved work plan. The piles will be monitored weekly by Texaco using an HNu until a stable point has been reached (as agreed in the Texaco Action Plan and a letter from DPNR to Texaco). The soil venting is estimated to take 10 weeks. A weekly report will be submitted to the DPNR regarding progress of the soil pile ventilation. When the stable point has been reached, soil samples will be taken and sent to an outside laboratory for analysis to determine the piles ultimate disposal requirements.

In conclusion, based on visual and olfactory observations, it seems apparent that the Tutu Texaco station is a source of the local petroleum contamination and a potential source of groundwater contamination. The sampling results will be available within the next few weeks to better evaluate this site.

Sincerely,

CDM Federal Programs Corporation

Scott Graber
TES III Work Assignment Manager

cc: Robert D.Goltz
Amy Chester, ORC
Francine Lang, DPNR-St. Croix
Jose Font, EPA-CFO
CDM FPC Document Control
CDM FPC NYC File

TUT 001 0801

(JJM1/22)

REFERENCE NO. 16

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CDM Federal Programs Corporation

⇒ EPA 3/3/89

case 3900 I Ser 25

March 6, 1989

Ms. Caroline Kwan
U.S. Environmental Protection Agency
26 Federal Plaza
New York, New York 10278

Project: EPA Contract No. 68-01-7331
Document No: T648-C02-EP-CZUU-1

Subject: CLP Sample Analysis Data Summary
Case No. 3900 I Ser 25
Tutu Wellfield Area
Work Assignment 648

Dear Ms. Kwan:

Enclosed please find the summary CLP analyses results for samples taken in the Tutu Wellfield Area, St. Thomas, U.S. Virgin Islands on September 12 and 15, 1988. The samples were analyzed by Cenref Labs Brighton, Colorado. The identification and location of the three samples are given below:

Sample #	Sample Location
eT-62	Tutu Texaco Service Station - oil/water separator
eE-63	Tutu Esso Service Station - holding tank
eE-64	Tutu Esso Service Station - oil/water separator

We have taken the liberty to limit the list of compounds to include benzenes, substituted benzenes, dichloroethane, dichloroethene, trichloroethane, trichloroethene, tetrachloroethane, tetrachloroethene compounds, toluene, xylene and any other compounds found above detection limits. These compounds (BTEX and chlorinated hydrocarbons) were identified as groundwater contaminants in past EPA sampling events conducted in the Tutu Wellfield Area. Alkanes and related compounds were not included.

It can be seen from the results that toluene, ethylbenzene and xylene were found in all three samples. A number of benzene-containing volatile and extractable compounds were tentatively identified in all three samples. Sample eE-64 from the Esso oil/water separator also contained detectable levels of methylene chloride, 2-butanone, 1,1,1 - trichloroethane, tetrachloroethene and benzene. Copies of the laboratory analysis data sheets for the three samples are attached.

40 Rector Street, 10th Floor New York, NY 10006 212 393-9634

All three of these sampling locations will be resampled later this month due to a break in the chain-of-custody during the original sample shipment.

Should you have any questions regarding these data, please do not hesitate to call me at (212) 393-9634.

Sincerely,

CDM Federal Programs Corporation

Scott Graber
TES III Regional Manager

SG/rw

Attachment

cc: P. Fischetti
J. Claypoole
NYC File
Document Control

(WP8/47)NY-GM0

LAB ANALYSIS DATA SHEETS

CENREF LABS

SAS No. 3900I, Set 25

VOLATILE ORGANIC COMPOUNDS (mg/kg)

Compound:	eT-62	eE-63	eT-64
methylene chloride	25u	250u	57
1,1-dichloroethene	25u	250u	25u
1,1-dichlorethane	25u	250u	25u
1,2-dichloroethene (total)	25u	250u	25u
1,2-dichloroethane	25u	250u	25u
2-butanone	50u	500u	62
1,1,1-trichloroethane	25u	250u	100
trichloroethene	25u	250u	25u
1,1,2-trichloroethane	25u	250u	25u
tetrachloroethene	25u	250u	65
1,1,2,2-tetrachloroethane	25u	250u	25u
benzene	25u	250u	29
toluene	140	1800	2900*
ethylbenzene	400	230	4500*
xylene (total)	160	1600	1900*
Tentatively identified compounds:			
propyl benzene	-	1200J	890J
ethyl methyl benzene	860J	6000J	1600J
C3 substituted benzene	-	2200J	-
C3 substituted benzene	-	1800J	-
trimethyl benzene	370J	8000J	1000J
ethyl methyl benzene	-	1700J	940J
trimethyl benzene	1300J	-	1900J
trimethyl benzene	390J	-	1000J
methyl propyl benzene	470J	1400J	1000J
methyl methyl ethyl benzene	550J	-	1100J
C4 substituted benzene	280J	2000J	760J
C4 substituted benzene	-	1200J	-
C4 substituted benezene	-	950J	-
ethyl dimethyl benzene	440J	-	-
tetramethyl benzene	-	-	680J
ethyl methyl benzene	-	-	940J
tetramethyl benzene	400J	-	-

u - below the detection limit
J - estimated value
* - value from analysis of a diluted aliquot of this sample

TUT 001 0806

EXTRACTABLE ORGANIC COMPOUNDS (mg/kg)

Tentatively identified compounds:	eT-62	eE-63	eT-64
C4 substituted benzene	220J	930J	1400J
C4 substituted benzene	-	620J	-
ethyl dimethyl benzene	-	690J	780J
1-methyl-3-(1-methyl ethyl)-benzene	-	720J	1600J
tetramethyl benzene	-	540J	360J
tetramethyl benzene	-	710J	410J
methyl-propyl benzene	-	-	720J
dihydro-methyl benzene	260J	-	-
dimethyl-(methyl ethyl)-benzene	260J	-	-
methyl naphthalene	-	990J	-
substituted methyl naphthalene	390J	-	290J
dimethyl naphthalene	250J	-	-
dihydro-methyl-indene	-	690J	490J
dihydro-dimethyl-indene	-	-	270J

J - estimated concentration

STANDARD OPERATING PROCEDURE

Page ~~26~~ of ~~31~~

Date: APR 18 1995

Number: HW-3

Revision: 2

Title: Attachment 2 - CLP Data Assessment Checklist: Short Form (GC/MS Analysts)

SURVEILLANCE AND MONITORING BRANCH REVIEW

Project Name/Site: ~~Mather machinery~~. TuTu-Wells.

Case Number: 3900I - Set-25

Type Investigation (Circle One): Remedial Site Other: TES / REM Iovers'gt

Contract No.: 68-01-7465

Laboratory: Centret labs.

Sample Identification Numbers:

Aqueous: 3 (Hi conc.) Oil

BAA097 -098 -099.

Soil/Sediment:

Superfund Account No.:

Comments: None

REJECTION SUMMARY FORM
(No. of Compounds/No. of Fractions (Samples))

SAS 3900.

Type of Review: TOTAL Date: 26 JAN 89 Case #: SET 05

Project: TUTU Lab Name: CENREF

Reviewer's Initials: Qen Number of Samples: 3 oils

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60BO TGO TUT

Analytes Rejected Due to Exceeding Review Criteria:

	Surrogates	Holding Time	Calibration	BLANK Contamination	ID	Other	* Total # Samples	Total # Rejected/ Total # in all Samples
Acids (15)							Ø	—
B/N (50)							Ø	—
VOA (~~35~~ 34)				1 /1			3	1 /102
PEST (~~20~~ 30)			3 /3				3	3 /30
PCB (7)							3	Ø /21
TCDD (1)							Ø	—

Analytes Estimated Due to Exceeding Review Criteria for:

Acids (15)							Ø	—
B/N (50)							Ø	—
VOA (~~35~~ 34)							3	Ø /102
PEST (20)							3	3/30
PCB (7)							3	Ø/21
TCDD (1)							Ø	—

* Includes any trip and field blanks, which are not subject to qualification based on some QC criteria (such as method blank contamination).

STANDARD OPERATING PROCEDURE

Date: Nov. 6, 1987
Number: HW-4
Revision: 3

Title: Attachment 2 - CLP Data Assessment Checklist
(GC and GC/MS Analysis)
PART II: MMB Review - TOTAL REVIEW

CASE # SAS 3900 I SET 25 LAB CENREF SITE TUTU

19.0 Conclusions: (NOTE: Reviewers must "R" unacceptable data on sample data (FORM I) sheets; "R" data does not imply the compound is not present). The letter J indicates an estimated value. In addition to the two definitions stated in the contract it also implies that the analyte is present but the quantitative value contains an unspecified degree of error. If an accurate quantity is desired, resampling/analysis is recommended.

19.1 Data Assessment This case consists of three oils submitted for high concentration VOA and Pesticide/PCB analyses (SAS).

VOA: Various blanks are analyzed to identify contaminants not indigenous to the samples (i.e. contamination added during sampling and/or analysis). Detection of a compound in a sample is considered valid only if its concentration in the sample significantly exceeds its concentration in the associated blank(s). The 2-Butanone result for sample BTA098 was flagged "U" (undetected) due to blank contamination.

19.2 Contract Problems/Non-compliance None

Reviewer's Signature: David E Merchetti Date: 10 JAN 89

Verified By: Paul B Patel Date: 1/13/89

STANDARD OPERATING PROCEDURE

Date: Nov. 6, 1987
Number: HW-4
Revision: 3

Title: Attachment 2 - CLP Data Assessment Checklist
(GC and GC/MS Analysis)
PART II: MMB Review - TOTAL REVIEW

CASE # SAS 3900 I SCT 25 LAB CENREF SITE TUTU

19.0 Conclusions: (NOTE: Reviewers must "R" unacceptable data on sample data (FORM I) sheets; "R" data does not imply the compound is not present). The letter J indicates an estimated value. In addition to the two definitions stated in the contract it also implies that the analyte is present but the quantitative value contains an unspecified degree of error. If an accurate quantity is desired, resampling/analysis is recommended.

19.1 Data Assessment (CONTINUED)

Pesticide/PCB: Calibration QC requirements are established to ensure that the instrument is capable of generating reliable quantitative data. The results for Endosulfan II have been flagged "R" (unusable) in all 3 samples due to calibration compound response below QC minimum.

VOA: The "J" qualifier (which means estimated quantity) on the toluene result for sample BAA097 has been removed by reviewer. No explanation for it was given in the lab's narrative and no deficiencies to justify it were evident in the data.

Reviewer's Signature: David E Meredith Date: 10 JAN 89

Verified By: Carol L. Cates Date: 1/13/89

In Reference to Case No(s):
SAS 3900I set 05

Contract Laboratory Program
REGIONAL/LABORATORY COMMUNICATION SYSTEM
Telephone Record Log

Date of Call: 22NOV 88, 5 DEC 88

Laboratory Name: CENREF

Lab Contact: Karen Kuoppala (303) 659-0497

Region: 2

Regional Contact: David Meredith

Call Initiated By: ___ Laboratory X Region

In reference to data for the following sample number(s):
BAA097, VOA

Summary of Questions/Issues Discussed:
① Explain calculation of conversion factor

Summary of Resolution:
① There was an additional 100 fold dilution, which isn't accomodated by and therefore did not show up on Form I. Calculations are OK when this factor is applied.

David E Meredith 5 DEC 88
Signature Date

Distribution: (1) Lab Copy, (2) Region Copy, (3) SMO Copy

Region 2

ORGANIC REGIONAL DATA ASSESSMENT

CASE NO. SAS 3900I SET 25 SITE TUTU

LABORATORY CENREF NO. OF SAMPLES/ MATRIX 3 O/S

SDG # BAA099 REVIEWER (IF NOT ESD) CDM

SOW# NA (1/88 high concentration) REVIEWER'S NAME David Meredith

DPO: ACTION _____ FYI _____ COMPLETION DATE 10JAN 89

DATA ASSESSMENT SUMMARY

		VOA	BNA	PEST	OTHER
1.	HOLDING TIMES	NA		NA	
2.	GC/MS TUNE/INSTR. PERFORM.	O		O	
3.	CALIBRATIONS	O		O	
4.	BLANKS	O		O	
5.	SURROGATES	O		O	
6.	MATRIX SPIKE/~~DUP~~	O		O	
7.	OTHER QC	—		—	
8.	INTERNAL STANDARDS	O		NA	
9.	COMPOUND IDENTIFICATION	O		O	
10.	SYSTEM PERFORMANCE	O		O	
11.	OVERALL ASSESSMENT	O		O	

O = Data had no problems/or qualified due to minor problems.
M = Data qualified due to major problems.
Z = Data unacceptable.
X = Problems, but do not affect data.

ACTION ITEMS: _____

AREAS OF CONCERN: It would be useful to see larger plots of PCB GC analyses — the larger picture facilitates visual comparison.

NOTABLE PERFORMANCE: _____

695 North Seventh Street
Brighton, Colorado 80601-1559
Telephone 303 659-0497

12 of 53

CenrefLabs

Analytical Chemistry Laboratories

001

October 25, 1988

Case Narrative

SAS : 3900I-Set25,All SAS
SDG No. : BAA097
Region : II
Contract: 68-01-7465

Samples: BAA097,BAA098,BAA098DL,BAA099,CMS--High Concentration Samples for Volatiles Analysis.

BAA097,BAA098,BAA099,CMS21--High Concentration Samples for Extractable Analysis(Pesticides Only).

BAA097,BAA098,BAA099,CMS14--High Concentration Samples for Arochlor/Toxaphene Analysis.

General

Three high concentration samples were analyzed for Volatiles. Three high concentration samples were analyzed for Extractables and Arochlor/Toxaphene. All the samples were determined to consist of one phase only, a WIL phase.

Sample Receiving/Chain of Custody

1. All samples were received in good condition September 22, 1988. The cooler was opened by the U.S. Postal Inspector because the ice had melted. The samples were still sealed and in good condition.

VOAs

1. There is no analytical or contractual holding time for the Volatile analysis (see SMO Memorandum).

2. BAA099 had a low recovery for Toluene-d8. All other surrogate recoveries were inside the advisory Q.C. Limits.

3. The recoveries for the CMS were all inside the Q.C. Limits.

4. All Internal Standard Areas were inside Q.C. Limits.

RECEIVED
OCT 26 1988
S&M BRANCH

VOAs

5. Screening for the volatile analysis was performed on the GC/MS. This generally gives a much better indication of the required dilution than GC/FID screening.

6. Sample BAA098 was analyzed at two different dilutions. The data from both dilutions has been enclosed.

7. The Hewlett-Packard data system does not report spectrum matches for TIC's when the probability of a match is less than one percent. All possible matches have been reported.

Extractables

1. There is no analytical or contractual holding time for the Extractable analysis (see SMO Memorandum).

2. All surrogate recoveries were inside the Q.C. Limits.

3. The recovery of Dieldrin was low, the recovery for Heptachlor was inside the Q.C. Limits.

4. All Internal Standard Areas were inside Q.C. Limits.

5. The samples were analyzed for Pesticides only, as requested. The Semivolatile standards were run and used to quantitate the surrogates. These standards have been included in the data package. The internal standard recoveries were calculated against the Semivolatile standard.

6. The Hewlett-Packard data system does not report spectrum matches for TIC's when the probability of a match is less than one percent. All possible matches have been reported.

7. The chromatograms from the GC/FID screens have been enclosed at the end of the extractables standards package.

Aroclors/Toxaphene

1. There is no analytical or contractual holding time for Aroclors/ Toxaphene.

2. All surrogate recoveries were inside Q.C. Limits.

3. The CMS recovery for Aroclor 1254 was 107%.

4. The method and instrument blanks contained no compounds of interest.

5. The Diol cartridge check was inside the Q.C. Limits.

6. There were no Aroclors/Toxaphene detected in any of the samples. There were a number of unidentified peaks in some of the samples. Pattern comparison chromatograms have been included with these samples for ease of interpretation.

7. The quantitation column was the SPB-5, there was no confirmation required.

8. The Toxaphene was the only multicomponent standard that did not show linearity. The continuing calibrations for Toxaphene were compared to the standard of the same concentration, not an average calibration factor for this reason.

"Release of the data contained in this hardcopy data package and in the computer-readable data submitted on floppy diskette has been authorized by the Laboratory Manager or his designee, as verified by the following signature."

Karen Kuoppala (10-25-88)

Karen Kuoppala, Organic Section Supervisor

Optional Flags used for Reporting GC/MS Data

A - Aldol condensation product. This flag is used for tentatively identified compounds in soil samples when the compound is suspected aldol condensation byproduct of the extraction technique.

M - Analyte has not met the identification criteria, but, in the opinion of the Mass Spectral Interpretation Specialist, the identification is correct.

This flag is used when the mass spectrum of the target analyte does not meet all of the criteria in the contract Task III, but the Mass Spectral Interpretation Specialist feels that the compound is actually present.

Sp- Spike compound.

This flag is used for Matrix Spike results to indicate that the compound was spiked into the sample before analysis.

DL- Diluted

This flag is used for samples analyzed at a secondary dilution.

E- Exceeds calibration range

This flag is used to flag compounds that are present outside the linear calibration range.

USEPA CONTRACT LABORATORY PROGRAM
SAMPLE MANAGEMENT OFFICE
P.O. BOX 818 ALEXANDRIA, VA 22313
703/557-2490 FTS-557-2490

CASE NO:

SAS NO: 3900I (IF APPLICABLE) SET 25

ORGANIC TRAFFIC REPORT

(FOR CLP USE ONLY)

005

TYPE OF ACTIVITY (CIRCLE ONE) ①
SUPERFUND—PA SI ESI (RIFS) RD RA ER
NPLD O&M OTHER _____
NON-SUPERFUND—_____PROGRAM

SAMPLE DESCRIPTION
(ENTER IN BOX A)
1. SURFACE WATER 4. SOIL
2. GROUND WATER 5. SEDIMENT
3. LEACHATE 6. OIL (SAS)
7. WASTE (SAS)

REGION NO: II SAMPLING COMPANY ② COM-FAC
SAMPLER: (NAME) Tom Mazza

SHIP TO: ③ CENREF
695 North 7th St.
Brighton, Colorado
80601
ATTN: Kari Gelok

SAMPLING DATE: ④
BEGIN: 9/12/88 END: 9/16/88
DATE SHIPPED: 9/20/88 CARRIER: USN ⑤
AIRBILL NO: B057341754

DATE REC'D: 9-22-88 ⑥ SDG NO: Begin BAA097 Final BAA099
REC'D BY: Jane DeSanti
LABORATORY CONTRACT NO. 68-01-7465 UNIT PRICE 760 579.00 9-23-88

TRANSFER TO: ⑦ DATE REC'D:
REC'D BY: CONTRACT NO./PRICE:

CLP SAMPLE NUMBER (FROM LABELS)	⑧ SAMPLE DESCRIPTION (FROM BOX 1) 1 2 3 4 5 6 7	⑧ CONCENTRATION L = LOW/MED H = HIGH (SAS)	⑨ RAS ANALYSIS: VOLATILE	BASE/NEUT /ACID	PESTICIDE /PCB's		⑩ SPECIAL HANDLING	⑪ STATION LOCATION	⑫ SAMPLE CONDITION ON RECEIPT	⑬ HIGH CONC. PHASES (CHECK): SOLID	WATER—MIS LIQUID	NON WATER—MIS LIQUID
BAA-097	6	H	X		X			eF-63	sample Tags are photo copies. The custody seals were broken by the US Postal Inspector. The samples themselves were received in good condition. The samples were shipped on 9-20-88 & should have arrived overnight but arrived 9-22-88. Jane DeSanti			
BAA-098	6	H	X		X			eF-64				
BAA-099	6	H	X		X			eT-62				

EPA Form 2075-7 (8-87)

TUT 001 0818

WHITE — SMO COPY PINK — CLIENT COPY WHITE — LAB COPY FOR RETURN TO SMO YELLOW — LAB COPY

REFERENCE NO. 17

U.S. ENVIRONMENTAL PROTECTION AGENCY
Contract Laboratory Program

EXHIBIT

SAMPLE MANAGEMENT OFFICE

MEMORANDUM

006

DATE: July 14, 1988

TO: Labs Analyzing Samples Under SAS No. 3900-I

FROM: Lynn Riddick, SMO ASG LSR

SUBJECT: Questions and Answers On SAS No. 3900-I

Several questions have recently been raised regarding specific items within the Scope of Work for this project. Listed below is a summary of those questions and the answers provided. If you have further questions regarding these answers or other discrepancies/clarifications with the method, please do not hesitate to contact me. Your questions are extremely helpful in correcting deficiencies within the Scope of Work.

Q: Are there any contractual or analytical holding times?

A: No.

Q: Page "EXT D-11" of the SOW, Section 9.1.2.1 refers to a " calibration solution specified in 2.2.3.1", but that Section does not exist.

A: It should refer to a calibration solution specified in Section 8.3.1.

Q: What solvent is to be used for this solution?

A: The solvent used should be methylene chloride.

Q: We tried to use methylene chloride, but we had trouble getting Sulfur to dissolve. What should we do?

A: You should either pre-dissolve the Sulfur or use a smaller amount in solution. Please note it in the narrative if you had to perform either of these steps.

Q: May we use a packed column for the pesticide analysis or must we use the wide bore capillary column?

A: You must use the wide bore capillary column. The method has been written specifically for these columns.

Q: Is Di-N-Butyl (Phthalate) a matrix spike compound? Page "EXT D-5" indicates that it is, however it is not listed on the forms or indicated on page "EXT E-38".

A: No. Di-N-Butyl (Phthalate) is not a matrix spike compound and should not be referenced on page "EXT D-5".

Q: What is the appropriate concentration for the continuing calibration standard? The forms indicate 50 nanagrams, but page "EXT E-31" indicates 80 nanograms.

TUT 001 0820

P.O. Box 818. Alexandria. Virginia 22313. Phone: (703) 557-2490/FTS-8-557-2490

SAMPLE MANAGEMENT OFFICE

A: The correct concentration is 50 nanograms.

Q: Are BNAs and PCBs required in the same run or separate runs for the calibration standards (i.e. may we mix them)?

A: It is up to the lab. You may inject the PCBs separately from the other compounds, but please note it in the narrative if you choose to do so.

Q: Does the Set Number have to go on all the computer printouts?

A: No. We only require that the Set Number and the SAS Number be clearly designated on the Cover Letter of the data package.

Q: Why is the GC FID Screen mandatory?

A: The screen is required to verify that the samples are indeed high concentration. If they screen low or medium, contact SMO immediately, so that we may reschedule them under your RAS contracts.

Q: Should the Control Matrix Spike (CMS) be run per Set or per phase within a Set?

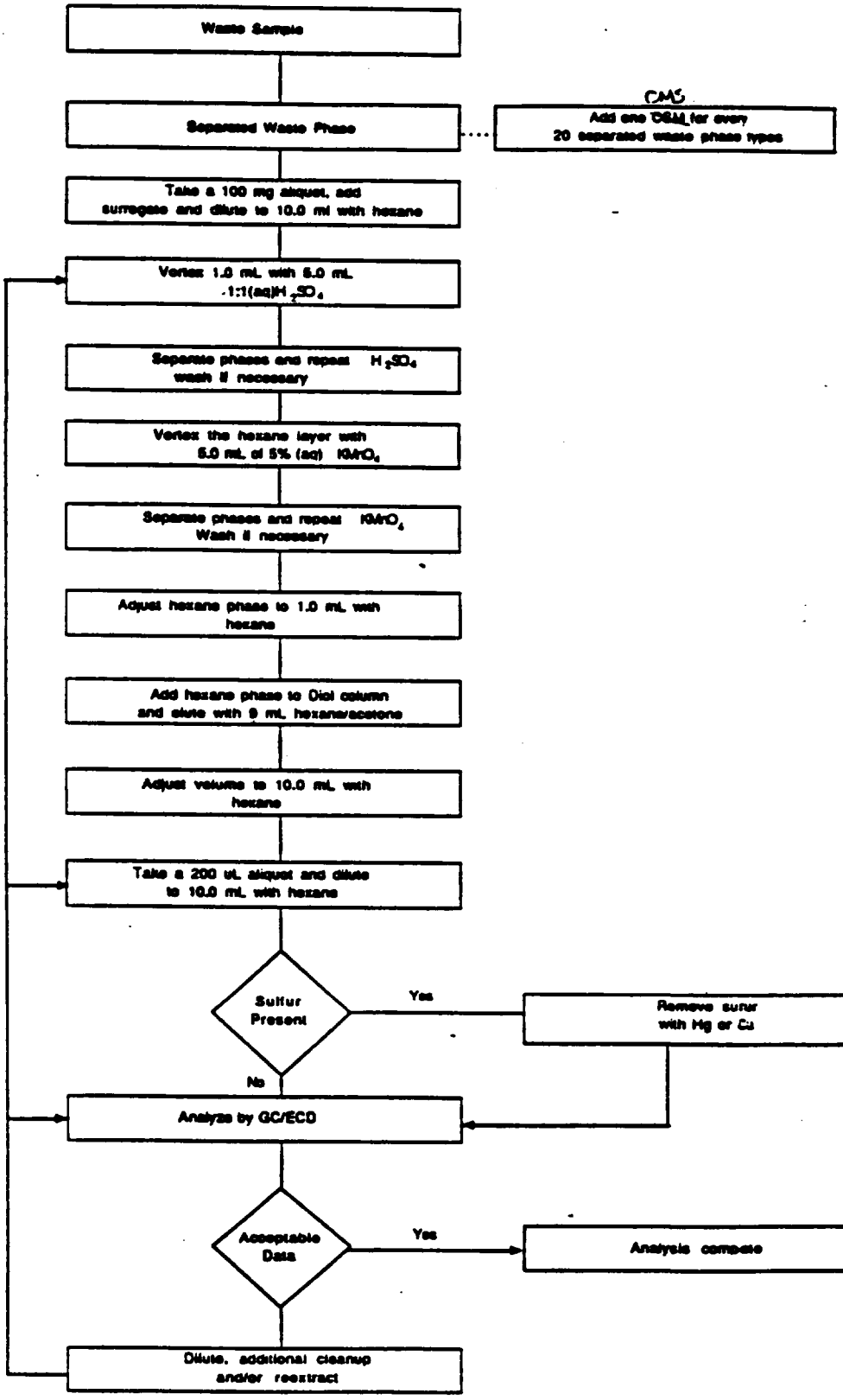
A: The CMS should be run per 20 single phase units within a set, regardless of phase type.

Q: Should blanks be run per phase or per Set?

A: One blank should be run per extraction episode or per 20 single phase units if all 20 are run at once. Again, the type and number of phases is of no significance.

TUT 001 0821

008


Waste Sample
Separated Waste Phase
CMS
Add one DSM for every
20 separated waste phase types
Take a 100 mg aliquot, add
surrogate and dilute to 10.0 ml with hexane
Vortex 1.0 mL with 5.0 mL
1:1(aq)H2SO4
Separate phases and repeat H2SO4
wash if necessary
Vortex the hexane layer with
5.0 mL of 5% (aq) KMnO4
Separate phases and repeat KMnO4
Wash if necessary
Adjust hexane phase to 1.0 mL with
hexane
Add hexane phase to Diol column
and elute with 9 mL hexane/acetone
Adjust volume to 10.0 mL with
hexane
Take a 200 uL aliquot and dilute
to 10.0 mL with hexane
Sulfur
Present
Yes
Remove sulfur
with Hg or Cu
No
Analyze by GC/ECD
Acceptable
Data
Yes
Analysis complete
Dilute, additional cleanup
and/or reextract

009

2HA

HIGH CONCENTRATION VOLATILE SURROGATE RECOVERY

Lab Name: Centrel Labs Contract: 68-01-7465 SAB 2900 I

Lab Code: Centrel Case No.: _____ SAS No.: Set 25 SDG No.: BAA097

	EPA SAMPLE NO.	S1 (TOL) #	S2 (BFB) #	S3 (DCE) #	OTHER	TOT OUT
01	VBLK1	96	89	119		0
02	VBLK2	113	78	118		0
03	VBLK3	99	98	107		0
04	CMS	76	90	90		0
05						
06	BAA097	102	97	116		0
07	BAA098	107	94	106		0
08	BAA099	40X	72	84		1
09						
10	BAA098 DL	104	71	94		0
11						
12						
13						
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23						
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27						
28						
29						
30				-		

	QC LIMITS
S1 (TOL) = Toluene-d8	(50-160)
S2 (BFB) = Bromofluorobenzene	(50-160)
S3 (DCE) = 1,2-Dichloroethane-d4	(50-160)

Column to be used to flag recovery values

D Surrogates diluted out

Method blanks are required to meet the QC limits. For samples and control matrix spikes, the QC limits are advisory.

TUT 001 0823

3HA

HIGH CONCENTRATION VOLATILE CONTROL MATRIX SPIKE RECOVERY

010

Lab Name: Ceneet Labs Contract: 68-01-7465

Lab Code: Ceneef Case No.: _____ SAS No.: 3900I Set25 SDG No.: BAA097

COMPOUND	SPIKE ADDED (mg/Kg)	CMS CONCENTRATION (mg/Kg)	CMS % REC #	QC. LIMITS REC.
1,1-Dichloroethene	25	22	88	60-150
Trichloroethene	25	22	88	60-150
Benzene	25	28	112	60-150
Toluene	25	24	96	60-150
Chlorobenzene	25	30	120	60-150

Column to be used to flag recovery values with an asterisk

* Values outside of QC limits

Spike Recovery: 0 out of 5 outside limits

COMMENTS: _____

TUT 001 0824

011

4HA

HIGH CONCENTRATION VOLATILE METHOD BLANK SUMMARY

Lab Name: Centrec Labs Contract: 68-01-7465 SAS 3900I

Lab Code: Centrec Case No.: _____ SAS No.: Set 25 SDG No.: PHA097

Lab Sample ID: VBLK1 Date Analyzed: 10/5/88

Lab File ID: >A1129 Time Analyzed: 13:54

Instrument ID: #1A

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, AND CMS:

	EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	TIME ANALYZED
01	CMS		>A1130	16:04
02	BAA098		>A1132	17:44
03				
04				
05				
06				
07				
08				
09				
10				
11				
12				
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28				
29				
30				

COMMENTS: _____

OK 10/22 IC

FORM IV HCV

4HA

HIGH CONCENTRATION VOLATILE METHOD BLANK SUMMARY

012

Lab Name: Ceneef labs Contract: 68-01-7465

Lab Code: Ceneef Case No.: _____ SAS No.: 3900I Set25 SDG No.: BAA097

Lab Sample ID: VBLK2 Date Analyzed: 10/7/88

Lab File ID: >A1137 Time Analyzed: 11:07

Instrument ID: #1A

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, AND CMS:

	EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	TIME ANALYZED
01	BAA099		>A1139	12:47
02	BAA098DL		>A1140	13:38
03				
04				
05				
06				
07				
08				
09				
10				
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29				
30				

COMMENTS: _____

TUT 001 0826

4HA

HIGH CONCENTRATION VOLATILE METHOD BLANK SUMMARY

013

Lab Name: Cerrel Labs Contract: 68-01-7465 545 39001

Lab Code: Cerrel Case No.: _____ SAS No.: 5425 SDG No.: PHA077

Lab Sample ID: VBLK3 Date Analyzed: 10/19/88

Lab File ID: 7B1384 Time Analyzed: 11:34

Instrument ID: 2B

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, AND CMS:

	EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	TIME ANALYZED
01	BAA097		7B1386	13:08
02				
03				
04				
05				
06				
07				
08				
09				
10				
11				
12				
13				
14				
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28				
29				
30				

COMMENTS: _____

TUT 001 0827

014

5HA

HIGH CONCENTRATION VOLATILE GC/MS TUNING AND MASS CALIBRATION - BROMOFLUOROBENZENE (BFB)

Lab Name: Ceocef Labs Contract: 68-01-7465

Lab Code: CENREF Case No.: _____ SAS No.: 3900I Set 25 SDG No.: BAA097

Lab File ID: >A1121 BFB Injection Date: 10/04/88

Instrument ID: # 1A BFB Injection Time: 15:16

m/e	ION ABUNDANCE CRITERIA	% RELATIVE ABUNDANCE
50	15.0 - 40.0% of mass 95	24.6
75	30.0 - 60.0% of mass 95	50.3
95	Base peak, 100% relative abundance	100
96	5.0 - 9.0% of mass 95	6.5
173	Less than 2.0% of mass 174	0 (0)1
174	Greater than 50.0% of mass 95	86.7
175	5.0 - 9.0% of mass 174	6.2 (7.2)1
176	Greater than 95.0%, but less than 101.0% of mass 174	84.9 (98.0)1
177	5.0 - 9.0% of mass 176	6.3 (7.4)2

1-Value is % mass 174 2-Value is % mass 176

THIS TUNE APPLIES TO THE FOLLOWING SAMPLES, CMS, BLANKS, AND STANDARDS:

	EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED	TIME ANALYZED
01	VSTD200		>A1122	10/4/88	15:51
02	VSTD150		>A1123	10/4/88	16:46
03	VSTD100		>A1124	10/4/88	17:34
04	VSTD050		>A1125	10/4/88	18:23
05	VSTD020		>A1126	10/4/88	19:12
06					
07					
08					
09					
10					
11					
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20					
21					
22					

TUT 001 0828

FORM V HCV

5HA

015

HIGH CONCENTRATION VOLATILE GC/MS TUNING AND MASS CALIBRATION - BROMOFLUOROBENZENE (BFB)

Lab Name: Centred Labs Contract: 68-01-7465 SAS 3900 I

Lab Code: Centr Case No.: ____ SAS No.: SAS 25 SDG No.: BAA097

Lab File ID: >A1127 BFB Injection Date: 10/05/88

Instrument ID: 2B BFB Injection Time: 11:37

m/e	ION ABUNDANCE CRITERIA	% RELATIVE ABUNDANCE
50	15.0 - 40.0% of mass 95	23.0
75	30.0 - 60.0% of mass 95	51.9
95	Base peak, 100% relative abundance	100
96	5.0 - 9.0% of mass 95	7.1
173	Less than 2.0% of mass 174	0 (0)1
174	Greater than 50.0% of mass 95	87.7
175	5.0 - 9.0% of mass 174	9.2 (8.2)1
176	Greater than 95.0%, but less than 101.0% of mass 174	82.2 (100)1
177	5.0 - 9.0% of mass 176	6.1 (6.9)2

1-Value is % mass 174 2-Value is % mass 176

THIS TUNE APPLIES TO THE FOLLOWING SAMPLES, CMS, BLANKS, AND STANDARDS:

	EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED	TIME ANALYZED
01	VSTD050		>A1128	10/5/88	11:58
02	VBLK1	VBLK1	>A1129	10/5/88	13:54
03	CMS		>A1130	10/5/88	16:04
04	BAA098		>A1132	10/5/88	19:44
05					
06					
07					
08					
09					
10					
11					
12					
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17					
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22					

TUT 001 0829

FORM V HCV OLC 10/22/88 KL 1/88

016

5HA

HIGH CONCENTRATION VOLATILE GC/MS TUNING AND MASS CALIBRATION - BROMOFLUOROBENZENE (BFB)

Lab Name: Ceneret Labs Contract: 68-01-7465

Lab Code: Ceneret Case No.: _____ SAS No.: 3400I Set 25 SDG No.: BAA097

Lab File ID: >A1135 BFB Injection Date: 10/7/88

Instrument ID: #1A BFB Injection Time: 9:57

m/e	ION ABUNDANCE CRITERIA	% RELATIVE ABUNDANCE
50	15.0 - 40.0% of mass 95	22.8
75	30.0 - 60.0% of mass 95	49.3
95	Base peak, 100% relative abundance	100
96	5.0 - 9.0% of mass 95	8.4
173	Less than 2.0% of mass 174	0 (0)1
174	Greater than 50.0% of mass 95	82.1
175	5.0 - 9.0% of mass 174	5.8 (7.0)1
176	Greater than 95.0%, but less than 101.0% of mass 174	82.6 (100.6)1
177	5.0 - 9.0% of mass 176	4.9 (5.9)2

1-Value is % mass 174 2-Value is % mass 176

THIS TUNE APPLIES TO THE FOLLOWING SAMPLES, CMS, BLANKS, AND STANDARDS:

	EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED	TIME ANALYZED
01	VSI0050		>A1136	10/7/88	10:15
02	VBLK2	VBLK2	>A1137	10/7/88	11:07
03	BAA099		>A1139	10/7/88	12:47
04	BAA098DL		>A1140	10/7/88	13:38
05					
06					
07					
08					
09					
10					
11					
12					
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17					
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19					
20					
21					
22					

TUT 001 0830

017

5HA

HIGH CONCENTRATION VOLATILE GC/MS TUNING AND MASS CALIBRATION - BROMOFLUOROBENZENE (BFB)

Lab Name: Centrex Labs Contract: 68-01-7465

Lab Code: Centrex Case No.: ____ SAS No.: SAS 39007 / Set 25 SDG No.: BAA097

Lab File ID: >B1245 BFB Injection Date: 10/3/88

Instrument ID: 2B BFB Injection Time: 8:28

m/e	ION ABUNDANCE CRITERIA	% RELATIVE ABUNDANCE
50	15.0 - 40.0% of mass 95	18.7
75	30.0 - 60.0% of mass 95	41.4
95	Base peak, 100% relative abundance	100.0
96	5.0 - 9.0% of mass 95	8.9
173	Less than 2.0% of mass 174	0.0 (0.0)1
174	Greater than 50.0% of mass 95	92.8
175	5.0 - 9.0% of mass 174	6.8 (7.3)1
176	Greater than 95.0%, but less than 101.0% of mass 174	91.7 (98.8)1
177	5.0 - 9.0% of mass 176	5.8 (6.3)2

1-Value is % mass 174 2-Value is % mass 176

THIS TUNE APPLIES TO THE FOLLOWING SAMPLES, CMS, BLANKS, AND STANDARDS:

	EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED	TIME ANALYZED
01	VSTD200		>B1246	10/3/88	10:11
02	VSTD150		>B1247	"	10:42
03	VSTD100		>B1248	"	11:13
04	VSTD050		>B1249	"	11:44
05	VSTD020		>B1250	"	12:16
06					
07					
08					
09					
10					
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22					

TUT 001 0831

FORM V HCV • OIC 10/12/88

1/88

018

5HA

HIGH CONCENTRATION VOLATILE GC/MS TUNING AND MASS CALIBRATION - BROMOFLUOROBENZENE (BFB)

Lab Name: Centrel Labs Contract: 68-01-7465

Lab Code: Centrel Case No.: _____ SAS No.: SAS 39007/Set 5 SDG No.: BAA097

Lab File ID: >B1378 BFB Injection Date: 10/19/88

Instrument ID: 2B BFB Injection Time: 7:53

m/e	ION ABUNDANCE CRITERIA	% RELATIVE ABUNDANCE
50	15.0 - 40.0% of mass 95	21.4
75	30.0 - 60.0% of mass 95	48.6
95	Base peak, 100% relative abundance	100.0
96	5.0 - 9.0% of mass 95	7.8
173	Less than 2.0% of mass 174	0.0 (0.0)1
174	Greater than 50.0% of mass 95	92.1
175	5.0 - 9.0% of mass 174	8.2 (8.5)1
176	Greater than 95.0%, but less than 101.0% of mass 174	93.2 (96.0)1
177	5.0 - 9.0% of mass 176	5.3 (5.7)2

1-Value is % mass 174 2-Value is % mass 176

THIS TUNE APPLIES TO THE FOLLOWING SAMPLES, CMS, BLANKS, AND STANDARDS:

	EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED	TIME ANALYZED
01	VSTD050		>B1379	10/19/88	8:27
02	VBLK3		>B1384	"	11:34
03	BAA097		>B1386	"	13:08
04					
05					
06					
07					
08					
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22					

TUT 001 0832

FORM V HCV

019

1HA

HIGH CONCENTRATION VOLATILE ANALYSIS DATA SHEET

EPA SAMPLE NO. BAA097

Lab Name: Conrad Labs Contract: 68-01-7465 SAS 3900 I/

Lab Code: Conrd U Case No.: ____ SAS No.: Sd25 SDG No.: BAA097

Phase Type: WI U Lab Sample ID: ____

Phase weight: 1.0 (g) Lab File ID: >B1386

Final Extract Volume: 10.0 (mL) Date Received: 9/22/88

Aliquot Volume: 100 (uL) Date Separated: ____

Conversion Factor: 50 Date Analyzed: 10/19/88

CAS NO.	COMPOUND	CONCENTRATION (mg/Kg)	Q
74-87-3	Chloromethane	500	U
74-83-9	Bromomethane	500	U
75-01-4	Vinyl Chloride	500	U
75-00-3	Chloroethane	500	U
75-09-2	Methylene Chloride	250	U
67-64-1	Acetone	500	U
75-15-0	Carbon Disulfide	250	U
75-35-4	1,1-Dichloroethene	250	U
75-34-3	1,1-Dichloroethane	250	U
540-59-0	1,2-Dichloroethene (total)	250	U
67-66-3	Chloroform	250	U
107-06-2	1,2-Dichloroethane	250	U
78-93-3	2-Butanone	500	U
71-55-6	1,1,1-Trichloroethane	250	U
56-23-5	Carbon Tetrachloride	250	U
108-05-4	Vinyl Acetate	500	U
75-27-4	Bromodichloromethane	250	U
78-87-5	1,2-Dichloropropane	250	U
10061-01-5	cis-1,3-Dichloropropene	250	U
79-01-6	Trichloroethene	250	U
124-48-1	Dibromochloromethane	250	U
79-00-5	1,1,2-Trichloroethane	250	U
71-43-2	Benzene	250	U
10061-02-6	trans-1,3-Dichloropropene	250	U
75-25-2	Bromoform	250	U
108-10-1	4-Methyl-2-Pentanone	500	U
591-78-6	2-Hexanone	500	U
127-18-4	Tetrachloroethene	250	U
79-34-5	1,1,2,2-Tetrachloroethane	250	U
108-88-3	Toluene	1800	~~U~~
108-90-7	Chlorobenzene	250	U
100-41-4	Ethylbenzene	230	
100-42-5	Styrene	250	U
1330-20-7	Xylene (total)	160	

Q1

TUT 001 0833

OK 10/22/88

020

THE
HIGH CONCENTRATION VOLATILE ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.: BAA097

Lab Name: Centrex Labs Contract: 68-01-7465

Lab Code: Centrex Case No.: ____ SAS No.: SAS3900I SDG No.: BAA097

Phase Type: WIL Lab Sample ID: ____

Phase weight: 1.0 (g) Lab File ID: >B1386

Final Extract Volume: 10.0 (mL) Date Received: 9/22/88

Aliquot Volume: 100 (uL) Date Separated: ____

Conversion Factor: 50 Date Analyzed: 10/19/88

Number TICs found: 10

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC. (mg/Kg)	Q
1.	103651	Propyl Benzene	15.26	1200	J
2.		unknown Ethyl Methyl Benzene	15.49	6000	J
3.		unknown C3 Substituted Benzene	15.69	2200	J
4.		unknown C3 Substituted Benzene	16.08	1800	J
5.		unknown trimethyl Benzene	16.48	8000	J
6.		unknown Ethyl Methyl Benzene	17.38	1700	J
7.		unknown Methyl Propyl Benzene	18.02	1400	J
8.		unknown C4 Substituted Benzene	18.21	2000	J
9.		unknown C4 Substituted Benzene	18.64	1200	J
10.		unknown C4 Substituted Benzene	20.87	950	J
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TUT 001 0834

OK 10/22/88 JL

220

1HB

HIGH CONCENTRATION EXTRACTABLE ANALYSIS DATA SHEET

EPA SAMPLE NO.

BAA097

Lab Name: CenRef Labs Contract: 68-01-7465

Lab Code: CENREF Case No.: _____ SAS No.: 3400E-5125 SDG No.: BAA097

Phase Type: WIL Lab Sample ID: _____

Phase weight: 1.1 (g) Lab File ID: SC1100

Final Extract Volume: 1.0 (mL) Date Received: 9-21-88

Injection Volume: 1 (uL) Date Separated: —

Conversion Factor: 20 Date Extracted: 10-6-88

pH: 7.0 Date Analyzed: 10-11-88

CAS NO.	COMPOUND	CONCENTRATION (mg/Kg)	Q
108-95-2	Phenol		
111-44-4	bis(2-Chloroethyl)ether		
95-57-8	2-Chlorophenol		
541-73-1	1,3-Dichlorobenzene		
106-46-7	1,4-Dichlorobenzene		
100-51-6	Benzyl alcohol		
95-50-1	1,2-Dichlorobenzene		
95-48-7	2-Methylphenol		
108-60-1	bis(2-Chloroisopropyl)ether		
106-44-5	4-Methylphenol		
621-64-7	N-Nitroso-di-n-propylamine		
67-72-1	Hexachloroethane		
98-95-3	Nitrobenzene		
78-59-1	Isophorone		
88-75-5	2-Nitrophenol		
105-67-9	2,4-Dimethylphenol		
65-85-0	Benzoic acid		
111-91-1	bis(2-Chloroethoxy)methane		
120-83-2	2,4-Dichlorophenol		
120-82-1	1,2,4-Trichlorobenzene		
91-20-3	Naphthalene		
106-47-8	4-Chloroaniline		
87-68-3	Hexachlorobutadiene		
59-50-7	4-Chloro-3-methylphenol		
91-57-6	2-Methylnaphthalene		
77-47-4	Hexachlorocyclopentadiene		
88-06-2	2,4,6-Trichlorophenol		
95-95-4	2,4,5-Trichlorophenol		
91-58-7	2-Chloronaphthalene		
88-74-4	2-Nitroaniline		
131-11-3	Dimethylphthalate		
208-96-8	Acenaphthylene		
606-20-2	2,6-Dinitrotoluene		

TUT 001 0835

221

1HC

HIGH CONCENTRATION EXTRACTABLE ANALYSIS DATA SHEET

EPA SAMPLE NO.

BAA097

Lab Name: Centref Labs Contract: 68-01-7465

Lab Code: CENREF Case No.: _____ SAS No.: 3900E-S+25 SDG No.: BAA097

Phase Type: WIC Lab Sample ID: _____

Phase weight: 1.1 (g) Lab File ID: >C1100

Final Extract Volume: 1.0 (mL) Date Received: 9-21-88

Injection Volume: 1 (uL) Date Separated: _____

Conversion Factor: 20 Date Extracted: 10-6-88

pH: 7.0 Date Analyzed: 10-11-88

CAS NO.	COMPOUND	CONCENTRATION (mg/Kg)	Q
99-09-2	3-Nitroaniline		
83-32-9	Acenaphthene		
51-28-5	2,4-Dinitrophenol		
100-02-7	4-Nitrophenol		
132-64-9	Dibenzofuran		
121-14-2	2,4-Dinitrotoluene		
84-66-2	Diethylphthalate		
7005-72-3	4-Chlorophenyl-phenylether		
86-73-7	Fluorene		
100-01-6	4-Nitroaniline		
534-52-1	4,6-Dinitro-2-methylphenol		
86-30-6	N-Nitrosodiphenylamine (1)		
101-55-3	4-Bromophenyl-phenylether		
319-84-6	alpha-BHC	200	U
118-74-1	Hexachlorobenzene		
319-85-7	beta-BHC	200	U
87-86-5	Pentachlorophenol		
58-89-9	gamma-BHC (Lindane)	200	U
85-01-8	Phenanthrene		
120-12-7	Anthracene		
319-86-8	delta-BHC	200	U
76-44-8	Heptachlor	200	U
309-00-2	Aldrin	200	U
84-74-2	Di-n-butylphthalate		
206-44-0	Fluoranthene		
1024-57-3	Heptachlor epoxide	200	U
27323-18-8	Monochlorobiphenyl	1000	U
2051-60-7	Dichlorobiphenyl	1000	U
2051-61-8	Trichlorobiphenyl	1000	U
2051-62-9	Tetrachlorobiphenyl	1000	U
129-00-0	Pyrene		
5103-74-2	gamma-Chlordane	200	U

(1) - Cannot be separated from Diphenylamine

TUT 001 0836

OK 10/23/88 KC

222

LHD

HIGH CONCENTRATION EXTRACTABLE ANALYSIS DATA SHEET

EPA SAMPLE NO.

BAA097

Lab Name: Centel Labs Contract: 68-01-7465

Lab Code: CENREF Case No.: _____ SAS No.: 3400I-S,r27 5 SDG No.: BAA097

Phase Type: WIL Lab Sample ID: _____

Phase weight: 1.1 (g) Lab File ID: >C1100

Final Extract Volume: 1.0 (mL) Date Received: 9-21-88

Injection Volume: 1 (uL) Date Separated: -

Conversion Factor: 2 Date Extracted: 10-6-88

pH: 7.0 Date Analyzed: 10-11-88

CAS NO.	COMPOUND	CONCENTRATION (mg/Kg)	Q
959-98-8	Endosulfan I	200	u
5103-71-9	alpha-Chlordane	200	u
25429-29-2	Pentachlorobiphenyl	1000	u
72-55-9	4,4'-DDE	200	u
60-57-1	Dieldrin	200	u
26601-64-9	Hexachlorobiphenyl	1000	u
72-20-8	Endrin	200	u
33213-65-9	Endosulfan II	200	u R
72-54-8	4,4'-DDD	200	u
28655-71-2	Heptachlorobiphenyl	1000	u
85-68-7	Butylbenzylphthalate		
1031-07-8	Endosulfan sulfate	200	u
50-29-3	4,4'-DDT	200	u
53494-70-5	Endrin ketone	200	u
56-55-3	Benzo(a)anthracene		
72-43-5	Methoxychlor	200	u
218-01-9	Chrysene		
55722-26-4	Octachlorobiphenyl	2000	u
91-94-1	3,3'-Dichlorobenzidine		
117-81-7	bis(2-Ethylhexyl)phthalate		
53742-07-7	Nonachlorobiphenyl	2000	u
2051-24-3	Decachlorobiphenyl	2000	u
117-84-0	Di-n-octylphthalate		
205-99-2	Benzo(b)fluoranthene		
207-08-9	Benzo(k)fluoranthene		
50-32-8	Benzo(a)pyrene		
193-39-5	Indeno(1,2,3-cd)pyrene		
53-70-3	Dibenz(a,h)anthracene		
191-24-2	Benzo(g,h,i)perylene		

OK 10/24 LL

TDI 001 0837

1HF

HIGH CONCENTRATION EXTRACTABLE ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.: BAAC97

Lab Name: CenRef Labs Contract: 68-01-7465

Lab Code: CENREF Case No.: _____ SAS No.: 3401-5+25 SDG No.: BAAC97

Phase Type: WL Lab Sample ID: _____

Phase weight: 1.1 (g) Lab File ID: >C1100

Final Extract Volume: 1 (mL) Date Received: 9-21-88

Injection Volume: 1 (uL) Date Separated: _____

Conversion Factor: 20 Date Extracted: 10-6-88

pH: 7.0 Date Analyzed: 10-11-88

Number TICs found: 19

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC. (mg/kg)	Q
1.		Cu Substituted Benzene	9.26	930	JH
2.		Cu Substituted Benzene	9.35	1020	JH
3.		Ethyl dimethyl Benzene	9.39	690	JH
4.	535773	1-methyl-3-(1-methylethyl)-Benzene	9.80	720	JH
5.		tetramethyl Benzene MF=C10H14	10.53	540	JH
6.		tetramethyl-Benzene MF=C10H14	10.61	710	JH
7.		1,6-dimethyl Indene MF=C11H12	11.20	640	JH
8.		unknown Alkane MF=C12H26	12.06	610	JH
9.		methyl Naphthalene MF=C11H10	13.42	990	JH
10.		unknown Alkane MF=C19H40	23.76	650	JH
11.	112955	Eicosane	24.56	790	JH
12.		unknown hydrocarbon	25.05	760	JH
13.		unknown Alkane	25.81	760	JH
14.		unknown Alkane	26.28	1500	JH
15.		unknown Alkane	27.46	2300	JH
16.		unknown Alkane	28.57	1100	JH
17.		unknown Alkane	30.91	1600	JH
18.		unknown Alkane	31.68	1300	JH
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TDT 001 08338

UCE 11 - Cer

048

LHA

HIGH CONCENTRATION VOLATILE ANALYSIS DATA SHEET

EPA SAMPLE NO.

BAA098

Lab Name: Ceref Labs Contract: 68-01-7465 3900I

Lab Code: Ceref Case No.: _____ SAS No.: Set25 SDG No.: BAA097

Phase Type: WIL Lab Sample ID: _____

Phase weight: 1.0 (g) Lab File ID: 2A1132

Final Extract Volume: 10.0 (mL) Date Received: 9/22/88

Aliquot Volume: 10 (uL) Date Separated: _____

Conversion Factor: 5.0 Date Analyzed: 10/5/88

CAS NO.	COMPOUND	CONCENTRATION (mg/Kg)	Q
74-87-3	Chloromethane	50	U
74-83-9	Bromomethane	50	U
75-01-4	Vinyl Chloride	50	U
75-00-3	Chloroethane	50	U
75-09-2	Methylene Chloride	57	
67-64-1	Acetone	50	U
75-15-0	Carbon Disulfide	25	U
75-35-4	1,1-Dichloroethene	25	U
75-34-3	1,1-Dichloroethane	25	U
540-59-0	1,2-Dichloroethene (total)	25	U
67-66-3	Chloroform	25	U
107-06-2	1,2-Dichloroethane	25	U
78-93-3	2-Butanone	102	~~U~~ Dv
71-55-6	1,1,1-Trichloroethane	100	
56-23-5	Carbon Tetrachloride	25	U
108-05-4	Vinyl Acetate	25	U
75-27-4	Bromodichloromethane	25	U
78-87-5	1,2-Dichloropropane	25	U
10061-01-5	cis-1,3-Dichloropropene	25	U
79-01-6	Trichloroethene	25	U
124-48-1	Dibromochloromethane	25	U
79-00-5	1,1,2-Trichloroethane	25	U
71-43-2	Benzene	29	
10061-02-6	trans-1,3-Dichloropropene	25	U
75-25-2	Bromoform	25	U
108-10-1	4-Methyl-2-Pentanone	50	U
591-78-6	2-Hexanone	50	U
127-18-4	Tetrachloroethene	105	
79-34-5	1,1,2,2-Tetrachloroethane	25	U
108-88-3	Toluene	~~1400~~ 2900 *	~~E~~ Dv
108-90-7	Chlorobenzene	25	U
100-41-4	Ethylbenzene	~~3200~~ 4500 *	~~E~~
100-42-5	Styrene	140	
1330-20-7	Xylene (total)	~~4900~~ 1900 *	~~E~~

TUT 001 0839

* Value from analysis of diluted aliquot this sample.

FORM I HCV

OE 10/12/88

1/88

049

THE HIGH CONCENTRATION VOLATILE ANALYSIS DATA SHEET TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.: BAA098

Lab Name: Ceneef Labs Contract: 68-01-7465 3900I

Lab Code: Ceneef Case No.: _____ SAS No.: Set25 SDG No.: BAA097

Phase Type: WIL Lab Sample ID: _____

Phase weight: 1.0 (g) Lab File ID: 7A1132

Final Extract Volume: 10.0 (mL) Date Received: 9/22/88

Aliquot Volume: 10 (uL) Date Separated: _____

Conversion Factor: 5.0 Date Analyzed: 10/5/88

Number TICs found: 10

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC. (mg/Kg)	Q
1.	103651	propyl Benzene	21.17	890	J
2.		ethyl methyl Benzene	21.46	1600	J
3.		trimethyl Benzene	21.59	1000	J
4.		ethyl Methyl Benzene	22.13	940	J
5.		trimethyl Benzene	22.51	1900	J
6.		trimethyl Benzene	23.54	1000	J
7.		methyl propyl Benzene	24.06	1000	J
8.		methyl methyl ethyl Benzene	24.26	1100	J
9.		Cd substituted Benzene	25.16	760	J
10.		tetramethyl Benzene	26.20	1680	J
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TUT 001 0840

10/20/88

1HB

HIGH CONCENTRATION EXTRACTABLE ANALYSIS DATA SHEET

EPA SAMPLE NO.

BAA098

Lab Name: CenRef Labs Contract: 68-01-7465

Lab Code: CENREF Case No.: _____ SAS No.: 3400I-5125 SDG No.: BAA097

Phase Type: WIL Lab Sample ID: _____

Phase weight: 1.0 (g) Lab File ID: >C1101

Final Extract Volume: 1.0 (mL) Date Received: 9-21-88

Injection Volume: 1 (uL) Date Separated: —

Conversion Factor: 20 Date Extracted: 10-6-88

pH: 7.0 Date Analyzed: 10-11-88

CAS NO.	COMPOUND	CONCENTRATION (mg/Kg)	Q
108-95-2	Phenol		
111-44-4	bis(2-Chloroethyl)ether		
95-57-8	2-Chlorophenol		
541-73-1	1,3-Dichlorobenzene		
106-46-7	1,4-Dichlorobenzene		
100-51-6	Benzyl alcohol		
95-50-1	1,2-Dichlorobenzene		
95-48-7	2-Methylphenol		
108-60-1	bis(2-Chloroisopropyl)ether		
106-44-5	4-Methylphenol		
621-64-7	N-Nitroso-di-n-propylamine		
67-72-1	Hexachloroethane		
98-95-3	Nitrobenzene		
78-59-1	Isophorone		
88-75-5	2-Nitrophenol		
105-67-9	2,4-Dimethylphenol		
65-85-0	Benzoic acid		
111-91-1	bis(2-Chloroethoxy)methane		
120-83-2	2,4-Dichlorophenol		
120-82-1	1,2,4-Trichlorobenzene		
91-20-3	Naphthalene		
106-47-8	4-Chloroaniline		
87-68-3	Hexachlorobutadiene		
59-50-7	4-Chloro-3-methylphenol		
91-57-6	2-Methylnaphthalene		
77-47-4	Hexachlorocyclopentadiene		
88-06-2	2,4,6-Trichlorophenol		
95-95-4	2,4,5-Trichlorophenol		
91-58-7	2-Chloronaphthalene		
88-74-4	2-Nitroaniline		
131-11-3	Dimethylphthalate		
208-96-8	Acenaphthylene		
606-20-2	2,6-Dinitrotoluene		

TLT 001 0841

266

LHC

HIGH CONCENTRATION EXTRACTABLE ANALYSIS DATA SHEET

EPA SAMPLE NO.

BAA098

Lab Name: CenRef Labs Contract: 68-01-7465

Lab Code: CENREF Case No.: _____ SAS No.: 3400E-S+25 SDG No.: BAA097

Phase Type: WL Lab Sample ID: _____

Phase weight: 1.0 (g) Lab File ID: >C1101

Final Extract Volume: 1.0 (mL) Date Received: 9-21-88

Injection Volume: 1 (uL) Date Separated: —

Conversion Factor: 20 Date Extracted: 10-6-88

pH: 7.0 Date Analyzed: 10-11-88

CAS NO.	COMPOUND	CONCENTRATION (mg/Kg)	Q
99-09-2	3-Nitroaniline		
83-32-9	Acenaphthene		
51-28-5	2,4-Dinitrophenol		
100-02-7	4-Nitrophenol		
132-64-9	Dibenzofuran		
121-14-2	2,4-Dinitrotoluene		
84-66-2	Diethylphthalate		
7005-72-3	4-Chlorophenyl-phenylether		
86-73-7	Fluorene		
100-01-6	4-Nitroaniline		
534-52-1	4,6-Dinitro-2-methylphenol		
86-30-6	N-Nitrosodiphenylamine (1)		
101-55-3	4-Bromophenyl-phenylether		
319-84-6	alpha-BHC	200	U
118-74-1	Hexachlorobenzene		
319-85-7	beta-BHC	200	U
87-86-5	Pentachlorophenol		
58-89-9	gamma-BHC (Lindane)	200	U
85-01-8	Phenanthrene		
120-12-7	Anthracene		
319-86-8	delta-BHC	200	U
76-44-8	Heptachlor	200	U
309-00-2	Aldrin	200	U
84-74-2	Di-n-butylphthalate		
206-44-0	Fluoranthene		
1024-57-3	Heptachlor epoxide	200	U
27323-18-8	Monochlorobiphenyl	1000	U
2051-60-7	Dichlorobiphenyl	1000	U
2051-61-8	Trichlorobiphenyl	1000	U
2051-62-9	Tetrachlorobiphenyl	1000	U
129-00-0	Pyrene		
5103-74-2	gamma-Chlordane	200	U

(1) - Cannot be separated from Diphenylamine

TUT 001 0842

OK 10/27/88

1HD

HIGH CONCENTRATION EXTRACTABLE ANALYSIS DATA SHEET

267
EPA SAMPLE NO.

BAAD98

Lab Name: Centel Labs Contract: 68-01-7465

Lab Code: CENREF Case No.: _____ SAS No.: 3900I-S-r27 SDG No.: BAAC97

Phase Type: WIL Lab Sample ID: _____

Phase weight: 1.0 (g) Lab File ID: >C1101

Final Extract Volume: 1.0 (mL) Date Received: 9-21-88

Injection Volume: 1 (uL) Date Separated: —

Conversion Factor: 20 Date Extracted: 10-6-88

pH: 7.0 Date Analyzed: 10-11-88

CAS NO.	COMPOUND	CONCENTRATION (mg/Kg)	Q
959-98-8	Endosulfan I	200	U
5103-71-9	alpha-Chlordane	200	U
25429-29-2	Pentachlorobiphenyl	1000	U
72-55-9	4,4'-DDE	200	U
60-57-1	Dieldrin	200	U
26601-64-9	Hexachlorobiphenyl	1000	U
72-20-8	Endrin	200	U
33213-65-9	Endosulfan II	200	~~U~~ R 12
72-54-8	4,4'-DDD	200	U
28655-71-2	Heptachlorobiphenyl	1000	U
85-68-7	Butylbenzylphthalate		
1031-07-8	Endosulfan sulfate	200	U
50-29-3	4,4'-DDT	200	U
53494-70-5	Endrin ketone	200	U
56-55-3	Benzo(a)anthracene		
72-43-5	Methoxychlor	200	U
218-01-9	Chrysene		
55722-26-4	Octachlorobiphenyl	2000	U
91-94-1	3,3'-Dichlorobenzidine		
117-81-7	bis(2-Ethylhexyl)phthalate		
53742-07-7	Nonachlorobiphenyl	2000	U
2051-24-3	Decachlorobiphenyl	2000	U
117-84-0	Di-n-octylphthalate		
205-99-2	Benzo(b)fluoranthene		
207-08-9	Benzo(k)fluoranthene		
50-32-8	Benzo(a)pyrene		
193-39-5	Indeno(1,2,3-cd)pyrene		
53-70-3	Dibenz(a,h)anthracene		
191-24-2	Benzo(g,h,i)perylene		

001 001 0843

OK 10/23/88

LHF

HIGH CONCENTRATION EXTRACTABLE ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

BAA098

Lab Name: CenRef Labs Contract: 68-01-7465

Lab Code: CENREF Case No.: _____ SAS No.: 3401E-S+X SDG No.: BAA097

Phase Type: WIL Lab Sample ID: _____

Phase weight: 1.0 (g) Lab File ID: >C1101

Final Extract Volume: 1 (mL) Date Received: 9-21-88

Injection Volume: 1 (uL) Date Separated: _____

Conversion Factor: 20 Date Extracted: 10-6-88

pH: 7.0 Date Analyzed: 10-11-88

Number TICs found: 16

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC. (mg/Kg)	Q
1.		C4 Substituted Benzene	9.29	1400	J
2.		ethyl-dimethyl Benzene MF=C10H14	9.43	780	J
3.		methyl-propyl Benzene MF=C10H14	9.59	720	J
4.	535773	1-methyl-3-(1-methylethyl)-Benzene	9.84	1400	J
5.	1120214	Undecane	10.19	420	J
6.		Tetramethyl Benzene MF=C10H14	10.56	360	J
7.		Tetramethyl Benzene MF=C10H14	10.66	410	J
8.		dihydro-methyl-Indene MF=C10H12	11.23	490	J
9.	112403	Dodecane	12.11	690	J
10.		Unknown Alkane MF=C13H28	12.36	330	J
11.		unknown	12.83	300	J
12.		dihydro-dimethyl-Indene MF=C11H14	13.11	290	J
13.		unknown hydrocarbon MF=C13H26	13.95	860	J
14.		Substituted methyl Naphthalene	14.28	290	J
15.		unknown Alkane MF=C14H30	15.69	1100	J
16.		unknown cyclic hydrocarbon	16.92	1500	J
17.					
18.					
19.					
20.					
21.					
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TUT 001 0844

OK 10/23 KC

EPA

HIGH CONCENTRATION VOLATILE ANALYSIS DATA SHEET

EPA SAMPLE NO. BAA099

Lab Name: Cenref Labs Contract: 68-01-7465 3900I

Lab Code: Cenref Case No.: _____ SAS No.: set25 SDG No.: BAA097

Phase Type: WIL Lab Sample ID: _____

Phase weight: 1.0 (g) Lab File ID: 7A1139

Final Extract Volume: 10.0 (mL) Date Received: 9/22/88

Aliquot Volume: 10 (uL) Date Separated: _____

Conversion Factor: 5.0 Date Analyzed: 10/7/88

CAS NO.	COMPOUND	CONCENTRATION (mg/Kg)	Q
74-87-3	Chloromethane	50	U
74-83-9	Bromomethane	50	U
75-01-4	Vinyl Chloride	50	U
75-00-3	Chloroethane	50	U
75-09-2	Methylene Chloride	25	U
67-64-1	Acetone	50	U
75-15-0	Carbon Disulfide	25	U
75-35-4	1,1-Dichloroethene	25	U
75-34-3	1,1-Dichloroethane	25	U
540-59-0	1,2-Dichloroethene (total)	25	U
67-66-3	Chloroform	25	U
107-06-2	1,2-Dichloroethane	25	U
73-93-3	2-Butanone	50	U
71-55-6	1,1,1-Trichloroethane	25	U
56-23-5	Carbon Tetrachloride	25	U
108-05-4	Vinyl Acetate	25	U
75-27-4	Bromodichloromethane	25	U
78-87-5	1,2-Dichloropropane	25	U
10061-01-5	cis-1,3-Dichloropropene	25	U
79-01-6	Trichloroethene	25	U
124-48-1	Dibromochloromethane	25	U
79-00-5	1,1,2-Trichloroethane	25	U
71-43-2	Benzene	6	J
10061-02-6	trans-1,3-Dichloropropene	25	U
75-25-2	Bromoform	25	U
108-10-1	4-Methyl-2-Pentanone	50	U
591-78-6	2-Hexanone	50	U
127-18-4	Tetrachloroethene	25	U
79-34-5	1,1,2,2-Tetrachloroethane	25	U
108-88-3	Toluene	140	
108-90-7	Chlorobenzene	25	U
100-41-4	Ethylbenzene	400	
100-42-5	Styrene	16	J
1330-20-7	Xylene (total)	160	

IUI 001 08845

10/12/88 ot

114

THE
HIGH CONCENTRATION VOLATILE ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.: BAA099

Lab Name: Ceimf Labs Contract: 68-01-7465 3400I

Lab Code: Ceimf Case No.: _____ SAS No.: Set25 SDG No.: BAA097

Phase Type: WIL Lab Sample ID: _____

Phase weight: 1.0 (g) Lab File ID: >A1139

Final Extract Volume: 10.0 (mL) Date Received: 9/22/88

Aliquot Volume: 10 (uL) Date Separated: _____

Conversion Factor: 5.0 Date Analyzed: 10/7/88

Number TICs found: 9

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC. (mg/Kg)	Q
1.		ethyl - ethyl Benzene	21.27	860	J
2.		trimethyl Benzene	21.39	370	J
3.		trimethyl Benzene	22.31	1300	J
4.		trimethyl Benzene	23.43	390	J
5.		methyl propyl Benzene	23.97	470	J
6.		methyl methyl ethyl Benzene	24.17	550	J
7.		Ethyl dimethyl Benzene	25.10	470	J
8.		tetramethyl Benzene	26.12	400	J
9.		Cd substituted Benzene	27.17	280	J
10.					
11.					
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13.					
14.					
15.					
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OK
10/12/88

TUT 001 0846

30

1HB

HIGH CONCENTRATION EXTRACTABLE ANALYSIS DATA SHEET

EPA SAMPLE NO.

BAA099

Lab Name: Centek Labs Contract: 68-01-7465

Lab Code: CENREF Case No.: _____ SAS No.: 3900F-S125 SDG No.: BAA097

Phase Type: WIL Lab Sample ID: _____

Phase weight: 1.0 (g) Lab File ID: SC1102

Final Extract Volume: 1.0 (mL) Date Received: 9-21-88

Injection Volume: 1 (uL) Date Separated: _____

Conversion Factor: 20 Date Extracted: 10-6-88

pH: 6.0 Date Analyzed: 10-11-88

CAS NO.	COMPOUND	CONCENTRATION (mg/Kg)	Q
108-95-2	Phenol		
111-44-4	bis(2-Chloroethyl)ether		
95-57-8	2-Chlorophenol		
541-73-1	1,3-Dichlorobenzene		
106-46-7	1,4-Dichlorobenzene		
100-51-6	Benzyl alcohol		
95-50-1	1,2-Dichlorobenzene		
95-48-7	2-Methylphenol		
108-60-1	bis(2-Chloroisopropyl)ether		
106-44-5	4-Methylphenol		
621-64-7	N-Nitroso-di-n-propylamine		
67-72-1	Hexachloroethane		
98-95-3	Nitrobenzene		
78-59-1	Isophorone		
88-75-5	2-Nitrophenol		
105-67-9	2,4-Dimethylphenol		
65-85-0	Benzoic acid		
111-91-1	bis(2-Chloroethoxy)methane		
120-83-2	2,4-Dichlorophenol		
120-82-1	1,2,4-Trichlorobenzene		
91-20-3	Naphthalene		
106-47-8	4-Chloroaniline		
87-68-3	Hexachlorobutadiene		
59-50-7	4-Chloro-3-methylphenol		
91-57-6	2-Methylnaphthalene		
77-47-4	Hexachlorocyclopentadiene		
88-06-2	2,4,6-Trichlorophenol		
95-95-4	2,4,5-Trichlorophenol		
91-58-7	2-Chloronaphthalene		
88-74-4	2-Nitroaniline		
131-11-3	Dimethylphthalate		
208-96-8	Acenaphthylene		
606-20-2	2,6-Dinitrotoluene		

TDF 001 0847

OK 10/23/88 KC

1HC

HIGH CONCENTRATION EXTRACTABLE ANALYSIS DATA SHEET

EPA SAMPLE NO.

BAA099

Lab Name: Cen Ref Labs Contract: 68-01-7465

Lab Code: CENREF Case No.: _____ SAS No.: 3460-S+25 SDG No.: BAA097

Phase Type: WIL Lab Sample ID: _____

Phase weight: 1.0 (g) Lab File ID: >C1102

Final Extract Volume: 1.0 (mL) Date Received: 9-21-88

Injection Volume: 1 (uL) Date Separated: -

Conversion Factor: 20 Date Extracted: 10-6-88

pH: 6.0 Date Analyzed: 10-11-88

CAS NO.	COMPOUND	CONCENTRATION (mg/Kg)	Q
99-09-2	3-Nitroaniline		
83-32-9	Acenaphthene		
51-28-5	2,4-Dinitrophenol		
100-02-7	4-Nitrophenol		
132-64-9	Dibenzofuran		
121-14-2	2,4-Dinitrotoluene		
84-66-2	Diethylphthalate		
7005-72-3	4-Chlorophenyl-phenylether		
86-73-7	Fluorene		
100-01-6	4-Nitroaniline		
534-52-1	4,6-Dinitro-2-methylphenol		
86-30-6	N-Nitrosodiphenylamine (1)		
101-55-3	4-Bromophenyl-phenylether		
319-84-6	alpha-BHC	200	U
118-74-1	Hexachlorobenzene		
319-85-7	beta-BHC	200	U
87-86-5	Pentachlorophenol		
58-89-9	gamma-BHC (Lindane)	200	U
85-01-8	Phenanthrene		
120-12-7	Anthracene		
319-86-8	delta-BHC	200	U
76-44-8	Heptachlor	200	U
309-00-2	Aldrin	200	U
84-74-2	Di-n-butylphthalate		
206-44-0	Fluoranthene		
1024-57-3	Heptachlor epoxide	200	U
27323-18-8	Monochlorobiphenyl	1000	U
2051-60-7	Dichlorobiphenyl	1000	U
2051-61-8	Trichlorobiphenyl	1000	U
2051-62-9	Tetrachlorobiphenyl	1000	U
129-00-0	Pyrene		
5103-74-2	gamma-Chlordane	200	U

(1) - Cannot be separated from Diphenylamine

OK 10/23/88 KL

TUT 001 0848

1HD

HIGH CONCENTRATION EXTRACTABLE ANALYSIS DATA SHEET

EPA SAMPLE NO.: BAA099

Lab Name: Centec Labs Contract: 68-C1-7465

Lab Code: CENREE Case No.: _____ SAS No.: 3900I-Sr2 5 SDG No.: BAA097

Phase Type: WIC Lab Sample ID: _____

Phase weight: 1. (g) Lab File ID: >C1102

Final Extract Volume: 1.0 (mL) Date Received: 9-21-88

Injection Volume: 1 (uL) Date Separated: -

Conversion Factor: 20 Date Extracted: 10-6-88

pH: 6.0 Date Analyzed: 10-11-88

CAS NO.	COMPOUND	CONCENTRATION (mg/Kg)	Q
959-98-8	Endosulfan I	200	U
5103-71-9	alpha-Chlordane	200	U
25429-29-2	Pentachlorobiphenyl	1000	U
72-55-9	4,4'-DDE	200	U
60-57-1	Dieldrin	200	U
26601-64-9	Hexachlorobiphenyl	1000	U
72-20-8	Endrin	200	U
33213-65-9	Endosulfan II	200	U RQ
72-54-8	4,4'-DDD	200	U
28655-71-2	Heptachlorobiphenyl	1000	U
85-68-7	Butylbenzylphthalate		
1031-07-8	Endosulfan sulfate	200	U
50-29-3	4,4'-DDT	200	U
53494-70-5	Endrin ketone	200	U
56-55-3	Benzo(a)anthracene		
72-43-5	Methoxychlor	200	U
218-01-9	Chrysene		
55722-26-4	Octachlorobiphenyl	2000	U
91-94-1	3,3'-Dichlorobenzidine		
117-81-7	bis(2-Ethylhexyl)phthalate		
53742-07-7	Nonachlorobiphenyl	2000	U
2051-24-3	Decachlorobiphenyl	2000	U
117-84-0	Di-n-octylphthalate		
205-99-2	Benzo(b)fluoranthene		
207-08-9	Benzo(k)fluoranthene		
50-32-8	Benzo(a)pyrene		
193-39-5	Indeno(1,2,3-cd)pyrene		
53-70-3	Dibenz(a,h)anthracene		
191-24-2	Benzo(g,h,i)perylene		

JUF 001 08849

DK 10/23/88 LK

1HF

EPA SAMPLE NO.

HIGH CONCENTRATION EXTRACTABLE ANALYSIS DATA SHEET TENTATIVELY IDENTIFIED COMPOUNDS

BAA099

Lab Name: CenRef Labs Contract: 68-01-7465

Lab Code: CENREF Case No.: _____ SAS No.: 3400E-5+25 SDG No.: BAA097

Phase Type: WL Lab Sample ID: _____

Phase weight: 1.0 (g) Lab File ID: >C1102

Final Extract Volume: 1 (mL) Date Received: 9-21-88

Injection Volume: 1 (uL) Date Separated: _____

Conversion Factor: 20 Date Extracted: 10-6-88

pH: 6.0 Date Analyzed: 10-11-88

Number TICs found: 20

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC. (mg/Kg)	Q
1.		C4 substituted Benzene	10.61	220	J
2.		dimethyl-methyl-Benzene	11.20	260	J
3.		dimethyl-(1-methylethyl)-Benzene	12.09	260	J
4.		Substituted Methylnaphthalene	13.94	390	J
5.		dimethyl Naphthalene MF=C12H12	16.14	250	J
6.	629797	Heptadecane	20.44	280	J
7.		Unknown hydrocarbon	20.54	350	J
8.		Unknown Alkene MF=C18H38	21.98	280	J
9.	629795	Nonadecane	23.25	390	J
10.	112955	Eicosane	24.57	500	J
11.		Unknown Hydrocarbon	25.06	540	J
12.		Unknown Hydrocarbon	25.54	300	J
13.		Unknown Alkane MF=C21H44	25.83	500	J
14.		Unknown Alkane	26.24	570	J
15.		Unknown Alkane	26.30	1000	J
16.		Unknown	26.82	570	J
17.		Unknown Alkane	27.48	1400	J
18.		Unknown Alkane	28.59	1200	J
19.		Unknown Alkane	29.67	900	J
20.		Unknown Alkane	30.70	800	J
21.					
22.					
23.					
24.					
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30.					

OK 10/23/88 JC

TUT 001 0850

1HA

HIGH CONCENTRATION VOLATILE ANALYSIS DATA SHEET

EPA SAMPLE NO.: VBLK1

Lab Name: [illegible] Contract: 68-01-7465

Lab Code: [illegible] Case No.: _____ SAS No.: 3900I 5425 SDG No.: BAAC97

Phase Type: _____ Lab Sample ID: VBLK1

Phase weight: 5.0 (g) Lab File ID: 7A1129

Final Extract Volume: 10.0 (mL) Date Received: _____

Aliquot Volume: 100 (uL) Date Separated: _____

Conversion Factor: 0.5 Date Analyzed: 10/5/88

CAS NO.	COMPOUND	CONCENTRATION (mg/Kg)	Q
74-87-3	Chloromethane	5	U
74-83-9	Bromomethane	5	U
75-01-4	Vinyl Chloride	5	U
75-00-3	Chloroethane	5	U
75-09-2	Methylene Chloride	2	U
67-64-1	Acetone	5	U
75-15-0	Carbon Disulfide	2	U
75-35-4	1,1-Dichloroethene	2	U
75-34-3	1,1-Dichloroethane	2	U
540-59-0	1,2-Dichloroethene (total)	2	U
67-66-3	Chloroform	2	U
107-06-2	1,2-Dichloroethane	2	U
78-93-3	2-Butanone	23	
71-55-6	1,1,1-Trichloroethane	2	U
56-23-5	Carbon Tetrachloride	2	U
108-05-4	Vinyl Acetate	2	U
75-27-4	Bromodichloromethane	2	U
78-87-5	1,2-Dichloropropane	2	U
10061-01-5	cis-1,3-Dichloropropene	2	U
79-01-6	Trichloroethene	2	U
124-48-1	Dibromochloromethane	2	U
79-00-5	1,1,2-Trichloroethane	2	U
71-43-2	Benzene	2	U
10061-02-6	trans-1,3-Dichloropropene	2	U
75-25-2	Bromoform	2	U
108-10-1	4-Methyl-2-Pentanone	5	U
591-78-6	2-Hexanone	5	U
127-18-4	Tetrachloroethene	2	U
79-34-5	1,1,2,2-Tetrachloroethane	2	U
108-88-3	Toluene	2	U
108-90-7	Chlorobenzene	2	U
100-41-4	Ethylbenzene	2	U
100-42-5	Styrene	2	U
1330-20-7	Xylene (total)	2	U

LOT 001 0851

OK
10/12/88

1HE

HIGH CONCENTRATION VOLATILE ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO. VBIK1

Lab Name: Centrex Labs Contract: 68-01-7465

Lab Code: Centrex Case No.: _____ SAS No.: 3900I/ Setas SDG No.: ~~BAAC97~~

Phase Type: _____ Lab Sample ID: VBIK1

Phase weight: 1.0 (g) Lab File ID: >A1129

Final Extract Volume: 10.0 (mL) Date Received: _____

Aliquot Volume: 100.0 (uL) Date Separated: _____

Conversion Factor: 0.5 Date Analyzed: 10/5/88

Number TICs found: 0

CAS NUMBER	COMPOUND NAME	RT	EST. CONC. (mg/Kg)	Q
1.	No volatile compounds detected			
2.				
3.				
4.				
5.				
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OK
10/12/88

TUT 001 0852

1HA

HIGH CONCENTRATION VOLATILE ANALYSIS DATA SHEET

EPA SAMPLE NO.

VBLK2

Lab Name: Ceret Labs Contract: 68-01-7465

Lab Code: Ceret Case No.: _____ SAS No.: 3900I Set25 SDG No.: BAAC97

Phase Type: _____ Lab Sample ID: VBLK2

Phase weight: 1.0 (g) Lab File ID: >A1137

Final Extract Volume: 10.0 (mL) Date Received: _____

Aliquot Volume: 100 (uL) Date Separated: _____

Conversion Factor: 0.5 Date Analyzed: 10/7/88

CAS NO.	COMPOUND	CONCENTRATION (mg/Kg)	Q
74-87-3	Chloromethane	5	U
74-83-9	Bromomethane	5	U
75-01-4	Vinyl Chloride	5	U
75-00-3	Chloroethane	5	U
75-09-2	Methylene Chloride	2	U
67-64-1	Acetone	5	U
75-15-0	Carbon Disulfide	2	U
75-35-4	1,1-Dichloroethene	2	U
75-34-3	1,1-Dichloroethane	2	U
540-59-0	1,2-Dichloroethene (total)	2	U
67-66-3	Chloroform	2	U
107-06-2	1,2-Dichloroethane	2	U
78-93-3	2-Butanone	20	
71-55-6	1,1,1-Trichloroethane	2	U
56-23-5	Carbon Tetrachloride	2	U
108-05-4	Vinyl Acetate	2	U
75-27-4	Bromodichloromethane	2	U
78-87-5	1,2-Dichloropropane	2	U
10061-01-5	cis-1,3-Dichloropropene	2	U
79-01-6	Trichloroethene	2	U
124-48-1	Dibromochloromethane	2	U
79-00-5	1,1,2-Trichloroethane	2	U
71-43-2	Benzene	2	U
10061-02-6	trans-1,3-Dichloropropene	2	U
75-25-2	Bromoform	2	U
108-10-1	4-Methyl-2-Pentanone	5	U
591-78-6	2-Hexanone	5	U
127-18-4	Tetrachloroethene	2	U
79-34-5	1,1,2,2-Tetrachloroethane	2	U
108-88-3	Toluene	2	U
108-90-7	Chlorobenzene	2	U
100-41-4	Ethylbenzene	2	U
100-42-5	Styrene	2	U
1330-20-7	Xylene (total)	2	U

IUT 001 0853

10/20/88

THE
HIGH CONCENTRATION VOLATILE ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

VBLK2

Lab Name: Cancet Labs Contract: 68-01-7465 3900I

Lab Code: Cancet Case No.: ____ SAS No.: Set25 SDG No.: BAAC97

Phase Type: ____ Lab Sample ID: VBLK2

Phase weight: 1.0 (g) Lab File ID: >A1137

Final Extract Volume: 10.0 (mL) Date Received: ____

Aliquot Volume: 100 (uL) Date Separated: ____

Conversion Factor: 0.5 Date Analyzed: 10/7/88

Number TICs found: 2

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC. (mg/Kg)	Q
1.		unknown Alkane	23.11	5	J
2.		unknown Alkane	26.56	4	J
3.					
4.					
5.					
6.					
7.					
8.					
9.					
10.					
11.					
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TUT 0054

OK
10/20/88
1/88
GH

204

1HA

HIGH CONCENTRATION VOLATILE ANALYSIS DATA SHEET

EPA SAMPLE NO. YB1K3

Lab Name: Envirosphere Contract: 68-01-7465 SAS 3900I/

Lab Code: Envr Case No.: _____ SAS No.: Set22 SDG No.: [illegible]

Phase Type: _____ Lab Sample ID: _____

Phase weight: 1.0 (g) Lab File ID: >B1384

Final Extract Volume: 10.0 (mL) Date Received: _____

Aliquot Volume: 100.0 (uL) Date Separated: _____

Conversion Factor: 0.5 Date Analyzed: 10/19/88

CAS NO.	COMPOUND	CONCENTRATION (mg/Kg)	Q
74-87-3	Chloromethane	5	U
74-83-9	Bromomethane	5	U
75-01-4	Vinyl Chloride	5	U
75-00-3	Chloroethane	5	U
75-09-2	Methylene Chloride	2	U
67-64-1	Acetone	5	U
75-15-0	Carbon Disulfide	2	U
75-35-4	1,1-Dichloroethene	2	U
75-34-3	1,1-Dichloroethane	2	U
540-59-0	1,2-Dichloroethene (total)	2	U
67-66-3	Chloroform	2	U
107-06-2	1,2-Dichloroethane	2	U
78-93-3	2-Butanone	23	
71-55-6	1,1,1-Trichloroethane	2	U
56-23-5	Carbon Tetrachloride	2	U
108-05-4	Vinyl Acetate	5	U
75-27-4	Bromodichloromethane	2	U
78-87-5	1,2-Dichloropropane	2	U
10061-01-5	cis-1,3-Dichloropropene	2	U
79-01-6	Trichloroethene	2	U
124-48-1	Dibromochloromethane	2	U
79-00-5	1,1,2-Trichloroethane	2	U
71-43-2	Benzene	2	U
10061-02-6	trans-1,3-Dichloropropene	2	U
75-25-2	Bromoform	2	U
108-10-1	4-Methyl-2-Pentanone	5	U
591-78-6	2-Hexanone	5	U
127-18-4	Tetrachloroethene	2	U
79-34-5	1,1,2,2-Tetrachloroethane	2	U
108-88-3	Toluene	2	U
108-90-7	Chlorobenzene	2	U
100-41-4	Ethylbenzene	2	U
100-42-5	Styrene	2	U
1330-20-7	Xylene (total)	2	U

OK 10/22/88 KL

5580 TOO 001

THE
HIGH CONCENTRATION VOLATILE ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO. VBIK3

Lab Name: Envirodyne Labs Contract: 68-01-7465 SAS 3900I

Lab Code: Envrd Case No.: _____ SAS No.: 0122 SDG No.: BHH07

Phase Type: _____ Lab Sample ID: _____

Phase weight: 1.0 (g) Lab File ID: >D1384

Final Extract Volume: 10.0 (mL) Date Received: _____

Aliquot Volume: 100.0 (uL) Date Separated: _____

Conversion Factor: 0.5 Date Analyzed: 10/19/88

Number TICs found: 0

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC. (mg/Kg)	Q
1.		No volatile compounds detected			
2.					
3.					
4.					
5.					
6.					
7.					
8.					
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23.					
24.					
25.					
26.					
27.					
28.					
29.					
30.					

OK 10/22/88 KL

TUT 001 0856

REFERENCE NO. 18

02-8902-43-PA
REV. NO. 1

FINAL DRAFT
PRELIMINARY ASSESSMENT
TUTU ESSO
ST. THOMAS, U.S. VIRGIN ISLANDS

PREPARED UNDER

TECHNICAL DIRECTIVE DOCUMENT NO. 02-8902-43
CONTRACT NO. 68-01-7346

FOR THE

ENVIRONMENTAL SERVICES DIVISION
U.S. ENVIRONMENTAL PROTECTION AGENCY

MARCH 24, 1989

NUS CORPORATION
SUPERFUND DIVISION

SUBMITTED BY:

Diane Trube

DIANE TRUBE
PROJECT MANAGER

Joseph Mayo

JOSEPH MAYO
SITE MANAGER

REVIEWED/APPROVED BY:

Ronald M. Naman

RONALD M. NAMAN
FIT OFFICE MANAGER

TUT 001 0858

02-8902-43-PA
Rev. No 1

POTENTIAL HAZARDOUS WASTE SITE PRELIMINARY ASSESSMENT

PART I: SITE INFORMATION

1. **Site Name/Alias** Tutu Esso

   Street Route 384 (Tutu District)

   City St. Thomas **State** U.S.Virgin Islands **Zip** 08002

2. **County** NA **County Code** NA **Cong. Dist.** NA

3. **EPA ID No.** New Site

4. **Latitude** 18° 20' 25" N **Longitude** 64° 53' 18" W

   USGS Quad. Eastern St. Thomas, U.S. Virgin Islands

5. **Owner** Esso VI Inc. **Tel. No.** (809) 792-2920

   Street GPO Box 4269

   City San Juan **State** Puerto Rico **Zip** 00936

6. **Operator** Danill Bayard **Tel. No.** 809-775-2360

   Street P.O. Box 7441

   City St. Thomas **State** U.S. Virgin Islands **Zip** 00801

7. **Type of Ownership**

   ☒ Private ☐ Federal ☐ State
   ☐ County ☐ Municipal ☐ Unknown ☐ Other _____

8. **Owner/Operator Notification on File**

   ☐ RCRA 3001 **Date** _____ ☐ CERCLA 103c **Date** _____
   ☒ None ☐ Unknown

9. **Permit Information**

Permit	Permit No.	Date Issued	Expiration Date	Comments
None				

10. **Site Status**

    ☒ Active ☐ Inactive ☐ Unknown

11. **Years of Operation** 1969 to Present

12. **Identify the types of waste units (e.g., landfill, surface impoundment, piles, stained soil, above- or below-ground tanks or containers, land treatment, etc.) on site. Initiate as many waste unit numbers as needed to identify all waste sources on site.**

(a) **Waste Management Areas**

Waste Unit No.	Waste Unit Type	Facility Name for Unit
1	Underground Storage Tanks	Waste Oil Underground Storage Tanks

(b) **Other Areas of Concern**

Identify any miscellaneous spills, dumping, etc. on site; describe the materials and identify their locations on site.

No miscellaneous spills, incidents of dumping, etc. were observed on the site during the NUS Corp. Region 2 FIT on-site reconnaissance. It should be noted, however, that an underground gasoline tank has been suspected of leaking on site.

13. **Information available from**

Contact Amy Brochu **Agency** U.S. EPA **Tel. No.** (201) 906-6802

Preparer Joseph Mayo **Agency** NUS Corp. Region 2 FIT **Date** 3/24/89

PART II: WASTE SOURCE INFORMATION

For each of the waste units identified in Part I, complete the following six items.

Waste Unit 1 - Underground Storage Tanks, Waste Oil Underground Storage Tanks

1. **Identify the RCRA status and permit history, if applicable, and the age of the waste unit.**

   There is no known RCRA permit for the underground storage tanks for waste oil. The manager indicated that the tanks were installed in 1969.

2. **Describe the location of the waste unit and identify clearly on the site map.**

   The waste units are located underground below a tire rack inside the garage.

3. **Identify the size or quantity of the waste unit (e.g., area or volume of a landfill or surface impoundment, number and capacity of drums or tanks). Specify the quantity of hazardous substances in the waste unit.**

   The volume of the storage tanks is unknown.

4. **Identify the physical state(s) of the waste type(s) as disposed of in the waste unit. The physical state(s) should be categorized as follows: solid, powder or fines, sludge, slurry, liquid, or gas.**

   The physical state of the waste oil in the tanks is liquid.

5. **Identify specific hazardous substance(s) known or suspected to be present in the waste unit.**

   The waste units contain waste oil from automotive repair and servicing activities. The manager indicated that only waste oil was put in the tanks. Solvents and cleaners are not disposed of in the tanks. Tank sampling, conducted by Cenref Labs and Belgodere and Associates Inc., indicates the presence of toluene, ethylbenzene, and xylene in wastes stored there.

6. **Describe the containment of the waste unit as it relates to contaminant migration via groundwater, surface water, and air.**

   The waste is contained in underground storage tanks. There is no information that indicates that the tanks are leaking; therefore, there is little potential for contaminant migration to air, groundwater, or surface water. The manager indicated that the tanks are periodically emptied by ESSO Corp. and the waste is shipped off St. Thomas for disposal.

Ref. Nos. 1, 18, 19, 20, 21, 22

PART III: HAZARD ASSESSMENT

GROUNDWATER ROUTE

1. **Describe the likelihood of a release of contaminant(s) to the groundwater as follows: observed, alleged, potential, or none. Identify the contaminant(s) detected or suspected, and provide a rationale for attributing the contaminant(s) to the facility.**

   There is a potential for contaminants to be released from the waste oil storage tanks to groundwater. The manager of the facility indicated that only waste oil was stored in the tanks. Cleaners and solvents are not put into the tanks. Small quantities of contaminants may have been introduced into the oil in the normal course of its use as motor oil. Tank sampling indicates the presence of toluene, ethylbenzene, and xylene in wastes stored on site in the tanks; however, these results are questionable due to chain-of-custody problems. A soil gas vapor study also confirmed chlorinated hydrocarbons on site.

   Ref. Nos. 1, 21, 22

2. **Describe the aquifer of concern; include information such as depth, thickness, geologic composition, permeability, overlying strata, confining layers, interconnections, discontinuities, depth to water table, groundwater flow direction.**

   The rock units of St. Thomas and St. John are divided into three major groups: the Water Island Formation, the Virgin Island Group, and an unnamed group of dioritic plutons. The Water Island Formation, which is late lower Cretaceous in age, consists of keratophyre and spillates. The Virgin Island Group, which is probably early Cretaceous or Albian in age, consists of andesitic-pyroclastic rocks and sedimentary formations. The Virgin Island Group is divided into four formations: the Louisenhoj Formation, which consists of augite-andesite breccia, tuff, and conglomerate; the Outer Brass Limestone, which consists of partially silicified-tuffaceous-radiolarian-limestone; the Tutu Formation, which consists of tuffaceous wacke, including megabreccia near the base and limestone near the top; and the Hans Lollik Formation, which may be Eocene in age and consists of augite-andesite breccia and tuff. The final group is made up of one or more dioritic plutons. These unnamed dikes and plugs of quartz-andesine-hornblende porphyry are Upper Cretaceous and Lower Tertiary in age. Alluvian deposits are quarternary in age.

   The Water Island Formation, which consists of 95 percent volcanic flow breccias, was probably extruded on a relatively level ocean floor. The absence of terrigenous sediments from this formation indicates that there were no emergent islands present in the area at the time of extrusion. Emergent islands would have served as a source of weather sediments or detritus, which are not present in this formation. There is evidence that sea floor subsidence occurred during the greater part of the accumulation of this formation. However, the subsidence was not rapid enough to maintain a constant water level, thereby causing explosive eruptions near the top of the formation. Regional uplift occurred near the end of the Water Island time.

   The Louisenhoj Formation of the Virgin Island Group unconformably overlies the Water Island Formation and crops out on about half of the land area on St. Thomas. Pillsbury Sound between St. Thomas and St. John was the origin of this formation. Evidence of this center is based upon the coarseness of volcanic ejecta in the formation in nearby eastern St. Thomas and western St. John. Material is less coarse and tuffs are more predominant as one moves further east and west away from the center or origin. This augite-andesite formation ranges in thickness from 4,000 to 13,000 feet. In certain areas of St. Thomas and St. John conglomerates are interbedded with andesitic rocks at the base of this formation. The depositional environment of this conglomerate varies from location to location throughout this formation.

   The Outer Brass Formation of the Virgin Island Group is mostly siliceous limestone which overlies the Louisenhoj Formation. This limestone formation is an offshore deposit formed by radiolarian and foraminiferal remains including a minor amount of tuff. Thicknesses are known to be at least 600 feet

TUT 001 0962

Overlying the Outer Brass Formation is the Tutu Formation. The Tutu Formation is fine- to coarse-grained volcanic wackes, which are termed flysch. This formation is derived from eroding sediments from the Louisenhoj andesites. Exposed thicknesses are known to be as much as 6000 feet. Within this formation are a megabreccia lithofacies with an average thickness of 30 feet and a limestone member with a thickness up to 300 feet.

The Hans Lollik Formation, which consists of at least 10,000 feet of augite-andesite pyroclastic rocks, crops out on Little Hans Lollik Island. Dioritic plutons are located in Pillsbury Sound between St. Thomas and St. John; in the narrows, between St. John and the British Virgin Islands; and south of St. Thomas. The exact delineation of these plutons is uncertain. Throughout the islands isolated dikes of quartz-andesine porphyries, andesine-hornblende porphyries, lamprophyres, breccias, and pegmatites appear.

Folding occurred after the deposition of the Virgin Island Group. Rocks were tilted to form a northward-dipping homocline, which is cut by sets of faults trending N 45°W, N 55°E, and north. Well-defined joint sets parallel each of the major fault trends. Dips range from 15° to 90° with the average being 40°. Strike-slip faults have horizontal offsets of less than 1 mile. Two major strike-slip graben structures or fault systems exist. The first passes through Redhook, St. Thomas and the eastern tip of Lovango Cay. The second crosses St. John, from Contact Point on the southwest to Brown's Bay on the northeast.

Most recent Pleistocene to Holocene alluvial deposits occurred primarily in coastal embayments. However, a narrow bank of alluvium extends up to Turpentine Run on the east end of the island. Most of these deposits are composed of silt, clay, and thin, discontinuous beds of sand and gravel. Maximum thickness of these is 50 feet.

Groundwater movement is limited to openings and joints along fault zones. Regional geologic information is insufficient to determine whether these fractures and fault zones are present in all of the above formations; however, for this report it is assumed that the fractures and fault zones are present in all of the formations. The valleys on the island are the result of weak zones caused by faulting and jointing and are primary recharge areas for groundwater. Alluvial deposits have a high porosity but low permeability, making this aquifer unfavorable for groundwater production. In coastal embankments throughout the island, saltwater intrusion is widespread in alluvial deposits. In most areas, alluvial deposits are interconnected with bedrock and act to recharge precipitation to the underlying bedrock.

The direction of groundwater flow in the Turpentine Run Basin Aquifer is south-southeast which is generally along the direction of flow of Turpentine Run. Depth to groundwater in the aquifer ranges from 5 to 60 feet, and the altitude of the water levels ranges from 1 to 209 feet above mean sea level.

Ref. Nos. 8, 10, 14.

3. **Is a designated sole source aquifer within 3 miles of the site?**

No sole source aquifer, as designated in the Federal Register, is located within 3 miles of the site.

Ref. No. 7

4. **What is the depth from the lowest point of waste disposal/storage to the highest seasonal level of the saturated zone of the aquifer of concern?**

The lowest point of the waste oil storage tank is unknown. It is assumed that the bottom of the tank is at least 6 feet below the ground surface. Depth to groundwater in Four Winds Shopping Plaza Well Nos. 1 and 2 is 13 feet and 9 feet, respectively. The Four Winds Shopping Plaza wells are located approximately 400 feet from the Tutu Esso facility. The depth from the lowest point of waste storage (6 feet) to the highest seasonal level of the saturated zone (9 feet) is 3 feet

Ref. Nos. 1, 2, 8

5. **What is the permeability value of the least permeable continuous intervening stratum between the ground surface and the aquifer of concern?**

There are no continuous intervening strata between the ground surface and the bedrock aquifer. Soils are generally thin in the area around the site. The water-bearing formations in the Turpentine Run Basin Aquifer are composed primarily of fractured and jointed volcanic rocks. The range of hydraulic conductivities associated with these formations is 10^{-1} to 10^{-5} cm/sec.

Ref. Nos. 9, 10, 14

6. **What is the net precipitation for the area?**

Net precipitation is usually calculated by subtracting mean annual lake evaporation (a surrogate measure for evapotranspiration) from normal annual total precipitation. Mean annual lake evaporation information was not available for St. Thomas; however, evapotranspiration data were available. These data indicate that 95.8 percent of the incident precipitation on St. Thomas is lost through evapotranspiration. The normal annual total precipitation for St. Thomas is 43.74 inches, but because of orographic effects on the Island, normal annual total precipitation can range from 35 inches to 50 inches over short distances. In the Turpentine Run Basin, normal annual precipitation is 40 inches. Calculations for net precipitation are provided below:

40 inches precipitation x 95.8 percent lost to evapotranspiration = 38.32 inches lost to evapotranspiration

40 inches precipitation - 38.32 inches lost to evapotranspiration = 1.68 inches net precipitation.

Ref. Nos. 3, 5, 11, 12

7. **Identify uses of groundwater within 3 miles of the site (i.e., private drinking source, municipal source, commercial, industrial, irrigation, unusable).**

Groundwater within 3 miles of the site is used as a source of private and municipal drinking water, and for commercial purposes. There are at least 41 wells within 2 miles of the site. Thirty-six of these wells are within 1 mile of the site. Sixteen of these wells have been ordered closed because of contamination with volatile organic compounds.

Ref. Nos. 6, 8

8. **What is the distance to and depth of the nearest well that is currently used for drinking or irrigation purposes?**

Distance 1100 feet **Depth** Unknown

The nearest well that is used for domestic purposes is the Francois Laplace well. It is uncertain whether this well is used for drinking. A number of wells in the vicinity of the Francois well have been closed because of contamination with volatile organic compounds.

Ref. Nos. 6, 8

9. **Identify the population served by the aquifer of concern within a 3-mile radius of the site.**

It is difficult to estimate the population served by groundwater on St. Thomas, as there are few records available on groundwater withdrawal, sale, and transport. The locations of some wells in St. Thomas are unknown, and there are reports of illegal drilling on the island. It is estimated that there are 500 to 600 private wells on St. Thomas. Most of these are used for nondrinking domestic uses such as washing and flushing, although some may be used for drinking. There are a number of wells that are used for commercial purposes. Water from these wells is trucked to private houses and pumped into cisterns to augment the rainwater collected from roofs. Groundwater is also bottled and sold in supermarkets

TUT 001 0864

There are at least 41 wells in the Turpentine Run Basin. Recently 16 of these wells have been ordered closed because they were found to be contaminated with volatile organic compounds. One of these wells was a major supplier of water to the eastern end of the island.

Estimates of the population using groundwater as a source of drinking water range from none to approximately 11,000--the population of the Turpentine Run Basin which is not served by water from the desalinization plant. The actual population served by groundwater is probably less than 11,000, as desalinated water and water from wells outside the 3-mile radius is trucked into the area.

Ref. Nos. 8, 12, 13, 16, 17

SURFACE WATER ROUTE

10. **Describe the likelihood of a release of contaminant(s) to surface water as follows: observed, alleged, potential, or none. Identify the contaminant(s) detected or suspected, and provide a rationale for attributing the contaminants to the facility.**

No potential exists for wastes to the released to surface water. Waste oil is stored in an underground storage tank. The tank is located under the garage, and no incidents of leaks or spills have been reported.

Ref. No. 1

11. **Identify and locate the nearest downslope surface water. If possible, include a description of possible surface drainage patterns from the site.**

Not applicable. Containment of the waste unit precludes any release to surface water.

Ref. No. 1

12. **What is the facility slope in percent? (Facility slope is measured from the highest point of deposited hazardous waste to the most downhill point of the waste area or to where contamination is detected.)**

Not applicable. Containment of the waste unit precludes any release to surface water.

Ref. No. 1

13. **What is the slope of the intervening terrain in percent? (Intervening terrain slope is measured from the most downhill point of the waste area to the probable point of entry to surface water.)**

Not applicable. Containment of the waste unit precludes any release to surface water.

Ref. No. 1

14. **What is the 1-year 24-hour rainfall?**

Not applicable. Containment of the waste unit precludes any release to surface water.

Ref. No. 1

15. **What is the distance to the nearest downslope surface water? Measure the distance along a course that runoff can be expected to follow.**

Not applicable. Containment of the waste unit precludes any release to surface water.

Ref. No 1

TUT 001 0865

16. **Identify uses of surface waters within 3 miles downstream of the site (i.e., drinking, irrigation, recreation, commercial, industrial, not used).**

Not applicable. Containment of the waste unit precludes any release to surface water.

Ref. No. 1

17. **Describe any wetlands, greater than 5 acres in area, within 2 miles downstream of the site. Include whether it is a freshwater or coastal wetland.**

Not applicable. Containment of the waste unit precludes any release to surface water.

Ref. No. 1

18. **Describe any critical habitats of federally listed endangered species within 2 miles of the site along the migration path.**

Not applicable. Containment of the waste unit precludes any release to surface water.

Ref. No. 1

19. **What is the distance to the nearest sensitive environment along or contiguous to the migration path (if any exist within 2 miles)?**

Not applicable. Containment of the waste unit precludes any release to surface water.

Ref. No. 1

20. **Identify the population served or acres of food crops irrigated by surface water intakes within 3 miles downstream of the site and the distance to the intake(s).**

Not applicable. Containment of the waste unit precludes any release to surface water.

Ref. No. 1

21. **What is the state water quality classification of the water body of concern?**

Not applicable. Containment of the waste unit precludes any release to surface water.

Ref. No. 1

22. **Describe any apparent biota contamination that is attributable to the site.**

Not applicable. Containment of the waste unit precludes any release to surface water.

Ref. No. 1

AIR ROUTE

23. **Describe the likelihood of a release of contaminant(s) to the air as follows: observed, alleged, potential, none. Identify the contaminant(s) detected or suspected, and provide a rationale for attributing the contaminant(s) to the facility.**

There is a potential for contaminants to be released to the air. Waste oil is contained in underground storage tanks. There are no reports of any spills, and the wastes are not known to contain volatile compounds, however, volatile compounds have been detected in soil gas vapor screening surveys

Ref Nos 1, 22

TUI 001 0856

24. What is the population within a 4-mile radius of the site?

Based on the 1980 census, the population within 4 miles of the site is approximately 36,000.

Ref. No. 15

FIRE AND EXPLOSION

25. Describe the potential for a fire or explosion to occur with respect to the hazardous substance(s) known or suspected to be present on site. Identify the hazardous substance(s) and the method of storage or containment associated with each.

Wastes on site are stored in an underground storage tank; however, due to their volatile nature, there is a potential for fire or explosion conditions present on the site.

Ref. Nos. 1, 22

26. What is the population within a 2-mile radius of the hazardous substance(s) at the facility?

Based on the 1980 census, the population within 2 miles of the site is approximately 19,000.

Ref. No. 15

DIRECT CONTACT/ON-SITE EXPOSURE

27. Describe the potential for direct contact with hazardous substance(s) stored in any of the waste units on site or deposited in on-site soils. Identify the hazardous substance(s) and the accessibility of the waste unit.

There is no potential for direct contact with hazardous substances. The waste is stored in an underground storage tank under a garage. The area of the storage tank is accessible only to workers.

Ref. No. 1

28. How many residents live on a property whose boundaries encompass any part of an area contaminated by the site?

There is no evidence that any residential areas have been contaminated by the site.

Ref. No. 1

29. What is the population within a 1-mile radius of the site?

Based on 1980 census data, the population within 1 mile of the site is approximately 11,000.

Ref. No. 15

PART IV: SITE SUMMARY AND RECOMMENDATIONS

Tutu Esso is an automotive service station located in the Tutu area of St. Thomas, U.S. Virgin Islands. The primary activities at the site are gasoline sales and automotive repair and maintenance. The area within approximately 1 mile of the site is densely populated and contains some commercial properties. The Four Winds Plaza shopping center is located just west of the site. There are large housing developments northwest, north, and east of the site. Beyond 1 mile, there are scattered smaller villages and towns. The densely populated and highly commercial town of Charlotte Amalie is located approximately 2.5 miles west of the site.

Waste oil at the Tutu Esso gas station is contained in underground tanks. The tanks reportedly hold only waste oil which is periodically disposed of by Esso Corporation. There is no direct evidence that the tanks are unsound or that there were any spills or releases to the environment. Based on the waste containment, there is no potential for contamination of surface waters or air, and there is no potential for fire and explosion or exposure by direct contact. However, results of soil gas vapor sampling in the vicinity of the site indicate the presence of chlorinated hydrocarbons at two locations. Although, chlorinated hydrocarbons are not known to be associated with wastes on the site, the soil gas vapor study results indicate that the facility may be a source of these contaminants. On the basis of the above information, a recommendation of **MEDIUM PRIORITY** is provided.

There were no known enforcement actions taken against Tutu Esso in the past. However, the owners of the Tutu Esso Site have been identified as one of nine potentially responsible parties in the contamination of groundwater in the Tutu area. In July and August of 1987, EPA confirmed by sampling that volatile organic compounds were present in a number of wells in the Tutu area. One of the wells was a major source of commercially provided potable water for the eastern end of the island. Additional sampling of wastes on site indicated the presence of toluene, ethylbenzene, and xylene; however, these results are suspect due to problems with regard to chain-of-custody integrity.

EPA removal action activities in the Tutu area included sampling of wells and cisterns, removal of contaminated water from cisterns, cleaning of cisterns, and supplying of clean water on a regular basis to affected residents.

Additional sampling procedures are recommended to ascertain the extent, if any, of contamination associated with this site.

ATTACHMENT A

MAPS AND PHOTOS

*No Photos were taken as the waste unit was below ground.

TUTU ESSO
ST. THOMAS, U.S. VIRGIN ISLANDS

CONTENTS

Figure 1: Site Location Map

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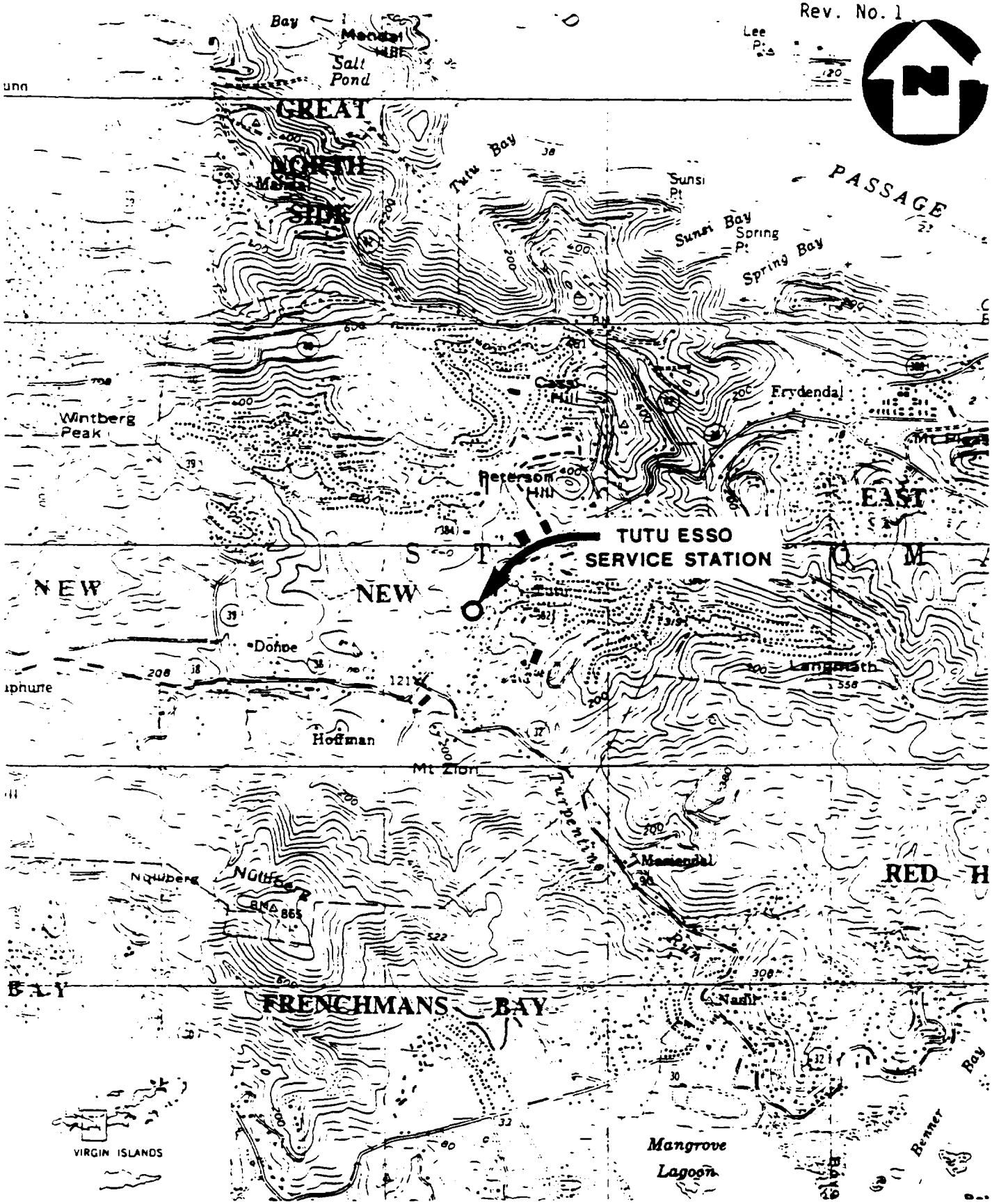

(QUAD) EASTERN ST. THOMAS, V.I.

FIGURE 1

SITE LOCATION MAP

TUTU ESSO SERVICE STATION

ST. THOMAS, U.S. VIRGIN ISLANDS

NUS CORPORATION

TUT 001 0871

ATTACHMENT B

REFERENCES

REFERENCES

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17. Telecon Note: Conversation between D. Goetz of Polycaribe and D. Trube, NUS Corp., on 3/14/89 at 1430 hours. Re: Wells and water use on St. Thomas.

18. Telecon Note: Conversation between L. Reed, DPNR, and D. Trube, NUS Corp. on 3/3/89 at 1640 hours. Re: Permits for site on St. Thomas.

19. Telecon Note: Conversation between T. Gutshall, Tutu Esso Manager, and J. Mayo, NUS Corp., on 3/15/89 1510 hours. RE: Background information for Tutu Esso.

20. Record of Communication, telephone conversation between Leonard Reid,DPNR, and A. Brochu, U.S. EPA Region 2, Jan. 30, 1989, 1400 hours.

21. Tutu Wellfield Area Sample Analysis Data Summary, Tutu Esso Service Station, St. Thomas, U.S. Virgin Islands. Prepared for U.S. EPA Region 2 by Cenref Labs, CDM, Federal Programs Corporation, March 6, 1989.

22. Esso Tutu Service Station Soil Gas Vapor Screening Survey Report, St. Thomas, U.S. Virgin Islands. Prepared for Esso Standard Oil S.A. LTD, by Belgodere and Associates Inc., August 1988.

REFERENCE NO. 19

REFERENCE NO. 20

ESSO

ESSO STANDARD OIL S. A. LIMITED
(PUERTO RICO)
G.P.O. Box 4269 - San Juan, P.R. 00936 - 4269

RECEIVED
FEB 26 1988
CDM-FPC, NYC

February 22, 1988

Ms. Francine Lang
Director Department of Planning
and Natural Resources
Altona and Welgunst No. 179
St. Thomas, USVI 00802

Re: Esso Tutu Service Station
U. S. Virgin Islands

Dear Ms. Lang:

Esso Standard Oil S. A. Limited (Esso), submits herewith its amended work plan for the Esso Service Station located at Road 38, in the Tutu neighborhood of St. Thomas, U. S. Virgin Islands, pursuant to the first amended order issued by Hon. Alan D. Smith, dated September 17, 1987.

As you can note that the date of project initiation is April 4, 1988. Please let us know the date and time for the start-up meeting.

If you have any question and/or comments in relation to this matter, do not hesitate to contact the undersigned.

Sincerely yours,

Ana Gloria Ramos

Ana Gloria Ramos, P. E.
Environmental Coordinator

AGR/mpt/08130

pc: Ms. Caroline Kwan, Eng. (EPA-New York)
Mr. Andrew Praschack, Esq. (EPA-Caribbean Field Office)
Mr. José Font, Eng. (EPA Caribbean Field Office)
Mr. Scott Graber - CDM - FPC
Mr. Gregory Rhymer - DPNR - USVI

TUT 001 0877

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Second Revision
Jan. 11, 1988

ESSO TUTU SERVICE STATION
SOIL VAPOR INVESTIGATION PLAN

Prepared for:

Department of Planning & Natural Resources, USVI.
Environmental Protection Agency - Region II, N.Y.
December 28, 1987

Submitted by
Esso Standard Oil S.A. Ltd.

Carlos M. Belgodere, Belgodere & Associates Inc.
Project Coordinator.

TUT 001 0878

Ana Gloria Ramos, P.E., ESSO Standard Oil SA LTD.
Project Manager

Amended on February 22, 1988

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Appendix B Petro-Tite tank results

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1.0 Description of Work

1.1 Background

A number of water wells have been shut down by the Department of Planning and Natural Resources of the USVI (DPNR) and the Environmental Protection Agency Region II, New York (EPA) as a result of reported ground water contamination in the Tutu area of St. Thomas, USVI. DPNR/EPA believe that among the possible sources of hydrocarbon contamination found in the ground water may be one or more of the various gasoline service stations which operate or had operated in the Tutu area. Esso Standard Oil S. A. Ltd. (ESSO) is the owner of the gasoline service station located in the Four Winds Shopping Center at the Tutu Area of St. Thomas. In consideration thereof, DPNR has ordered ESSO to submit an investigation plan to assess the potential seepage of product into the underlying soil of the above referred Service Station.

ESSO has requested Belgodere & Associates Inc. (BAI) to perform the above mentioned investigation ordered by DPNR. Pursuant to DPNR Administrative Order of September 17, 1987, the plan contained herein has been developed to effectively characterize the contaminants, if any, at the soils beneath the Service Station.

The study will encompass an assessment of the possibility of motor fuel releases from underground storage tanks/pipelines and potential migration pathways at the Esso Service Station by performing a soil vapor survey. If as a result of the soil vapor investigation it is determined that the Esso Service Station is not the source nor has contributed to the contamination of the

local aquifers, adequate releases in agreement with DPNR/EPA will be sought by Esso Standard Oil S.A. Ltd.

ESSO, and BAI Representatives have met with EPA Project Manager, Ms. Caroline Kwan, DPNR Representative, Ms. Francine Lang, and the Project Officer at Camp, Dresser & Mckee Federal Programs Corporation (CDM-FPC) Mr. Scott B. Graber. DPNR, EPA, and CDM-FPC have discussed the principles for the technical approach and work schedule presented in this Work Plan. It is our understanding that all parties are in agreement with the concepts and schedule presented herein.

1.2 Hydrogeologic Setting

The Esso Service Station is located in St. Thomas U.S.V.I., on the West Side of Rd #38 in the Tutu area, at the Four Winds Shopping Center Parking Lot.

According to information obtained from "Soil Survey Virgin Islands of the US, 1970 Soil Conservation Service Report", issued in August 1970, the area is described as a network of terraces and alluvial fans sloping gently to moderately toward the south. Soil deposits consist of stratified sands, gravels and clays with a permeability of 0.20 to 0.63 in./hr. Soil strata thickness around site location varies from bare rock on slope side of hills to over 20 ft. on alluvial deposits.

Based on topographic and structural information obtained from "Geology of St. Thomas and St. John, U.S. Virgin Islands" by Thomas W. Donnelly (NSF, G-114407) the local water table should generally slope to the south. Direction of local ground water flow is controlled by volcanic bedrock fractures underlying the

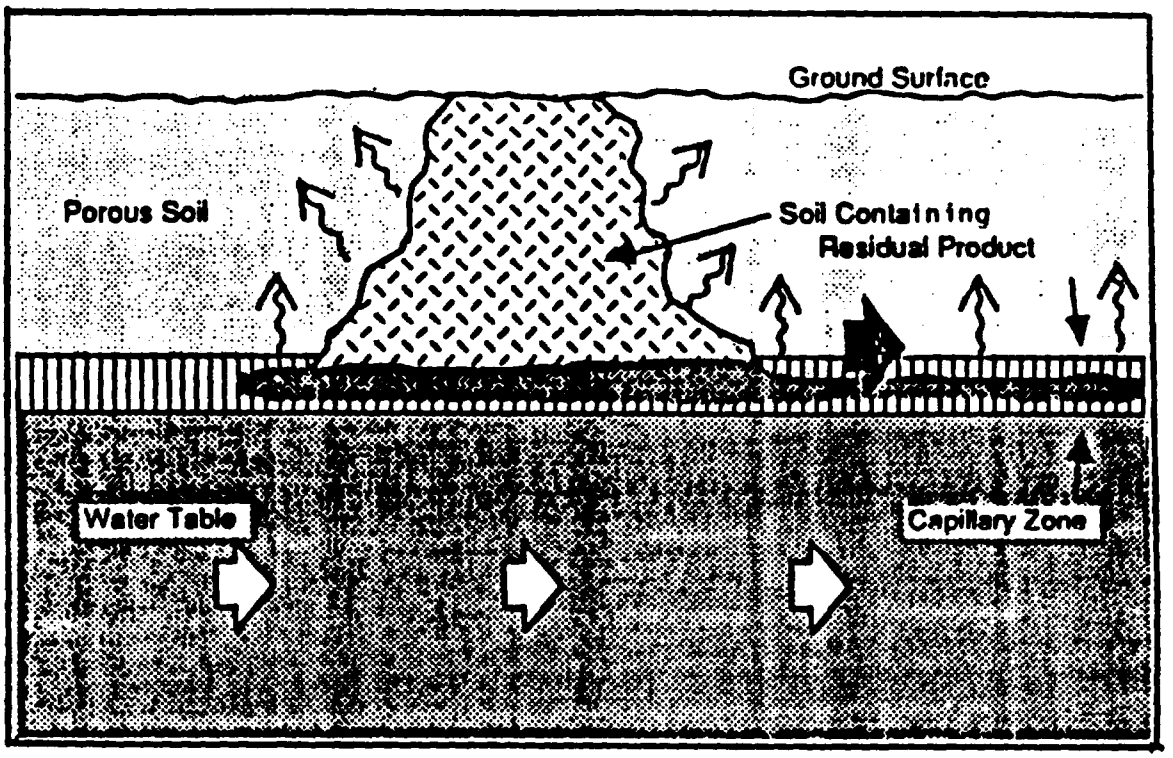
TUT 001 0882

Based on discussion with local water well drillers (Poly Caribe) depth, of ground water at the Four Winds Shopping Center well, located 25 ft. north of the Service Station and the Tillett Water Well, located 250 ft. north east, is reported to be between 15 and 20 ft. during the rainy seasons where water table is high and pumping of commercial and residential water wells is low. The local aquifer water table has been previously observed beyond 80 ft. as a result of high water extraction during extended drought periods.

1.3 Purpose and Methodology of Soil Vapor Survey.

The purpose of the proposed soil vapor survey is to determine whether there has been a leak or a spill from the Service Station underground storage tanks and/or pipelines that may have contributed to the local aquifer contamination and, if leaks and/or spills from the Service Station are identified, to determine their areal extent.

In theory, when an underground motor fuel tank or pipeline experience mechanical integrity failure and release occurs, hydrocarbons are expected to move downward in the direction of the water table and then carried in the upper part of the shallowest aquifer in the direction of ground water flow, therefore, contaminating soils along its pathway due to capillary action of soil matrix (figure 1.3.1). Soils containing motor fuel components will yield when analyzed high values of total hydrocarbons, benzene, toluene, ethyl-benzene and xylenes when soil vapor is extracted from soils stratas underneath and around



Vapor movement from zones of soil and ground water containing hydrocarbons

SCHEMATIC ILLUSTRATION SHOWING SUBSURFACE VAPOR AND HYDROCARBONS RESULTING FROM A PRODUCT RELEASE

(Adapted From: Underground Storage Tank Corrective Action Technologies, EPA/625/6-87-015, January 1987)

Figure 1.3.1

TUT 001 0223A

suspected point sources. Relatively high hydrocarbon concentration in soil vapor from the zone above the hydrocarbon plume will often allow for efficient mapping of plume origin and extend by systematically obtaining soil vapor samples and analyzing them for hydrocarbons content.

The proposed soil vapor extraction and analysis to be performed in the Esso Service Station area will:

- o Detect the presence, if any, of total hydrocarbons, benzene, toluene, ethyl-benzene, xylenes, trichloroethylene, tetrachloroethylene, and dichloroethylene contamination in soils.
- o If contamination in soils is present, it will identify and define its nature and extent.

Soil vapor contaminant investigation refers to a method revived by Thomas M. Spittler (EPA Region I Laboratory) from the Oil and Gas Exploration Industry for investigating underground contamination by means of detecting organic vapors. The method involves pumping a small amount of soil vapor out of the ground through a hollow probe driven to a desired depth and analyzing the vapor for the presence of volatile contaminants. The soil vapor analysis is performed in the field so that samples do not have to be packed or shipped also, analytical results are available immediately and can be used to help direct the investigation. The investigation is usually carried out by analyzing soil vapors in 50'-100' center trancets across the suspected contaminated area until boundaries are well defined. The Soil Vapor Investigation Plan has been prepared in consonance with "Spittler

Method". Please refer to section 2.3 of the QA/QC Plan for description of the Sampling Network Design and Rationale.

2.0 Statement of Work

In order to determine the range, and spatial distribution of motor fuel that may be present in the soil at the Esso Tutu Service Station, ESSO will implement a two-phase approach which includes the following:

Phase I

The first phase will consist of soil vapor sampling and analysis on a grid encompassing the Esso Service Station property to determine the presence, if any, of motor fuel contamination in the underlying soils. An extension of Phase I sampling grid will be carried out beyond the Esso Service Station boundaries to determine, if any, the nature of the hydrocarbon plume.

Phase II

This phase of the investigation will be conducted only if significant hydrocarbon concentrations are found at and around the Tutu station during Phase I. Significant hydrocarbon concentrations will be considered to exist if any of the samples taken exceeds those found in background locations in a factor of three or more.

Additional locations may be sampled based on field judgement and the results of phase I.

The soil vapor sampling program will be terminated at the end of Phase I if it is determined in agreement with USEPA and

TUT 001 0885

Department of Planning and Natural Resources(DPNR) that there is no evidence of motor fuel at the soils underneath the Service Station, or at the end of Phase II if it is determined that motor fuel contamination found on site inmigrated from other sources outside the Esso Service Station property.

The work which ESSO proposes to perform is described in Section 3 of this Work Plan. The results of Phase I will trigger and influence the need for the other phases of this investigation.

3.0 Technical Approach

The technical approach for this project has been developed with significant input from EPA and CDM-FPC and various site visits performed by ESSO and BAI Representatives during the September-December 1987 period. The proposed study is divided into various tasks in order to provide check points at which progress and findings will be examined, therefore, allowing flexibility for field decisions as to necessity for implementation of subsequent task phases.

The technical approach has been divided into nine tasks. Through these tasks a Work Plan has been developed to conduct a soil vapor sampling grid. Soil vapor samples will be analyzed on site for the following parameters:

- Total Hydrocarbons
- Benzene
- Toluene
- Ethyl-benzene
- Xylene

TUT 001 0886

- o Trichloroethylene
- o Tetrachloroethylene
- o Dichloroethylene

The three chlorinated hydrocarbon compounds, although not typically found on motor fuels, will be analyzed following suggestions from DPNR and EPA. Based on results from previous phases of the program, further soil vapor samples and analysis for the same parameters may be conducted as needed. A final report will be prepared describing and illustrating the results of the study.

The tasks to be performed under the Work Plan do not encompass permit requirements under federal and local environmental laws and regulations. There are no requirements under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), the Resource Conservation and Recovery Act (RCRA), or any other environmental law o regulation, either federal or local, applicable to the endeavors covered under the Work Plan.

Occupational Safety and Health Standards found in 29 CFR 1910 are applicable to this project. The Health and Safety Plan submitted herewith addresses the minimum safety procedures that will be followed during the performance of all the tasks involved

TUT 001 0887

in this Work Plan. The nine tasks are presented below:

Task 01 Site History (completed)

Task 02 Work Plan Development (completed)

Task 03 Management Coordination (on going)

Task 04 Preliminary Site Investigation (completed)

Task 05 Quality Assurance Project Plan Preparation (completed)

Task 06 Soil Vapor Sampling and Analysis

Task 07 Data Analysis and Interpretation

Task 08 Preparation of Illustrations and Technical Report

Task 09 Quality Assurance/Quality Control

To succesfully carry out this Work Plan within the estimated scheduled time frame, the Esso Project Manager, the BAI Project Officer, and DPNR/EPA designated Field Representatives will maintain the necessary communication to assure that efforts are coordinated and each task is completed according to the Work Plan. Any necessary field changes or corrections in strategies will be examined carefully, and will be documented and coordinated with ESSO and approved by DPNR/EPA Field Representatives.

3.1 Task 01 Site History

The Esso Service Station located at the parking lot of the Four Winds Shopping Center, Road 38 in the Tutu neighborhood of St. Thomas, U.S. Virgin Islands, initiated operations during 1970. The Service Station is equipped with two (2) underground fuel storage tanks of 6,000 gallon each. The Service Station, as

well as the necessary equipment and appurtenances for its operation, such as the underground tanks and the gasoline pumps, are owned by Esso Standard Oil S.A. Limited, a Bahama corporation organized under the laws of Bahamas.

Mr. Robert Duns, the Service Station first dealer, operated the station from 1970 through 1971, when Mr. Daniel Bayard took over its operation as Esso's new dealer and lessee. Daniel D. Bayard, Jr., the service station current dealer, assumed full management responsibility of the Esso Service Station in March 1976 when his father, the previous dealer, went into retirement.

Of the maintenance activities that have been conducted at the Service Station throughout the years, only two (2), the replacement of piping and an integrity test, may have a bearing on the project.

The 2" pipes connecting the dispensing units to the underground storage tanks were replaced from galvanized to fiberglass during 1985-1987. The replacement job was conducted by Mr. Eugenio de Arce, Esso's St. Thomas maintenance contractor.

One of the two underground storage tanks was emptied and removed from service on July 27, 1987, after the results of a Petro-Tite tank test performed by Roque Schmidt Corp.(see Appendix B for test results) caused Esso to question the structural integrity of the tank. The tank has remained empty ever since, pursuant to an order issued by the Department of Planning and Natural Resources of the U.S. Virgin Islands dated August 21, 1987. A physical examination of the tank has been

TUT 001 0889

unable to be performed pending DPNR authorization.

3.2 Task 02 Work Plan Development

The proposed Work Plan has been developed from:

- Series of meetings between ESSO and BAI Representatives at the site to evaluate physical condition that may restrain the technical approach.
- Meetings and telephone conversations between ESSO, BAI, DPNR, EPA, and CDM-FPC personnel to establish the basic guidelines and objectives for the proposed study.

The deliverable for Task 01 is this Work Plan. The Work Plan may be adjusted as appropriate at the end of each phase with cocurrence and approval by DPNR and EPA pending its outcome.

3.3 Task 03 Management and Coordination

The BAI Project Officer will coordinate the technical execution of work tasks described on this Work Plan. The overall Project Management will be performed by Esso Project Manager.

The following is a list of activities to be performed under this task:

- Provide assurance that team staff and resources are provided so that each task is completed on schedule,
- initiate approved changes to the Work Plan as necessary,
- ensure that Quality Control and Quality Assurance measures are monitored and implemented.
- provide assurance that field personnel will adhere to Health and Safety Plan.

TUT 001 0890

3.4 Task 04 Preliminary Site Investigation

A preliminary site investigation has been performed during the months of September thru December 1987 to allow for optimization of resources during soil vapor extraction and testing operation by identifying in advance the limitation imposed by local conditions, ie. topographic, geologic, construction, structures. This work plan is partially based on site specific requirements based on the results of the preliminary site investigation, as follows:

- The area is mostly covered with concrete or asphalt and fill material above rocky soil which may limit the soil vapor probe depth of penetration .
- Establishment of the sampling grid is affected by numerous existing structures. Offset of grid points may be necessary to provide areal coverage. Sampling grid may be extended based on field judgment.
- Access authorization from third parties will be required to establish sampling points outside the Service Station, if necessary.

3.5 Task 05 Preparation of Quality Assurance/Quality Control Plan

The attached QA/QC Plan is a documentary record detailing the sampling methodology, QA/QC procedures, data presentation and evaluation techniques to be followed during the field data collection, analysis and report preparation phases of this Work Plan. The QA/QC is based on the requirements outlined in the interim guidelines and specifications for preparing Quality Assurance Project Plans EPA-600/4-83-004, February 1983 publication.

3.6 Soil Vapor Sampling and Analysis

The proposed soil vapor sampling and analysis program consists of a two-phase approach were the need for subsequent work will be established by the results of phase I and field judgment.

Soil vapor samples will be collected by driving a 5/8 inch diameter hollow stainless steel probe to the appropriate depth by hand or with a pneumatic driver. After desired depth is achieved, 5 to 10 liters of soil vapor from around the shield point will be extracted with the use of a 500cc/min battery operated vacuum pump attached to the probe with a vacuum gauge and a septum sampling port via a teflon hose. A gas tight syringe will be inserted through the septum port to collect a 2 micrograms to 10 milliliters vapor sample for immediate on site analysis (see figure 3.6.1).

TUT 001 0892

During all phases of work, soil vapor samples will be analyzed using gas chromatographs owned and operated by BAI (See section 6 and 7 of AQ/QC Plan). Two gas chromatographs equipped with flame ionization detectors (FID) will be used to identify total hydrocarbons and chlorinated hydrocarbons. Analysis to be made at each sample point will consist of:

- o Total hydrocarbons
- o Benzene
- o Toluene
- o Ethyl-Benzene
- o Xylene
- o Trichloroethylene
- o Tetrachloroethylene
- o Dichloroethylene

The two proposed phases of work to be conducted at the Esso Service Station area are as follows:

Phase I

Phase I consists of soil vapor sampling on the Esso Service Station property. Sampling points will be spaced in a grid

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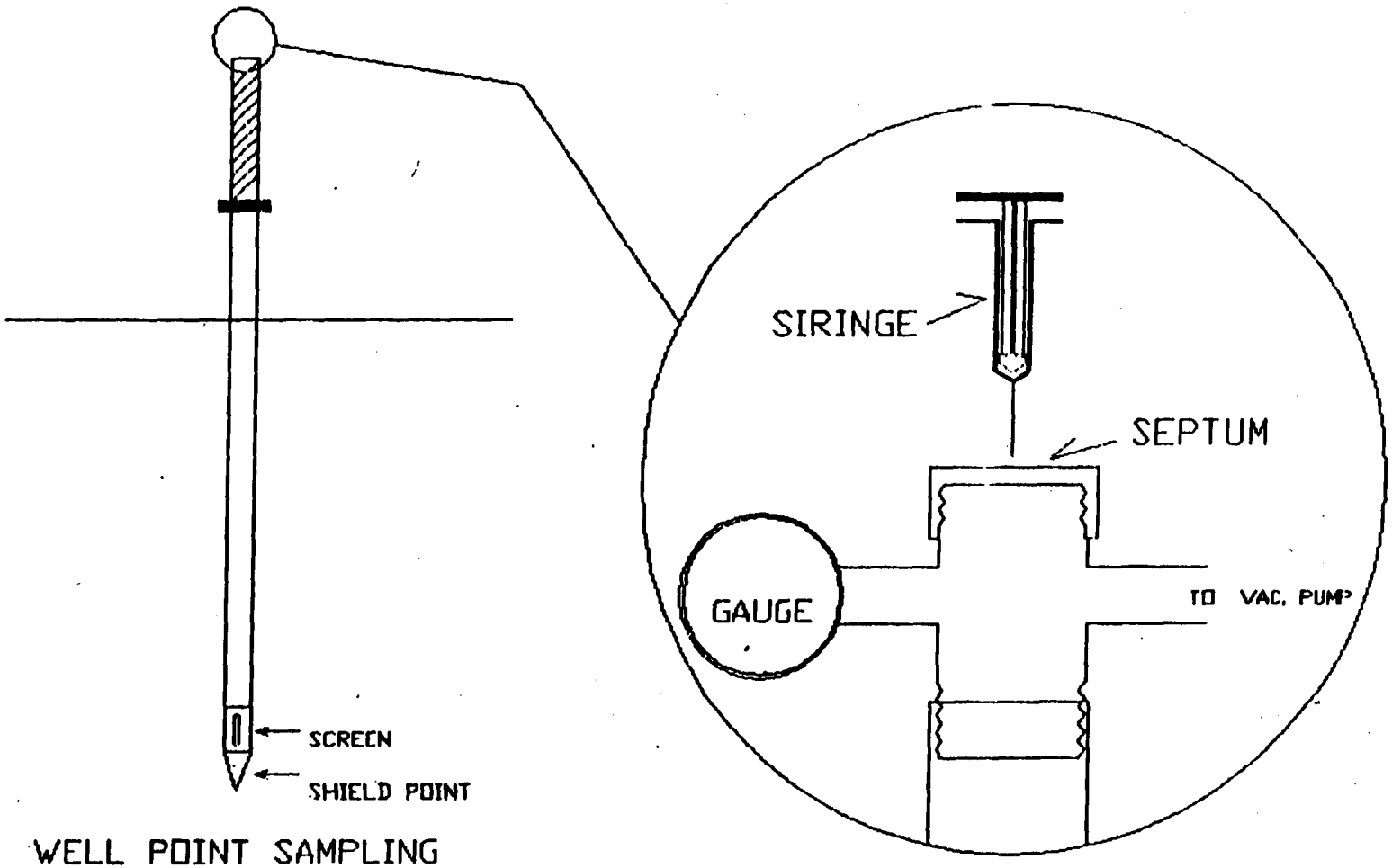

WELL POINT SAMPLING

FIGURE 3.6.1	SOIL VAPOR SAMPLING PROCEDURE	BELGODERE & ASSOCIATES ENVIRONMENTAL-GEO CONSULTANTS

TUT 001 0894

pattern approximately 50 ft centers (figures 3.6.2 a, b). Additionally, at least two background sample points based on field judgement will be taken upgradient or downgradient. A natural drift point should be established based on field judgement to note any significant change in soil vapor values on a day to day basis.

The second phase of this investigation will be conducted if the following criteria is met during the first phase:

- o values of hydrocarbons detected on the station property exceed those found in background locations by a factor of three or more, or based on field judgement.

If Phase II is required, Phase II will extend the grid pattern on a 50, 100, or 200 ft. center as considered appropriate to determine if hydrocarbon contamination generated at the site or inmigrated from other sources. Intermediate points in the grid will be established as necessary for adequated plume definition based on field judgement.

Phase II

If soil contamination is found to have orginated at the Service Station, a further extension of the sampling grid will be

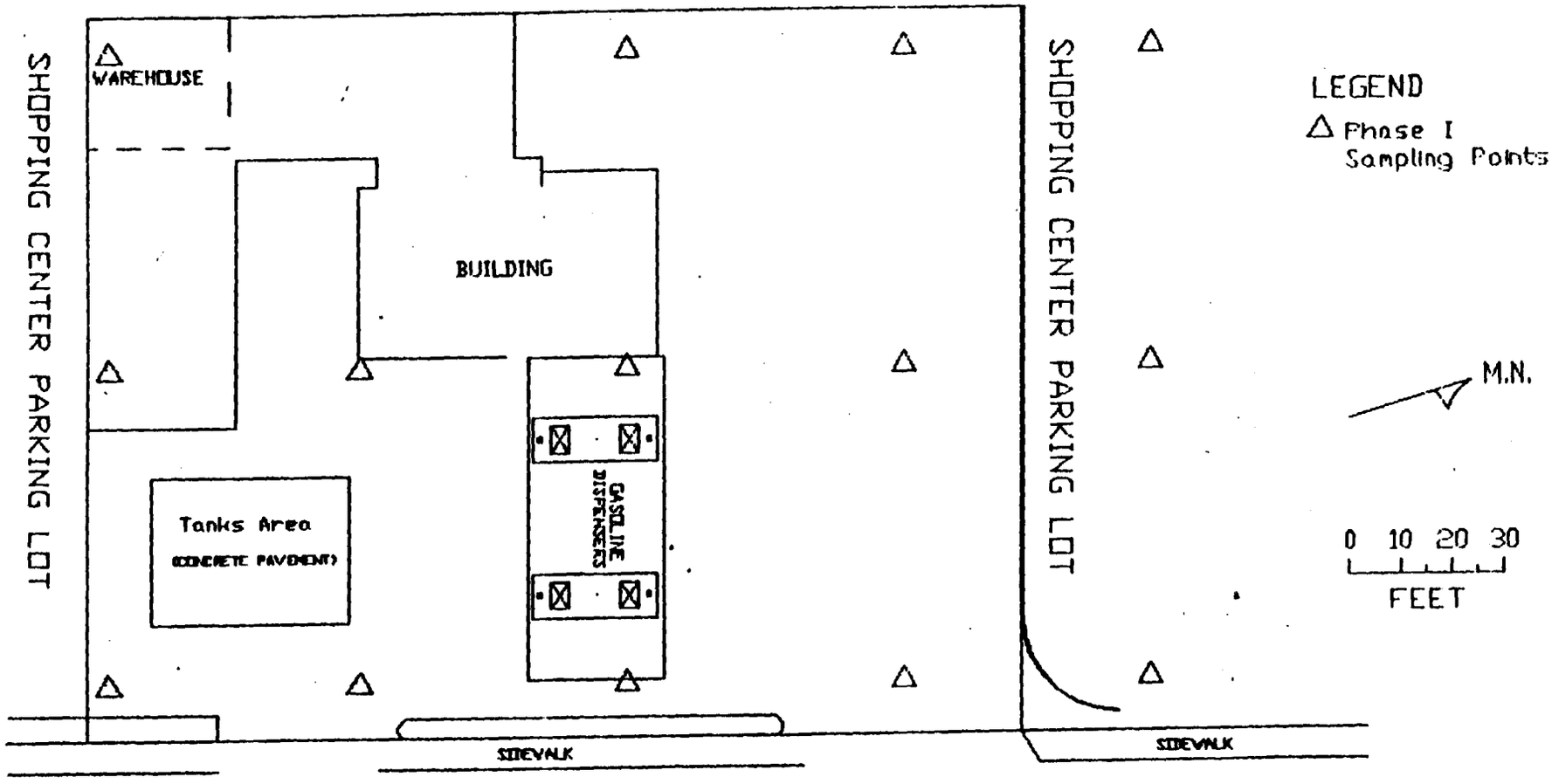

FIGURE 3.6.2	ESSO SERVICE STATION PHASE I SOIL VAPOR SAMPLING GRID	BELGODERE & ASSOCIATES ENVIRONMENTAL-GEO CONSULTANTS

9680 T00 JTT

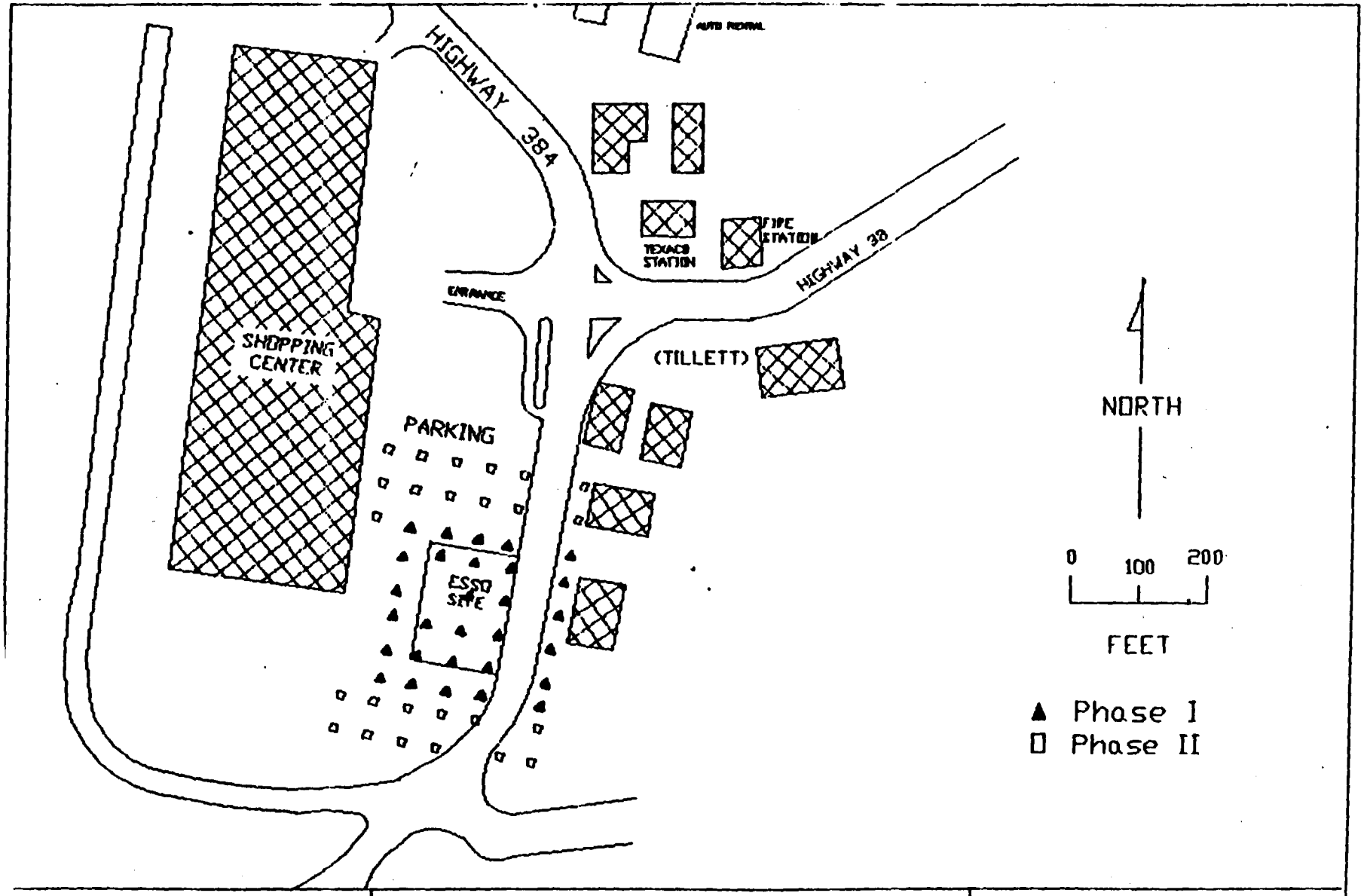

FIGURE 3.6.2 (b)	ESSO SERVICE STATION PHASE I, II SOIL VAPOR SAMPLING GRID	BELGODERE & ASSOCIATES ENVIRONMENTAL-GEO CONSULTANTS

carried out to define the areal extent of motor fuel contamination plume in soils above ground water.

The soil vapor sampling program will be terminated in agreement with DENR and USEPA at the end of Phase I if it is determined that there is no evidence of motor fuel at the soils underneath the Service Station, or at the end of Phase II if it is determined that motor fuel contamination found on site inmigrated from other sources outside the Esso Service Station property.

3./ Task 07 Data Analysis and Interpretation

Data analysis and interpretation will be performed simultaneously with the field work to allow changes in field work to properly orientate, extend or reduce the sampling grid based upon results of previously sampling and analysis. Initial data reduction and mapping of soil vapor concentration will be performed at BAI, St.Thomas office.

3.8 Task 08 Preparations and Illustrations of Technical Report

After completion of the site investigation described under task 03 through 07, BAI will prepare a final report discussing the results of the investigation. The final report will include, as a minimum, a tabular presentation of the soil vapor analysis values encountered during the course of the investigation (ie. total hydrocarbons, benzene, toluene, ethyl-benzene, xylenes, trichloroethylene, tetrachloroethylene, and dichloroethylene) illustrating the spacial orientation of measured values.

TUT 001 0898

Specific items to be included in the report are:

- Base map showing distribution of soil vapor sampling points;
- contour maps of hydrocarbon values to delineate hydrocarbon plumes and possible trajectory;
- tables listing all soil vapor hydrocarbon values encountered during the course of this investigation;
- maps showing relationship of hydrocarbons values in soil vapors to estimate ground water flow direction on local geology;
- GC Chromatograms;
- conclusions and recommendations.

3.9 Task 09 Quality Assurance and Quality Control

QA Officer for this project, Eng. Omar Muniz has reviewed this work plan for QA requirements and will maintain QA oversight through the duration of this project. BAI work on this assignment will be conducted in accordance with project specific QA/QC which is being submitted with this Work Plan.

4.0 Performance Schedule and Schedule of Deliverable

A site investigation plan schedule is shown in figure 4.0.1 and the deliverable date schedule is included on figure 4.0.2.

The project schedule depends upon initiation of field work on April 4, 1988. Approval of the Work Plan and Quality Assurance, Quality Control Plan one week before that date will be necessary to assure timely completion of the project.

TUT 001 0899

Figure 4.0.1

SITE INVESTIGATION SCHEDULE

Work Plan Development.....Dec. 2 to Dec. 28, 1987

Review Approval.....Jan. 25 to Feb. 1, 1988

Soil Vapor/Field Investigation.....Apr. 4 to May 4, 1988

Data Evaluation.....May 4 to May 18, 1988

Final Report.....May 18 to Jun. 1, 1988

Figure 4.0.2

DELIVERABLE SCHEDULE

Project Deliverable	Initial Text to DPNR/EPA	Receipt of Technical Comments	Final
1. Work Plan	12/28/87	1/25/88	2/1/88
2. QA/QC	12/28/87	1/25/88	2/1/88
3. Health & Safety Plan	12/28/87	1/25/88	2/1/88
4. Final Report	6/01/88	N/A	N/A

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ESSO - 5-2360
Post Office 4-1950

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TUT 001 0903

TUT 001 0904

John Mezzo 6-5-89

845 Startup Meeting
Scott Graber DPM
~~John Mezzo~~
Gary Rymer DPWR
Ana Gloria Ramos ESSO
Angel Roman ESSO
Fidnais Torres Goldman & Antonetti
Eugenio de Arce Constructor
Alberto Barrera Soil Tech
~~Julio Rodrigues~~ Shantech
Frank Garcia Sharp Shantech
Frank DeLuca Applied Earth Sciences
~~Jose M. Cardona~~ Soiltech

Go over plans for project.
Ana & Angel contacts for ESSO
1 week projected completion
work hours 8-6

915 meeting adjourns.
Startup activities taking place. Concrete to be broken today.

KM 6-5-89

930 Photo 11 - Soil pile area
Photo 12 - Tank area
Photo 13 - Tank area
all photos before work starts.

1024 Breaking up concrete. Unloading supplies etc.

1045 Building box for sampling approx 8x4x4 ft. Will be lowered into tank pit using a cherry picker. Sampler will work from this box. Box is constructed out of 2x4's and plywood.

1140 Man from Channel 10 news walked onto site. Escorted off. Will take pictures of when breaking concrete (Video)

KM

KM 6-5-89

11:55 Spoke to Patrick McMurtry Ch 10 WBWB (4-0300). Today just taking preliminary pictures but tomorrow, will do a more extensive story on the excavation I will notify both EPA and DNR today.

1209 a tanker is onsite to remove any product in the tanks

1221 Can't access the bottom of tank. It appears that the dip stick for measuring tank levels is inside tank. 3" pipe is being used presently. A smaller tube will have to be used. According to Angel there is about 300 to 400 gallons of product in tanks

1317 About a inch of water in the one tank (last). 3" of product left in the other. This will

KM

4

EM 6-5-89

be pumped out of hand pump locker (west tank)

1324 Checking concrete w/ (Sail Tech) Combustible meter and HNU. No significant readings (background)

1340 Continuing breaking concrete. Men in Level D, no coveralls.

1624 Concrete still being broken. ESSO predicts that they will finish concrete tomorrow by noon.

1725 Taking some readings at ground level within broken up concrete. % LEL 0-1.5 HNU 0-5 ppm max 20 ppm

1755 Activity has stopped for the day. Start tomorrow 7:00AM

EM

5

JJ Mgf 6-6-89

0900 onsite.

0920 Men working to break up concrete

0925 Spoke to Alberto of Sail Tech. Soil will be removed from beneath concrete and above tanks and stockpiled at northeast portion of site. This will be monitored using an HNU to determine if clean. Actual criteria has not been determined but must have EPA (COM) approval prior to use as backfill. The remainder of soil will be stockpiled at north west portion of site for sampling. I will consult with Scott Carter on what criteria to use for the "clean" stockpile. A sample may or may not be taken from the pile for analysis to determine

JJ

EJM 6-6-89

if it is clean. Will confirm this later.

0928 SoilTech people are out monitoring around tank area w/ HNU and LEL meter. I took out CDM HNU and someone monitored the area w/ them. Checked HNU w/ magic marker and got a big response. Background was not very stable Ranged from 0-1 ppm and at times dropped below 0. I believe this is due to the high humidity. Results of scan was 0% LEL throughout area using SoilTech monitor. SoilTech HNU ranged from 0-4 ppm at grade level probing in crevices of broken concrete. CDM HNU however recorded 0-20 ppm at the same areas w/ some

EJM

EJM 6-6-89

negative readings. The response on the CDM HNU, however, correlated well w/ the SoilTech readings. CDM readings were greater than those of SoilTech. Breathing zone 0-1 ppm (background)

0943 CDM HNU info:
Harco #313 - OB meter
7000-23 probe
the probe # is attached in bottom of probe. Span set at 5

1001 Weather: Sunny, hot, humid, breezy. Wind from East but changeable.

1021 Mrs. Tidd was across street taking pictures of work. She did not enter site.

1023 Yesterday I had spoke to Scott and Greg Rhyne about Tidd creek. Scott said it is DNR's job to deal w/ creek

EJM

TUT 001 0908

6-6-89

However their press person is not on the island this week. I have been instructed not to say anything and but refer them to DPRP for comments if asked.

1147 Backhoe moving large chunks of concrete. The concrete is reinforced w/ steel rods making it difficult to break up. HNU readings by Soil Tech were max 6 ppm.

1200 Break for Lunch

1240 Back on site. Work has not begun reviewing sampling protocol, etc.

1326 Press (Chip) is here, will interview Craig Rhymer. Work has resumed

1411 Check area w/ CSM HNU

6-6-89

Checked you at Standby, then switched to 0-20 ppm. Background was just above zero ppm. Switched back to Standby and noted zero to 0.7 ppm. Switch to 0-20 ppm all background is 0.6 to 0.8 ppm. Sniffed around soil newly exposed readings range from 0.8 to 5 ppm but fluctuated. Surface breaking zone remained at background.

1446 Angel would like to load concrete into truck and take offsite in the morning. Loading concrete as it is generated. I spoke to Craig Rhymer and he can speak to Scott. We can cut concrete on site but must be monitored first w/ HNU and readings cannot be above background

10

6-6-89

Ana Glover and Angel have been informed.

1430 Background 0.7 ppm on HNU. Sniffed concrete removed thus far. Checked in crevasses & cracks (caps) all readings at background except odd location where a spike of 5 ppm was recorded. Monitored this area a while and was unable to get any other hits

1443 photo 16 - tank area during concrete removal looking south

photo 16 - tank area looking southeast

photo 17 - closeup of area green fill

11

6-6-89

1443 The tank area is now about 80% complete w/ regard to concrete removal. The fill material appears to be a pale green color in certain areas. There is a faint odor of hydrocarbons (but w/ no significant reading on HNU)

1513 1st truck loaded w/ concrete leaves site. Based on my previous readings w/ the HNU I gave the ok to take to the landfill. (Borrow)

1543 Checked breathing level near excavation w/ OVM HNU. Background 0.7 ppm. Occasional hits of 2 ppm (1.3 ppm above background) average was near background

1600 Soil Tech setting up decon station to obtain sampling

12

6-6-89

implements today for use tomorrow.

1627 Number of samples to be collected by ESSO (CDM splits)
15 Tank pit (8)
9 Soil pile (4)
6 field blanks (3)

1634 photo 18 - decon station while decoming
photo 19 - Same as above different angle

1644 decon procedure that is being used.
Wash w/ detergent (low phosphate) tap water rinse
acetone
hexane
DI rinse
air dry
wrap w/ alum foil

6-6-89

1745 work stops. ESSO and plans to pump the west tank free of product w/ barrel pump.

1800 Cleaning soil away from piping to tanks. Pipes have located most contam. of tank area. Hits down 8ft of soil surface ~ 2ft down vault from 10-20ppm w/ sharper hits or spikes. Breathing zone occasional hits of 5-10ppm above background

1815 Disconnected piping some spilling but contained very quickly w/ plastic bucket and absorbent pads. Then hand operated pump to pipe (1" diameter) into tank and ran to pump w/ small hand pump.

14

6-6-89

1818 Small pump failed. Now place a 12 foot PVC pump into tank.

1822 Pumping product into 55 gal drum. The drum is red & white (for identification purposes) This drum will be labeled.

1843 Digging at north piping of West tank for discantling. Still pumping from west tank. They did pumped some gas into a plastic container, the gas is red with brown sludgy water (2 phases).

1917 Too dark to work. Will resume tomorrow at 6 am. Covering tank area w/ plastic

15

6-7-89

0631 [redacted] is down pumping out lines to gas pumps w/ small hand pump.
Sue Aston - CDM and myself were on site at 6:05 am.

639 Pipes are made of fiberglass. ½" hose is inserted into small hole poked in fiberglass pipe. Pumping into plastic containers and funneled to 55 gal drum. Some small spillage but contained on absorbant pads. A plastic container is below pipe to collect any spillage & and surrounded by pads.

721 Will use a electric explosion proof pump to make the gas presently draining from piping at service pump & allow air to enter system to remove additional product from pipes.

Dean Carter

16 6-7-89 SA

0835/SA & JM leave Esso excavation for Texaco.

1050/SA returns to Esso, still pumping gasoline out of the lines & tank.

1130/Venting pipe added to tank as gasoline removal continues.

1152/Cast vent lines in place. Crew breaks for lunch.

1230/Crew preparing tank for addition of gas to ventilate vapors. Mopping up remaining gasoline with absorbant material that is being placed in a 55 gallon drum.

1255/Crew using CO_2 (carbon dioxide) to ventilate the tanks. CO_2 being added in one end. Visible vapors coming off at the pipe at the other end.

1305/P# 20, 21 CO_2 entering tank. P# 22, picture of setting CO_2 tank & import hose.

1315/One CO_2 tank empty. Ventilated tank closest to the building.

Susan Ornton

6-7-89 SA 17

first. Referred to as tank No. 1.

1320/Mopping up tank No. 2 furthest away from the building.

1338/Starting to ventilate tank No. 2 CO_2 or vapors coming out of vent pipe.

1405/Removing top layer of soil above tanks. This soil will be stockpiled on plastic scanned with an HNu if soil comes up clean it can be used as fill material. Clean is background reading. Excavating cement along with soil.

1415/P# 23 & 24 excavation of tank No. 2.

1500/HNu readings of stock piled material b/g of 0.2 → 2 ppm depending on wind direction. b/g increases when winds blow off of heavy equipment & the direction of excavation pit. Readings deflected from 10 - 15 ppm & dropped to b/g. HNu Texaco # 313 OB

Susan Ornton

TUT 001 0912

(18) 6-7-89

11.7eV probe no calibration sticker.

1510/ Reading around excavation pit continue to ~~flutuate~~ fluctuate between 10-15ppm depending on wind gusts. Readings do not remain constant.

1530/ Confirmed reading with benzene dreger tube. No benzene in the breathing zone. (no reason to upgrade to level C)

1540/ Soil from the excavation pit color tends to be green with spots of brown. P#25.

1550/ Creating a new stockpile with potentially contaminated soil HNu readings between 20-30ppm fluctuations, soil is moist. First stock pile located in the northern area of the site, next to green dumpster.

1610/ Readings around excavation pit deflected up to 20ppm. Next to tank No. 1-all oily materials on the ground in the p,t next to the tank.

Susan Cutter

6-7-89 19

1615/ Adding CO_2 to tank No. 1, vapors escaping.

1620/ New stockpile being created with "hot" soil located in the north west corner, sustained HNu readings of 5ppm, soil being stockpiled within a wooden wall structure (less wind) on top of plastic.

1650/ PP #26 PVC slotted screen being placed in soil for soil venting.

1710/ Crew taking a break. An attempt was made to move tank no. 1 before it can be moved it must be checked with an explosimeter, it was + all alarms went off to much O_2. It was ventilated twice with CO_2. Still stockpiling soil.

1720/ Greg Rymer of DPNR + associate arrived on-site to observe operation

Yvette Canegata of DPNR

1730/ Removing top soil, top of tank No. 2 reading deflect to 10ppm 10ppm can be stockpiled as clean fill.

Susan Cutter

(20) 6 & 85

87

1740/ Screening of soil, HNu 100ppm deflection, soil being moved to stockpile in NW corner

1745/ Excavator appears to have hit natural bedrock appears to be shale.

1800/ Picture of product on floor near tank no 1 P#27 & 28.

1820/ Explosimeter in tank no 1 off scale again.
O_2 level reported to be 5.5 while the LEL is >100%

1830/ SG + JM arrive on-site

1850/ Explosimeter O_2 @ 6% & LEL 100%.

1920/ Explosimeter of Tank #1 5.5 O_2 & 70% LEL
Tank #2 O_2 3.0 & LEL > 100.

1945/ CDM FPC crew leaves the day

Susan Canton

6-8-89 (21)

0715 Scott Crabb & Dan Mann on site. Workers are here ESSO people are not

0731 ESSO arrived a few minutes ago. Workers are dismantling the barricade erected surrounding pit. Soil piles in north west corner and NE corner were covered over night w/ plastic. There was a brief shower overnight resulted due to small puddles. The barricade used to protect pit is just 2x4's w/ a sheet of wire w/ 4x4 openings.

Sections of barricade bolted together.

0838 Added one tank of O_2 to west tank (Tank #1). Checked O_2 & LEL
(CDM FPC) 90% O_2 >100% LEL
(HNu JM) Background reading on HNu 0.5 ppm. While venting tank readings were 3 to 10 ppm

JM

(22)

KM 6-8-89

downwind. Left area immediately. Frank of Shaetzel took a Benzene reading in the pit but lowering the pump into down via a rope. According to Frank there was no significant reading.

0903 HNU (CDM) had problems when turned on. Would not zero, stayed negative. However after a hour in standby zero happens to adjusted. His HNU is Hnu #313-08. Adjusted zero to 0.5 ppm. Turn to get Background at 0-20 scale & got 0.9 ppm.

0957 Degassing last tank (Tank #2) Visible gasses escaping from vent hole.

1005 Degassing complete.

1007 >100% LEL 4% O_2.

KM

(23)

KM 6-8-89

4 #5 Confer w/ Scott Ayres that it should be ok to pull Tank #2.

1011 HNU reading 2-3 ppm ambient during pulling Tank in clear zone

1023 Tank #2 is out and set on 2x4's in area near work bays. Degassing Tank #1

1025 Water/Soda tank was filled pit (gulley). Hydrocarbon sheen a top of water. The sheen is yellow to black in color. Actually forms a thin layer

1030 Degassing Tank #1

1038 Check LEL 20% O_2 >100% LEL ESSO will get another CO_2 cylinder. What goes on board after the report cylinder ESSO wants to pull Hook. CDM FIC recommends #5% or less but the decision is left to ESSO.

KM

TUT 001 0915

(24)

6-8-89

1126 Took 4 photos of tank cover all four sides. The tank does not have any obvious holes. It is somewhat rusty in certain areas, but overall looks good. It is impossible at this point to fully inspect the tank until it is cleaned of all remaining soil. The bulk of soil has been removed but still needs a thorough cleaning before any tiny holes may be found (if they exist).

1135 Ready to check soil piles w/ combi HNU. Standby set to 1 ppm. ~~Organic~~ background reads 1.4 ppm.

1145 HNU acting funky. Poked holes into "clean" pile at NE of site. Some holes would deflect negative and other ranges from 5 to 50 ppm. Cannot honestly rely on this HNU.

(25)

Will try again later with another HNU.

1142 Ready to degas Tank #1 again

1155 5.5% O_2. Will degas and move fan

800 Degassing again.

1215 ESSO decided to break for lunch. Will degas after

1311 Degas tank.

1314 4.5% O_2

1322 Tank #1 pulled. Set aside

1 Tank #2. A black to brown material is at bottom of cavity. Black water & product

1350 The tank pit measures 30 ft east-west & 38 ft north-south presently about 8 ft deep

1520 The water has been pumped into drums. Scott wants to sample the two drums. ESSO will also take sample

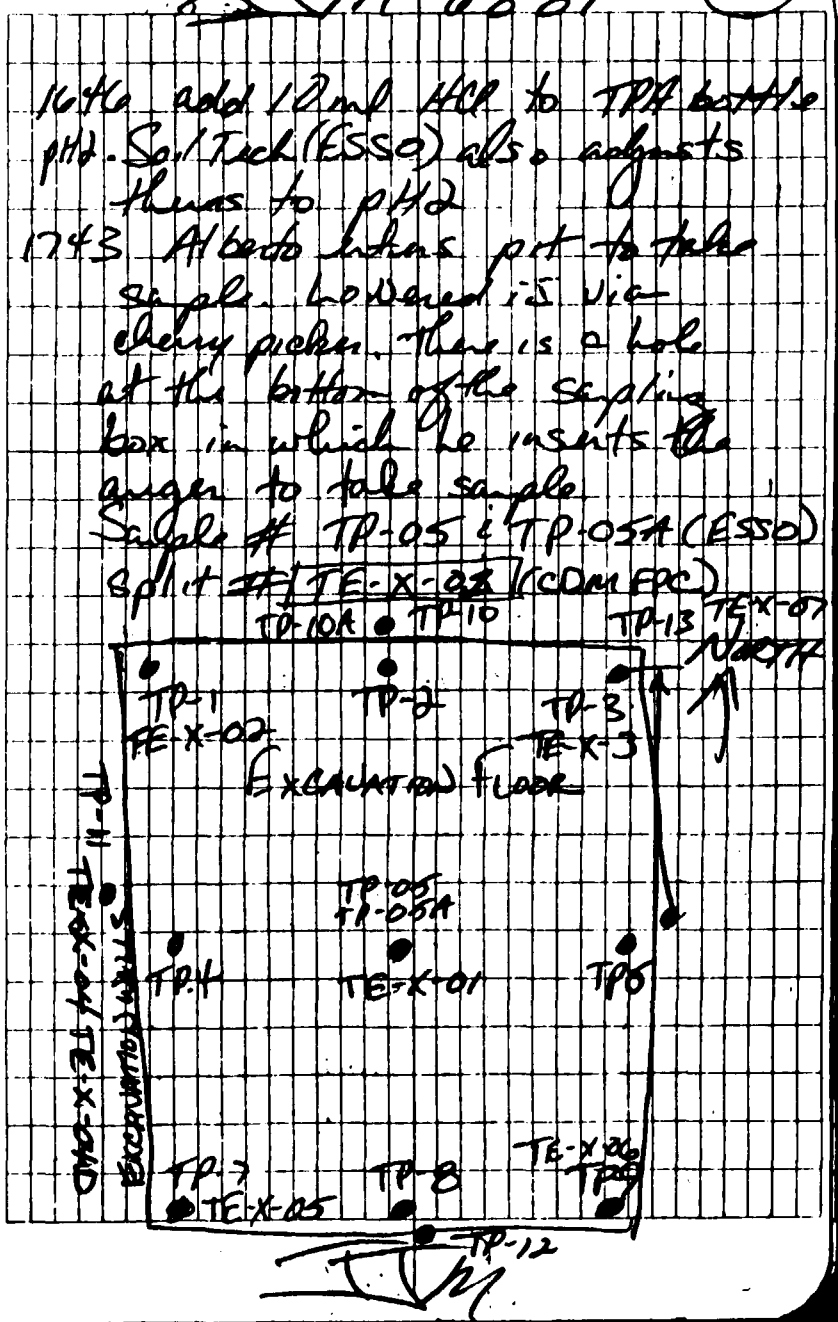
1524 They have now begun to excavate remaining soil in tank pit

(20) 6-8-89

1539 COM FRC HNU # PI 405
5-20 ppm in pit
0-5 breathing space.
Stockpiling so. W at north wall of pit. Vapors flow through clean one. Again 0-50 ppm. Avg 1-2 ppm. Background has been ~0.7 ppm
1635 Sample drum. Water was cloudy yellow w/ [illegible] suspended particulates.
Sample was TE-A-01. 2-80z 2-40ml & 2-1l were filled. ESSO also collected a sample 1-40ml and 6-1l were filled for them. Sample was collected using a 80z jar and poured into the sample bottles. The VOAs were not preserved w/ HCl, so they were taken again w/ 6 drops HCl checked w/ pH paper to be ≤2 pH. TPH was not adjusted as per of yet.

6-8-89 (21)

1644 added 10ml HCl to TPH bottle pH2. Sol Tech (ESSO) also adjusts them to pH2
1743 Alberto takes pict to take sample. Lo Wand is in vic cherry picker. There is a hole at the bottom of the sampling box in which he inserts the auger to take sample
Sample # TP-05 & TP-05A (ESSO)
Split # TE-X-08 (COM FRC)



TUT 001 0917

28

KM 6-8-89

VOA's collected first. He is taking enough sample for homogenizing per analysis (except VOA).

1750 Weather is clear, temp about 80°F, breezy.

Photo taken of samples being lowered into pit previously.

1754 Samples are being homogenized in a S.S. bowl. S.S. spatula also used.

1758 Moved box a little to allow additional sample to be collected.

1803 The material at the bottom of pit is a clayey moist gravel. The wall vary quite a bit. The east wall is an igneous rock starting at about 2 ft from top of concrete. The material on the remaining walls is that clayey moist gravel w/ varying gravel size. Colors range from black green to light yellow & red orange.

1808 Depth to floor is 8 ft 2 in.

KM

29

KM 6-8-89

Depth across checked using wood stake depth (level) stake.

1827 4 Photos of walls of excavation in the following order: East, South, West, North.

1844 Taking sample # TP-10 & TRIPA Based on field determination sample 10 will be a duplicate sample instead of 11 as indicated in the work plan.

1848 S.S. spoons are also used as sampling implements.

Sample 10 is taken from mid point of north wall approx 4 ft depth.

1956 Field blank taken of sampling spoon, spatula & bowl. Rinsed in Solvent [illegible] distilled water.

2550 FB-1

2005 Site Auto & Tech Mgt leave Site.

J. K. Hoff

30

6-9-89

0715 Safe Tailgate ✓ John Nivera onsite
At 0630 JM forgot logbook at
hotel went back to get it.
0726 photo 13 - excavation barricade
photo 14 - temporary soil pile
from bottom scrape
(after piles were removed.
photo 15 - "hot" soil pile
photo 16 - "clean" soil pile
0742 the excavation was barricaded
overnight. Soil piles were
not covered w/ plastic.
Soil Tech is now preparing
for sampling. Field blank
will be taken first.
0746 Weather clear/sunny, breezy,
cool. no rain overnight
0816 Collecting Field blank FB-2
[FE-FB-2] (COM split)
0840 Field blank complete
VOAs & TPH adjusted to
pH 2 for both ESSO & COM
samples.
0841 COM/PC left site, last night while
ESSO was shutting down

JM

6-9-89

51

JM

they were barricading pit I
assumed since the previous
night they covered the piles
the same would be done last
night. This was not the case.
To compensate for this samples
will be taken at least 1 ft
from surface of piles, preferably
deeper.
0856 Ready to take TP-1 NW corner
of pit. Will also split
w/ [TP-1X-02]
0902 HNU reading background 0.4ppm
Average background at surface
near excavation, a depletion
of 0.2 (0.2 above) observed.
Very faint smell of hydrocarbons.
0907 Soil collected, oil range. Top
few inches shaved off. VOAs
collected from remaining soil.
0910 Samples collected from
the top 0-6 in. undisturbed
soil
0940 Sampling TP-2 north center floor

JM

KM 6-9-89

0941 See page 27 for floor sample locations

0946 The pit floor is very moist but there is no standing water.

1007 Collecting sample TP-3, split is TE-X-03 from NE comman floor

1014 Photo 167 - Alberto collecting sample TP-3

1031 Collecting sample TP-11 from west wall 4 ft off bottom of concrete. SM
Splits: TE-X-04 & TE-X-04 duplicate
Also ESSO is collecting triple volume for extractable matrix spike duplicate analysis

1120 Collecting sample TP-4 along west wall floor

1143 Sampling TP-6 along east wall comman floor. Sample is about 1.5 ft from wall to avoid hitting rock.

1247 Sample TP-7 SW comman floor TE-X-05 split

KM

KM 6-9-89

1313 Water was encountered at TP-8. It appears to be perched water. Sample TP-5 also encountered a similar situation.

1321 When sampling inside pit is complete, they will excavate an additional 4 ft of soil for the new tanks. This soil will be stockpiled at the same location as the previous soil. Sampling will occur when soil pile is complete which should be tomorrow.

1341 Sampling TP-9 SE comman floor split TE-X-06

1346 All samples thus far have been a greenish clayey silt grand very moist

1410 Taking sample TP-12. South wall center 4 ft depth.

1430 Collecting sample at TP-13 Split TE-X-07 This sample is located on the west wall about 3 ft depth and 6 ft from

KM

TUT 001 0920

34

XTM 6-9-89

NE corner the area is a patch of soil about 2ft deep roughly. Same type of material as the other samples. Sampling complete in task pit

1459 EXCAVATION CONTINUES IN TASK PIT. COVERING SOIL pile w/ plastic to protect against approaching storm (rain) "clean designated"

1514 Checked Soil pile w/ OVM #P1405. (pile at NE of site). Poked holes into pile w/ auger handle. Holes ranged from 3" to 1ft depending on ease of entry. About 15 holes were started surrounding the pile. Alberto of Soil Tech was witnessing the event. 2-3 holes had background 1 hole was 1 ppm, 1 was 5 ppm the rest were 2 ppm. These values are averages or steady values. Background

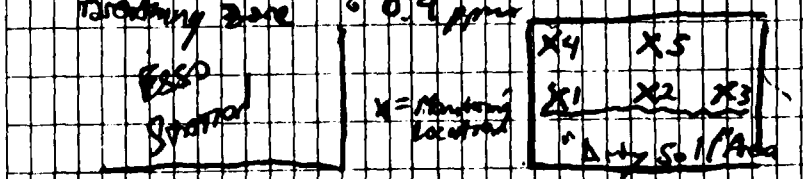
XTM

35

XTM 6-9-89

were 0.4 ppm.

1620 Scott Osborn and Alberto Barrera (Soil Tech) monitored the "dirty" soil pile w/ OVM. Background reading 0.4 ppm. Breathing Zone 0.4 ppm



B.Z.	X1	8-10 ppm	X4	4 ppm
Perimeter Points	X2	10-15 ppm	X5	4 ppm
	X3	2 ppm	"clean soil" Pile	

Monitoring was done approximately 3' into soil pile monitoring location. The values were averages of steady values. Based on the comparison results of the dirty vs clean soil piles there will be the "clean" soil pile as backfill with the sand that has been brought on-site as fill material.

NOTE: The stacks that have been removed

1645 and is now sitting on the side of the Esso Station requires further degassing/heating in order to meet LEL reading ≤ 20% in order to afford for transportation to Laurel Landfill on property

Scott Osborn

KM 6-9-89

1653 Excavation ½ complete (additional 4 ft)

1716 HNu readings of soil pile staged temporarily at north of excavation were 5-20 ppm depending upon location on pile.

1720 According to Ana Gloria of ESSO, the two abd tanks may be removed tomorrow. She says they will depos the tanks and check for LBE prior to leaving site. Ana confirmed that the tanks must be below 200 ppm LEL

1902 All soil has been removed from pit. The cut was about 8 ft into bedrock. Pictures will be taken tomorrow. Moving soil from temp. pile to permanent pile. Installing venting system as they go. Photo - venting system being installed.

KM

1930 Work continues. They plan to work 2 to 3 more hours and try to finish moving the soil. No sampling will take place tomorrow. KM will leave site to shower and get some dinner then return.

2100 KM returns. Still moving soil. Quite a bit of soil left to move. Excavation beyond

2212 Work ends for the night. There is about 50 cu yds left to move however the "clean" soil pile must be moved up so pile can be extended. Tomorrow the "clean" pile will be moved and the remainder of soil dug. Work will start about 5:30 am. The samplers will arrive at about 8 am.

2218 Soil pile at excavation and the permanent pile are covered w/ plastic. The clean pile

KM

38

~~EM~~ 6-9-89

remains as is, since it will be used as backfill.

2232 Leave site

39

6/10/89

0700 Scott Ember & Joe Claycomb arrive on site. Begin breathing pit with sand in preparation for real Bank validation.

0720 Backhoe/Loader moving dirty soil to dirty soil pile.

0745 Background MMI Reading: 0.4 ppm
Rotameter Horiba Reading: 0.4 ppm

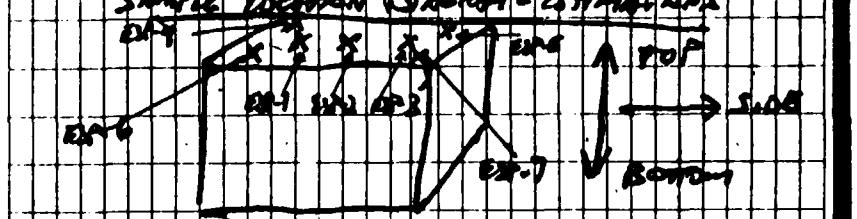
0845 Backhoe removing the "dirty" soil pile. ESD Sampling crew arrives on site and begins sample preparation. ESD-FB-3

0930 ESD Prepared a Field Blank (clean water) for ESD prior to sampling the soil pile. (#6)

Note: Three augers will be used to sample "dirty" pile. pH check on Field Blank is correct pH=7.

1030 Background Bore Reading 0.4 ppm 3" into bore
Soil Pile ("dirty") Reading 1.0 ppm Bore reading
Final soil sample taken ESD-1 while real Bank validation continuing in excavation pit. (#5)

Sample Location Diagram - ESD-1 through ESD-7



Scott B. Sproles

TUT 001 0923

40 6/9/89

Samples ESP-1, -2, -3 will be taken from the top, middle and bottom, and composited. Sampling will be done at the surface of "dirty" soil pile moving vertically into the pile.

Samples ESP-4, -5, -6, -7 will be taken from the top, middle side and bottom side of the pile.

1100 Readings on tank removed
53-69-1877 LEL > 100%, O_2 = 6.5%
52-67-1877 LEL > 100% O_2 = 6.5%
When opening the tanks it was noted that vapors were released (visual) into the atmosphere. Preliminary assessment of vapors seem to indicate gasoline vapors.

1115 Sample ESP-1 depths of "dirty" soil pile
Top = 3" middle = 32" Bottom = 44"
Readings HNu's Top 3" = , Middle 870 ppm, Bottom 100 ppm
Background reading on soil pile = 0.4 ppm

1200 noon Sample ESP-2 depths of "dirty" soil pile
Top = 2-8" middle = 30-35" Bottom = 48"
HNu Readings Top = — middle = 170 ppm Bottom = —
HNu Instrument is down; no instrument readings for remainder of the day

Keith B. Foster

6/10/89 Job Mgr

10:30 Steve Alton & Job Mgr on site.

13:00 Scott Leahy & Joe Clapp and Leah Sitz on site.
Alberto collecting extractables
1 COM split for extractables

14:48 Sampling crew back from lunch. There were problems with crane, but they were fixed over lunch. Ground cloth should be installed this afternoon.

15:01 Begin sampling SP-3 split as ESP-2

15:08 VOA ESP-03 K (COM) SP-3 for top 3" taken

15:34 VOA middle and bottom complete. Remainder homogenized & bottles filled. Sample complete

15:36 Packaging to put 2nd tank in place

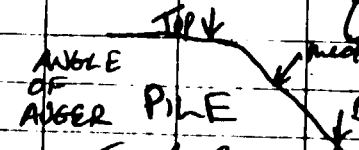
15:47 Middle measurement for SP-3 was 36" and bottom was 48"

TUT 001 0924

4pm

6-10-89

1556 Began collecting sample from NW corner of pile SP-4, ± (SP-4 A dup)



no OM split

1612 Top hole 12" deep. Middle hole 12" deep Bottom ~9" deep. Filled in when auger was pulled out.

1625 Sample complete

1630 Greg Rhyner on site. He is told to take all trash w/ LEL meter prior to disposal.

1638 Begin sampling SP-6 ESSO's triple volume for extractable

1658 Sample SP-6 complete.

1659 Greg Rhyner will be responsible for making sure that ESSO has properly degassed the 2 old tanks and that the LEL is less than 20% prior to removal from site & transport down the mountain.

1716 Begin sampling SP-5. Location is NW corner.

6-10-89

1717 Weather: Temp: low 90's Sky clear, sunny, slightly breezy. Much greater than normal

1737 Sample SP-5 complete. It should be noted that Greg Rhymer could have only talked about 15 min and left saying he would return

1738 Bedrock drainage tube readings by Sun Nuclear as 1.0 - 5 ppm.

1745 Began sampling SP-5. Location South east corner of pile. The decanting has been taking place ~~between~~ during sampling. Two sets of augers and other equipment. No significant deviations from work plan. Site is clean procedures

1756 Workers are beginning the excavation and building the sand berm around the pad.

1807 Sampled SP-4, ± middle and bottom

all taken at an interval 6"-12" deep.

1815 Sampling complete!

1830 Tank #0 >100% LEL 8% O_2 (52-69-1877)

Tank #1 (53-69-1877) >100% LEL 7.5% O_2

Tanks will be degassed on Monday.

1838 While we were sampling Julio of Soil Tech was collecting soil and filling 80z jars to halfway, covering w/ aluminum foil and sealing. He is now checking head space w/ HNU by poking a hole in foil and sticking probe into space. Reading ~~not~~ was

SP4 TOP - 100 ppm
MID - 94 ppm
BOT - 78 ppm

SP5 TOP - 150 ppm
MID - 170 ppm
BOT - 200 ppm

SP6 TOP - 20 ppm
MID - 80 ppm
BOT - 130 ppm

SP7 TOP - 200 ppm
MID - 250 ppm
BOT - 70 ppm

1851 Soil Tech collecting water blank

1853 Soil pile dimensions approx 25 ft x 40 ft x 5 ft

1903 CDM informs ESS (Anabelle) that they (Shawn) must be notified prior to tank transport & monitoring on Monday. As of this time Greg has not returned to the site as he said he would.

1905 CDM leaves site.

REFERENCE NO. 21

CDM Federal Programs Corporation

April 24, 1989

Ms. Caroline Kwan
U.S. Environmental Protection Agency
26 Federal Plaza
New York, New York 10278

Contract No.: 68-01-7331

Document No.: T648-C02-LR-DDLC-1

SUBJECT: Summary of 104(e) Letter Responses and Facility Inspections Relating to Underground Storage Tanks in the Tutu Wellfield Area, St. Thomas, U.S. Virgin Islands, Work Assignment 648

Dear Ms. Kwan:

The purpose of this letter is to summarize the findings of the 104(e) letters and informal facility inspections relating to the underground storage tanks (USTs) at the Tutu Esso Service Station, and Ramsay Motors facility.

Esso Standard Oil S.A. Limited (Esso Standard Oil) indicated in their December 15, 1987 response to an EPA Information Request Letter that the results of a Petro Tite test questioned the structural integrity of one of their gasoline storage tanks. The 104(e) letter response also indicated that this tank was emptied on July 27, 1987 pending further investigation of its integrity.

CDM Federal Programs Corporation (CDM FPC) performed an informal inspection of the Tutu Esso Car Care Center in September 1988. During this inspection, the manager of the facility disclosed the following information:

- The tank which Esso Standard Oil stated was empty and out of service on July 27, 1987 contained 1105 gallons of product when measured on August 17, 1987.

- When measured again on Febuary 17, 1988, the tank reportedly contained 1015 gallons of product.

Ramsay Motors, Inc. indicated in their response to the EPA Request For Information that one waste motor oil underground storage tank exists within their facility. The integrity of the Ramsay UST is unknown. CDM FPC plans to sample its contents in the second round of the Tutu Wellfield Area 104(e) Letter Response Sampling planned for May 1989.

If you have any questions about this information please call me at (212) 393-9634.

Very truly yours,

CDM Federal Programs Corporation

Scott B. Graber
TES III Work Assignment Manager

JMC

cc:	Jose Fonte	EPA-CFO
	Francene Lang	DPNR-St. Croix
	Greg Rhymer	DPNR-St. Thomas
	Amy Chester	ORC
	CDM FPC	Document Control (2 copies)
	CDM FPC	NYC File

REFERENCE NO. 23

SOIL TECH

LABORATORY ANALYSES OF SOIL AT

TUTU ESSO CAR CARE CENTER
TUTU, ST. THOMAS,
U.S. VIRGIN ISLANDS

FOR

ESSO STANDARD OIL CO.

Prepared by

Soil Tech Corp.
Amur Street Corner Duina
Reparto Landrau
Rio Piedras, Puerto Rico 00927

Job No. 88364

January 11, 1989

TUT 001 0931

SOIL TECH

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APPENDIX NO. 1 - SUMMARY OF DATACHEM LABORATORY RESULTS

1.0 INTRODUCTION

This report contains the results of the tank removal activity conducted, on June 4, 1989, at the Esso Tutu Car Care Station, St. Thomas, U.S. Virgin Islands. The report includes the following information:

- o Background information;
- o Hydrogeological setting;
- o All soil results in table format as well as contour maps of sampling locations; and
- o Conclusions and recommendations of method of disposal for the soil in the site.

Esso Standard Oil Company retained the services of Soil Tech Corporation to prepare this report. The main objective of this report is to present a summary of the chemical results obtained from soil and liquid samples collected during the removal of the two (2) existing underground tanks and recommendations for the disposal of the excavated soil. It also include field observations on the tanks surface condition.

The work at this site was conducted according to the "Work Plan for the Removal and Installation of Two Underground Storage Tanks at Tutu Esso Car Care Center, Tutu, St. Thomas, USVI" (Dated December 1988/Revised May 1989), prepared by Sharetech.

Subsections below presents the results of the data-collection activities conducted during tank removal and recommendations for the disposal of the existing soil pile.

1.1 BACKGROUND

The Tutu Esso Car Care Center is located within the parking lot of the Four Winds Shopping Center at the Tutu Area of Saint Thomas, U.S. Virgin Islands. The facility is bounded to the southeast by State Highway No. 38 and the ramaining sides by the parking lot of the Four Winds Shopping Center. Figure No. 1 - "Location Map" shows the location of the project on a topographic map of the U.S. Geological Survey corresponding to the East St. Thomas Quadrangle (scale 1:20,000). Figure No. 1-A indicates more detail on site access.

For the performance of the work, Esso Standard Oil Company contracted the services of the following companies:

- o Eugenio de Arce: Excavation and tank replacement, and preparation of soil pile.
- o Soil Tech : Soil sampling; pile soil venting system installation and operation.
- o Datachem : (Utah, USA) Laboratory Analyses
- o Sharetech (OMA): Quality Assurance and Quality Control, and Health and Safety.

The on-site project manager and coordinator was Mrs. Ana Gloria Ramos from Esso. The work at site was observed and supervised by EPA through their consultants, CDM.

The field work at the service station began on June 4, 1989 with the establishment of the working zones and the performance of

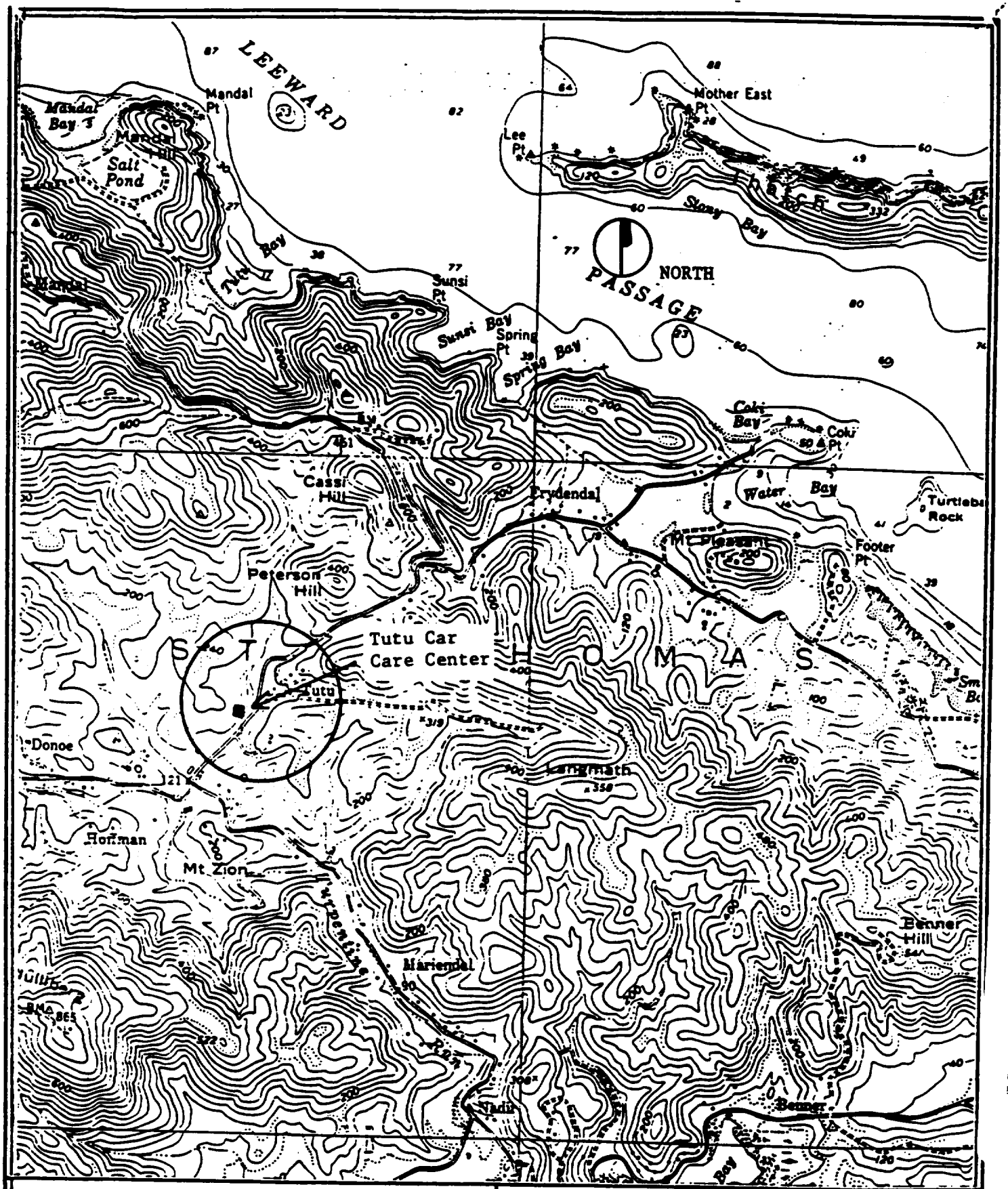

FIGURE No. 1
LOCATION PLAN

SOIL TECH

SCALE 1:20,000

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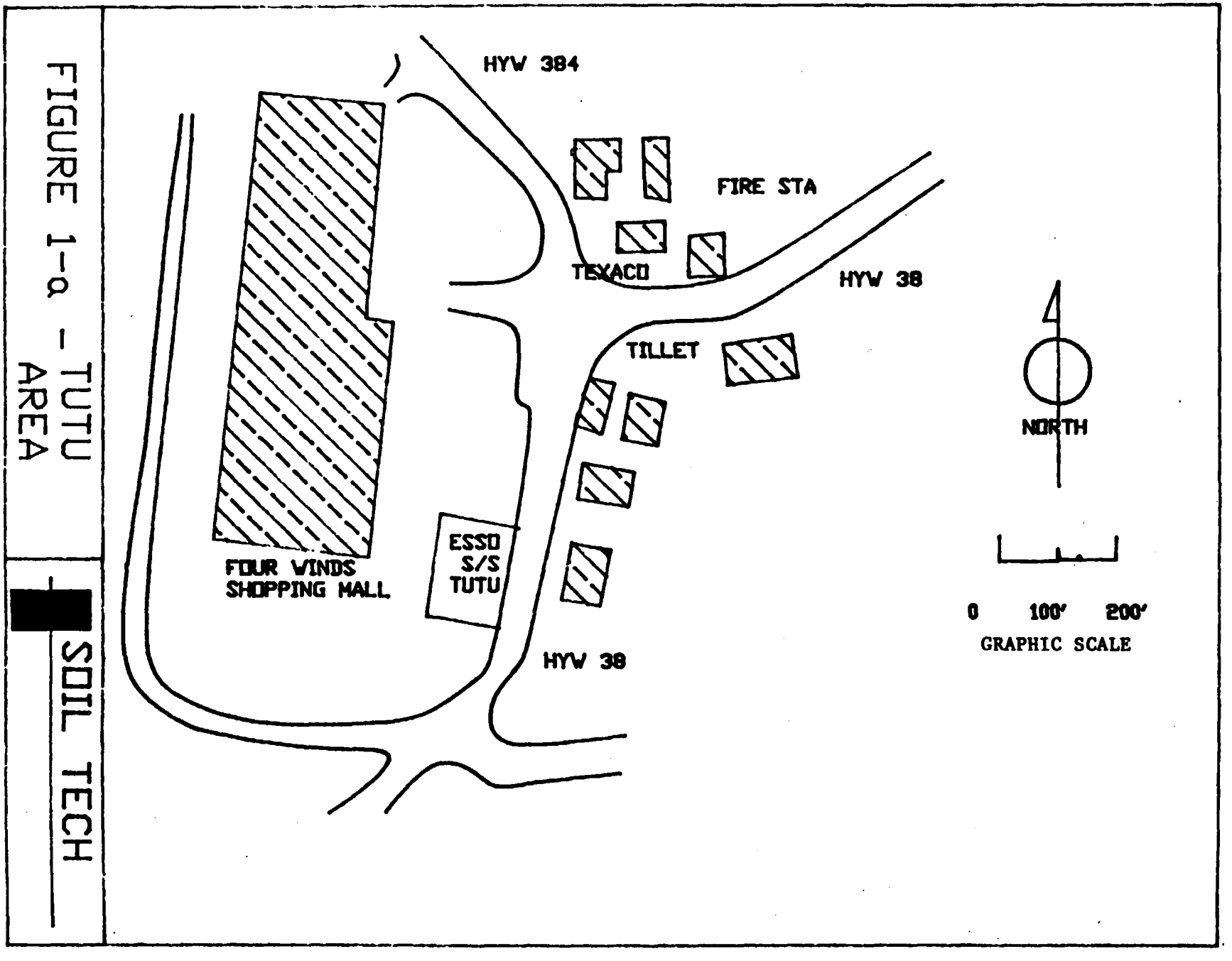
FIGURE 1-a - TUTU AREA
SOIL TECH
HYW 384
FIRE STA
TEXACO
HYW 38
TILLET
NORTH
FOUR WINDS SHOPPING MALL
ESSO S/S TUTU
HYW 38
0 100' 200'
GRAPHIC SCALE

an initial air monitoring. This monitoring was conducted using a portable explosimeter, an organic vapor analyzer (HNU), and Benzene draeger tubes. All results were below detection limit. Air monitoring was performed, by the Safety Officer, during all field activities obtaining below detection limit results.

Before uncovering the tanks, the content was pumped out using a small hand activated pump. All liquid residues from this operation were stored in a 55 gallon drum (DOT approved) at site.

Following these activities, the concrete slab was removed and the concrete debri stockpiled at site until screened with the portable OVA (HNU). The screening results were below detection limit and EPA representatives accepted Esso's proposal to dispose of the material at the Bovoni Landfill in St. Thomas.

At the completion of the concrete slab removal, excavation of tanks backfill began. At the same time, the area proposed for the soil stockpiling was being prepared with a wood fence and plastic liner. All soil excavated was initially stockpiled adjacent to the excavation and then hauled with a small front loader (trench digger) to the stockpiling area located at the North section of the station. As the soil piling progressed, all necessary pipes and connections for the soil venting system were installed. Figure No. 2 - "Service Station Layout" shows the location of the main structures in the service station and soil pile location.

After the backfill soil was excavated, the tanks were lifted and placed above ground over wood supports for surficial clean-up

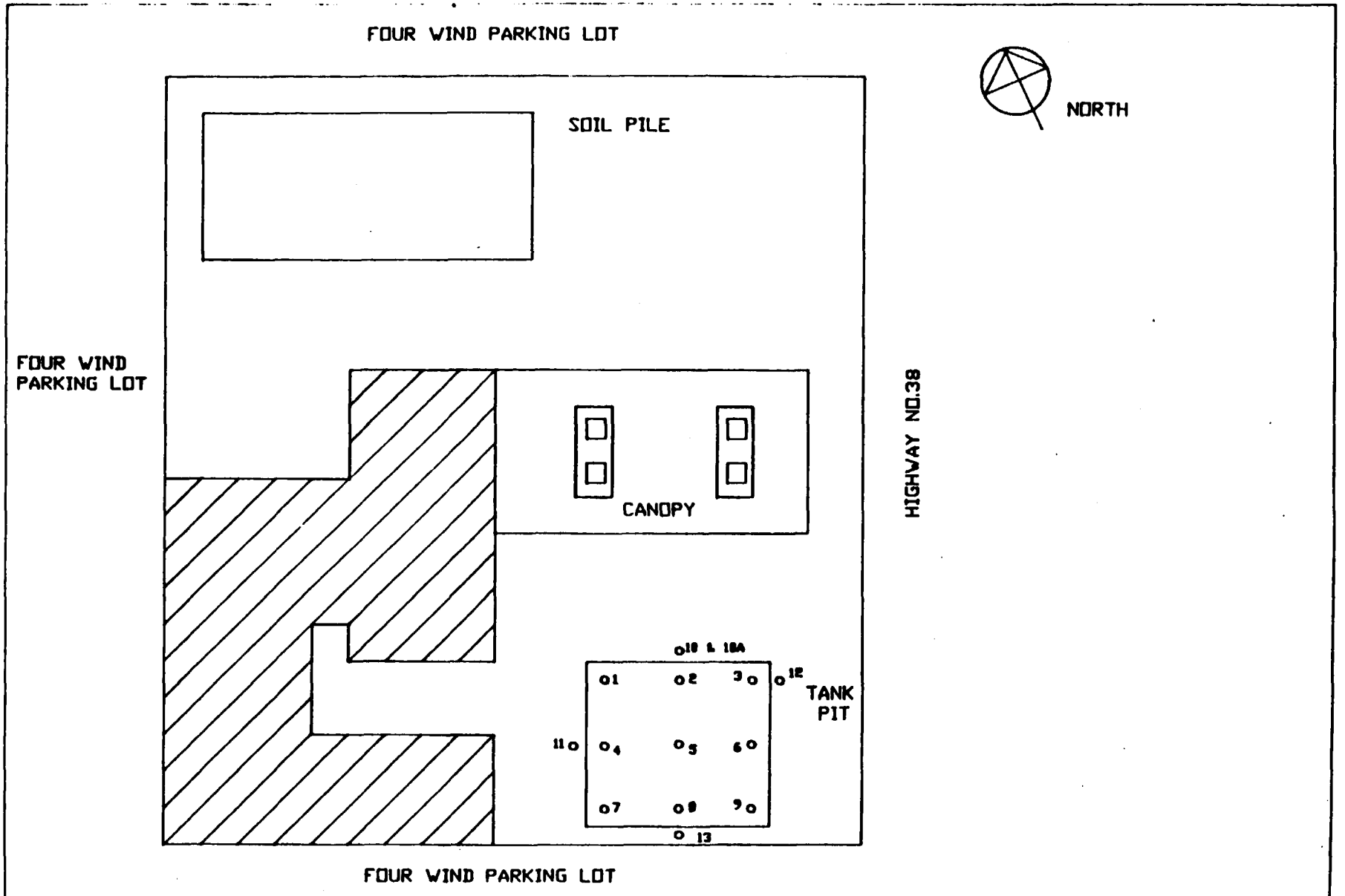

FIGURE NO.3

JOB # 89364

TANK PIT SAMPLING LOCATION

SOILTECH

NOT TO SCALE

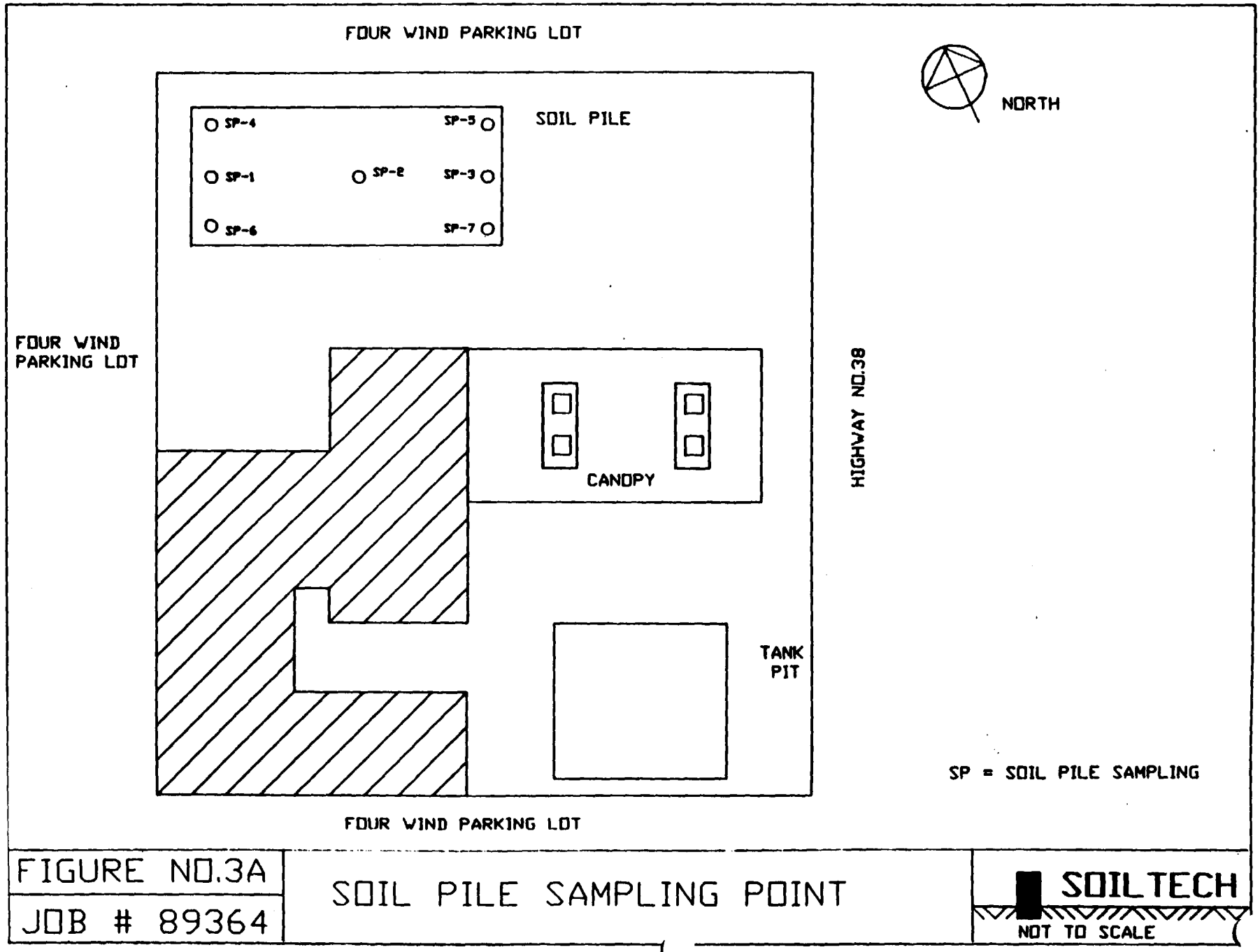

FIGURE NO.3A

JOB # 89364

SOIL PILE SAMPLING POINT

SOILTECH

NOT TO SCALE

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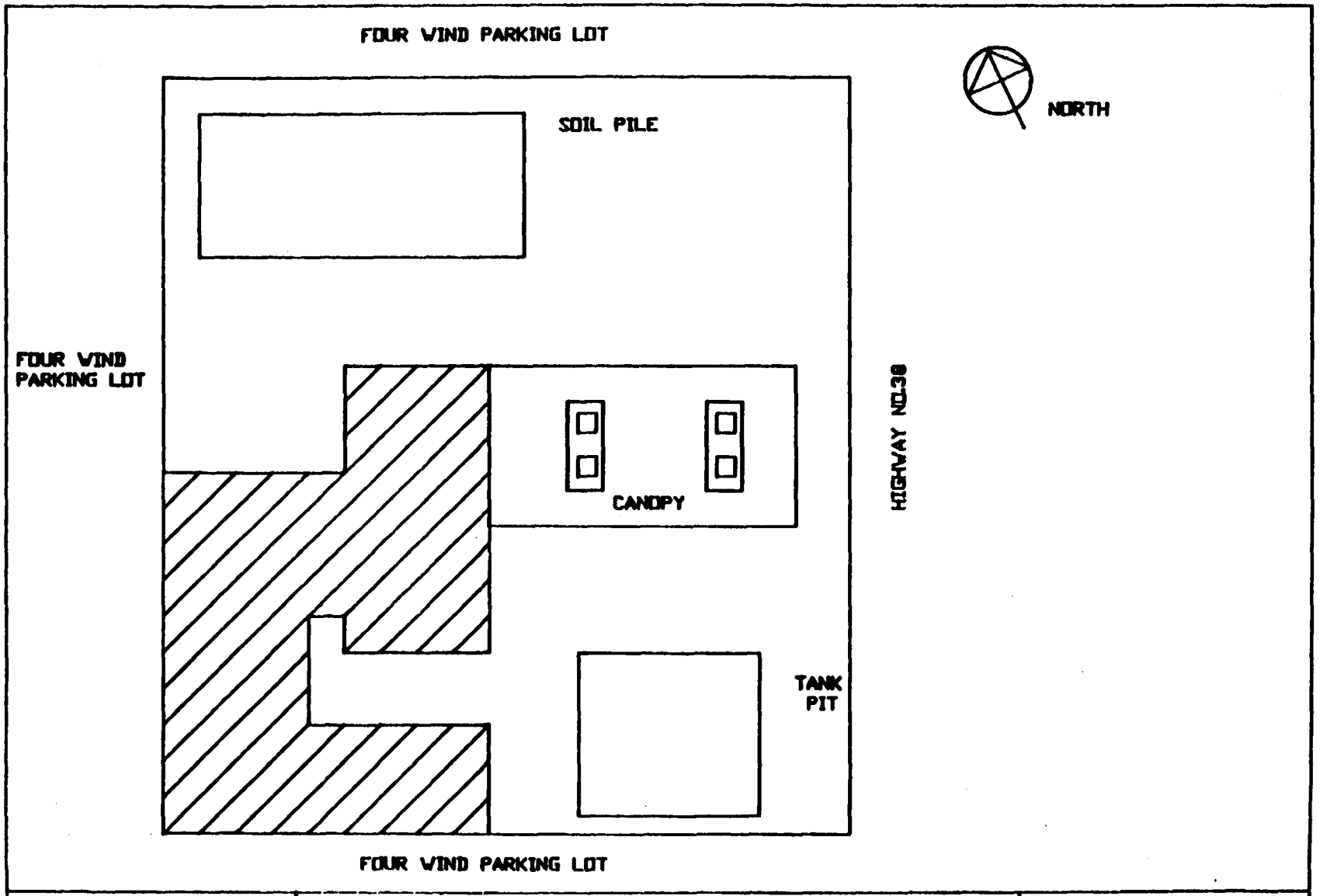


FIGURE NO. 2

JOB # 89364

SERVICE STATION LAY-OUT

SOILTECH

NOT TO SCALE

TUT 001 0944

and inspection. Personnel from CDM, Esso, and Soil Tech examined the tanks finding no physical evidence of perforations in the steel shells.

Following the tanks removal, a sheen of product was observed on the former location of the East tank. This sheen was removed using hydrocarbon absorbent material. Then, the ramaining backfill soil, at the tank pit bottom, was removed and placed in the stockpile.

Subsequent to this activity, the pit soil sampling began. A total of thirteen soil samples were collected from the tank pit area. Figure No. 3 presents the location of each sample taken. Following this activity, seven (7) composite soil samples were collected from the soil pile. These were taken by mixing equal amounts of soil obtained from the top, middle, and bottom part of the pile. Discrete grab samples, for VOA analysis, were collected prior to compositing from each sampling depths and point. A total of 21 grab samples were collected. Figure No. 3-A shows the location of each sample collected at the soil pile. Split samples, from selected location at the tank pit and soil pile, were obtained as requested by EPA representatives, CDM. The sampling activity was completed by June 12, 1989.

Upon completion of soil sampling in the excavation, approximately two (2) additional feet of soil were excavated to reach new tanks invert elevation. At this time, a trickle of

water was observed on the southwest corner of the pit which could be considered a manifestation of the ground water. No liquid phase hydrocarbons were observed in the tank pit area. Then, the new jacketed tanks were installed in the tank pit and backfilled with clean material. Also, the vacuum pump was connected to the soil venting pipes and the venting system started.

2.0 HYDROGEOLOGICAL SETTING

The project is located as shown on Figure No. 1. This corresponds to the hydrologic watershed of the Turpentine Run. This watershed drains an area of 3.4 square miles described as a dendritic system typical of volcanic terrain. About two thirds of the drainage basin lies in the interior of the Island and is surrounded by high hills. The main surface stream consist of an intermittent creek known as the Turpentine Run which discharges through a narrow valley. Surface runoff is concentrated in a narrow corridor probably due to geomorphological controls such a steep topographic gradients and geo-structural conditions.

The water table has been found to be, locally, a subdued manifestation of the surface topography. For instances the depth to water table under non-pumping conditions is reported at 13 to 15 feet below grade at the Four Winds #1 and #2 wells located some 50 to 100 feet north of the Service Station. Depth to water in the wells nearby range between and 15 and 20 feet below grade. But near the ridges it has been reported at as much as 120 feet below grade.

The excavation exposed a mixed face with recent unconsolidated material above the sedimentary, volcanic, and metavolcanic material found at site. The overburden was very shallow from 1 to 2 feet at one side to the total excavation

depth. This was composed of weathered volcaniclastic material and volcanic material. Part of the exposed excavation consisted of a fractured siltstone with a relatively steep bedding. This forced the relocation of sampling point No. 12 to a corner were soil was exposed.

The bottom of the excavation was at about 12 feet below grade. At this depth a trickle of water was noted and was considered to be a manifestation of the ground water at site. No liquid phase hydrocarbons were observed on this water.

3.0 SOIL SAMPLING AND TESTING

Soil samples were collected from the pit area after the fill material around the tanks was excavated and the tanks were removed. Location of the sampling points is indicated on Figure No. 3 - "Tank Pit Sampling Points". A total of thirteen (13) grab samples were collected from the pit area.

Soil samples collected from the soil venting pile were composites, except for VOA's analysis where grab samples were taken. Sampling locations are indicated on Figure No. 3-A - "Soil Pile Sampling Points".

A total of seven (7) composite soil samples, plus one duplicate, were obtained from the soil venting pile at specific sampling points. Each sample was prepared by mixing equal amount of soil from the top, center and bottom part of each point in the soil pile. Grab samples, to be analyzed for VOA's, were obtained directly from each depth at all sampling locations, for a total of 21 samples plus duplicates.

Split samples were collected from some of the sampling locations, as requested by CDM personnel, for their own analyses.

Soil samples were analyzed by Datachem for the following parameters:

SOIL TECH

Area	Parameters
Tank Pit	Lead, Chromium, VOA, TPH, Pesticides, and PCBs
Soil Pile	Lead, Chromium, VOA, TPH, Pesticides, PCBs, and Ignitability

Laboratory analyses were conducted by Datachem of 960 West Levoy Drive, Salt Lake City, UT 84123. Methods used in the analyses of soil samples were as follows:

Parameter	Method
Total Petroleum Hydrocarbon (TPH)	Pretreat as per oil and grease method EPA/CE-81-1, p 3-284, IR option, followed by Method 418.1 starting with paragraph 7.7 (Three (3) grams of silica gel per every 100 ml of extract).
VOA	Analytical methods for analysis will conform to "Statement of Work for Organic Analysis, Multi-Concentration", USEPA Contract Laboratory Program as revised 2/88.

Parameter	Method
Lead	"Test Methods for Evaluating Solid Waste (SW-846)", November 1986. USEPA Method 3050 for extraction and USEPA Method 7420 for analysis.
Ignitability	USEPA Method 1010 (Pensky-Martens, close-cup).
Chromium	"Test Methods for Evaluating Solid Waste (SW-846)", November 1986. USEPA Method 3050 for extraction and Method 7190 or 7191 for analysis.
Pesticides/PCBs	"Method 8080, Test Methods for Evaluating Solid Waste (SW-846)", November 1986.

Decontamination water and field blanks were analyzed for the same parameters as those for soil samples as follows:

Parameter	Method
TPH	Method 48.1, Methods for Chemical Analysis of Water and Wastes, March 1983.

Parameter	Method
VOA	Analytical Methods to Conform to "Statement of Work for Organic Analysis, Multi-Concentration", USEPA Contract Laboratory Program as revised 2/88.
Lead	Aqueous sample matrix - "Test Methods for Evaluating Solid Waste (SW-846)", November 1986.
Lead	USEPA Method 3010 for extraction and USEPA Method 7420 for analysis. No pretreatment is required.
Ignitability	USEPA Method 1010, Pensky-Martens closed cup method.
Chromium	"Test Methods for Evaluating Solid Waste (SW-846)", November 1986, USEPA Method 7190.
Pesticides/PCB's	"Method 8080, Test Methods for Evaluating Solid Waste (SW-846)" November 1986.

Reportedly, the complete QA/QC documentation for Datachem is on file with USEPA.

4.0 RESULTS OF LABORATORY ANALYSES

Tables No. 1 through No. 7 summarizes the parameters that were found on each soil sample from the tank pit area.

These tables are subdivided as follows:

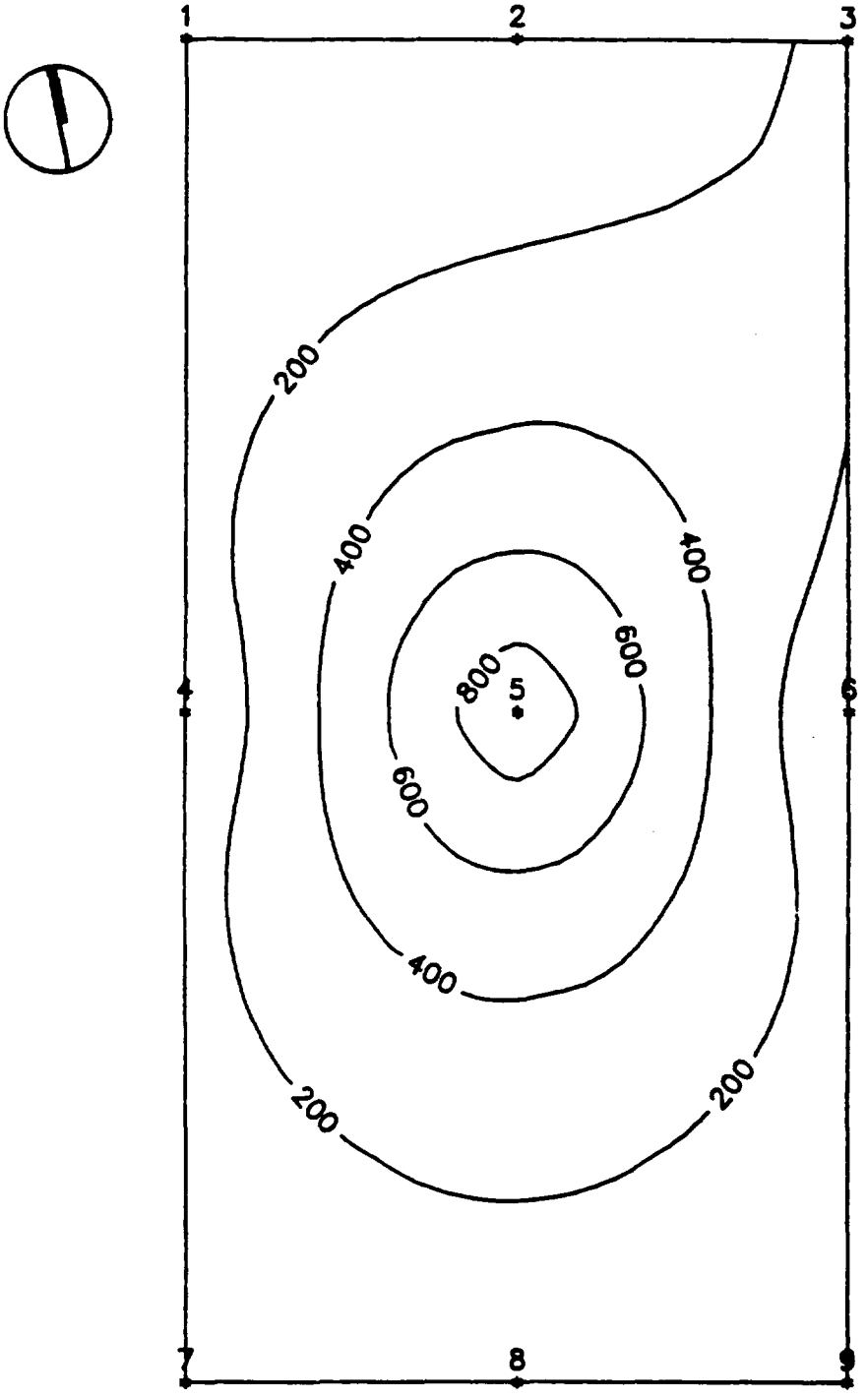
Table	Content
No. 1 -	Pit area volatile organics
No. 2 -	Pit area volatile organics (Tentatively Identified)
No. 3 -	Pit area semi-volatile organics
No. 4 -	Pit area semi-volatile organics (Tentatively Identified)
No. 5 -	Pit area Total Petroleum Hydrocarbons
No. 6 -	Pit area metals

Chlorinated hydrocarbons, pesticides and PCB's were not found in the pit area.

Laboratory data on benzene, toluene, ethylbenzene, and total xylenes found within the pit floor area is shown on contour format as Figures No. 4 through No. 7.

The maximum BTEX concentrations found within the tank pit were as follows:

SOIL TECH



Contours
in
ug/kg or ppb

* Sampling Points

FIGURE 4 – BENZENE CONTOURS PIT FLOOR

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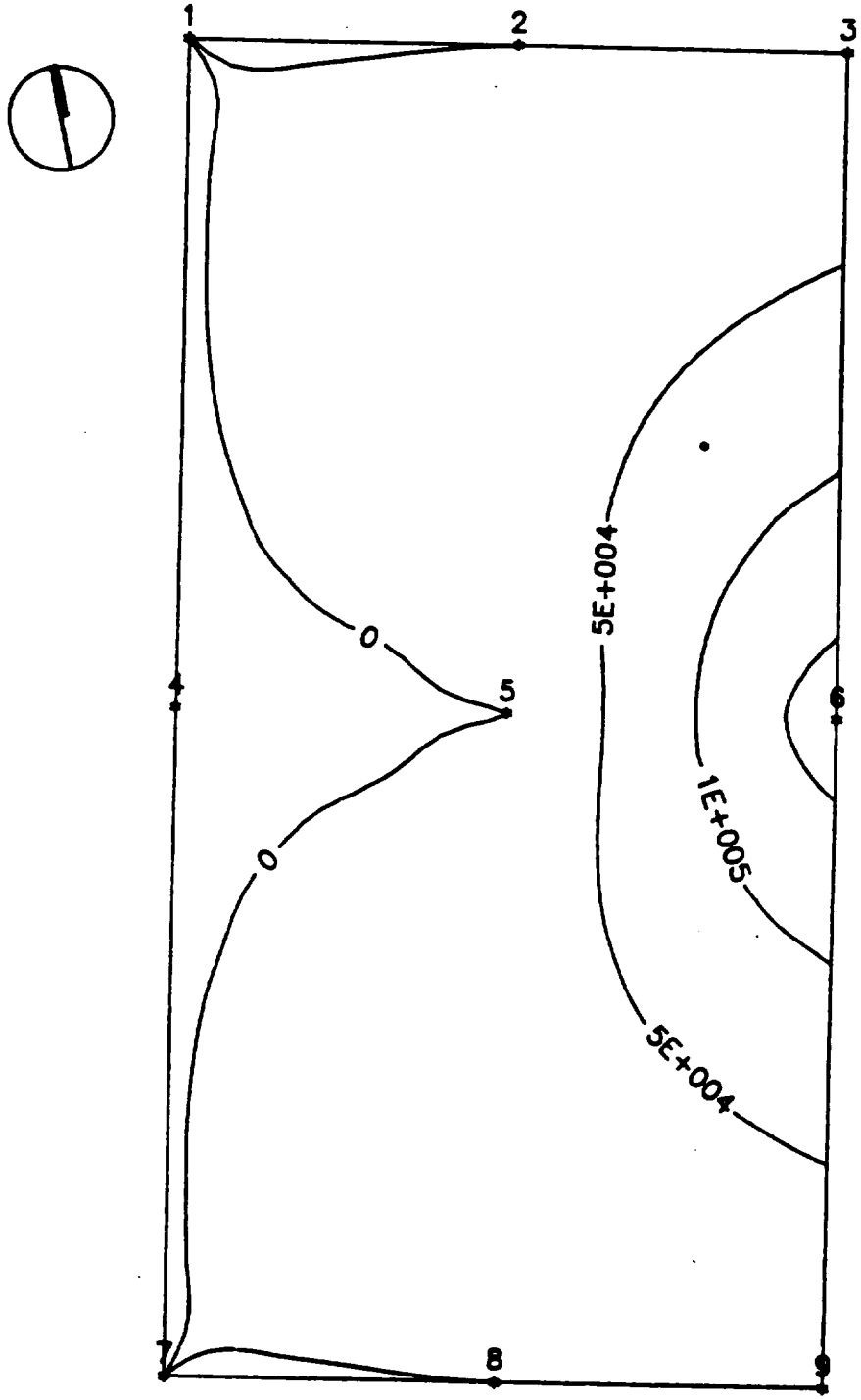
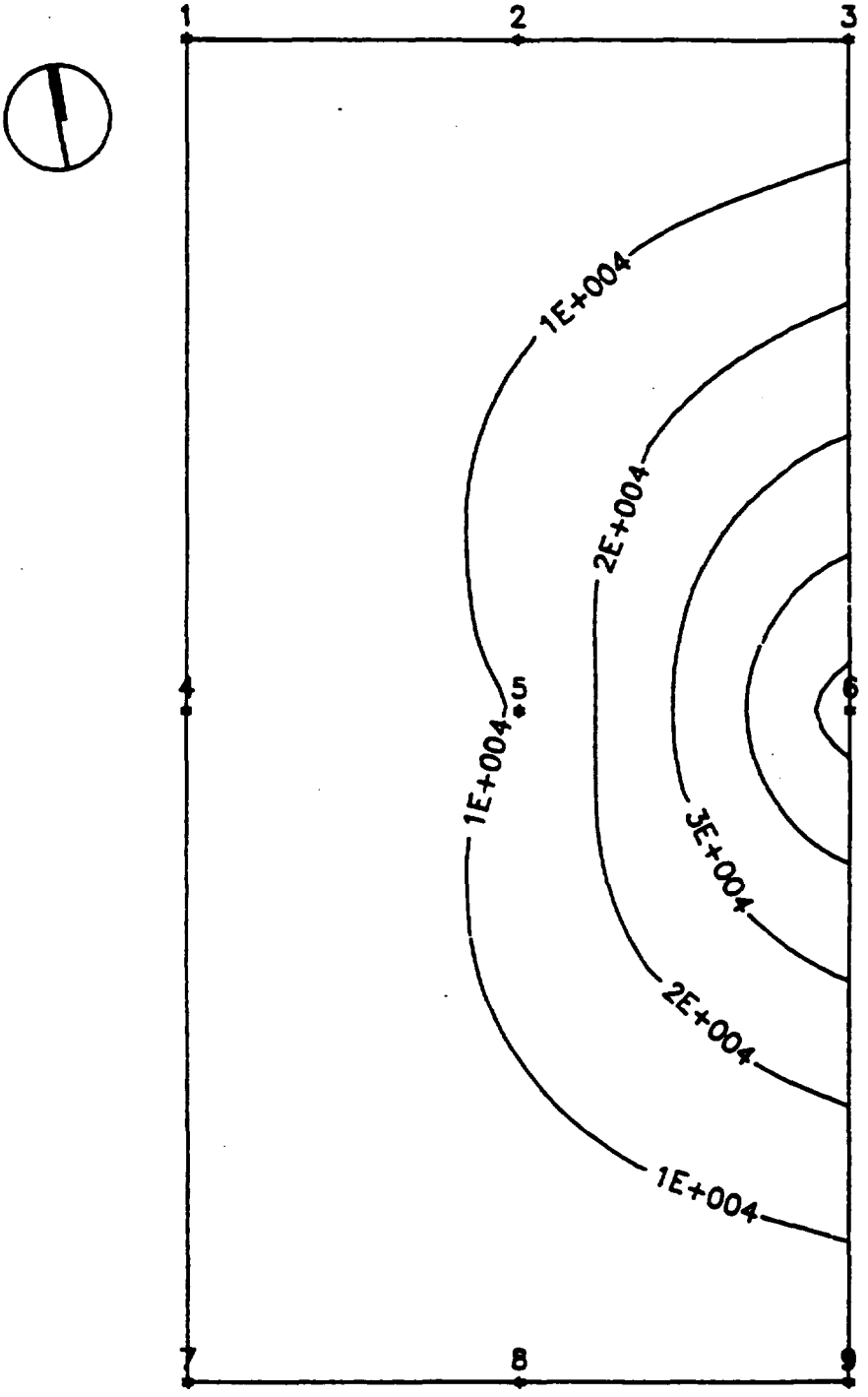


FIGURE 5 – TOLUENE CONTOURS PIT FLOOR

SOIL TECH

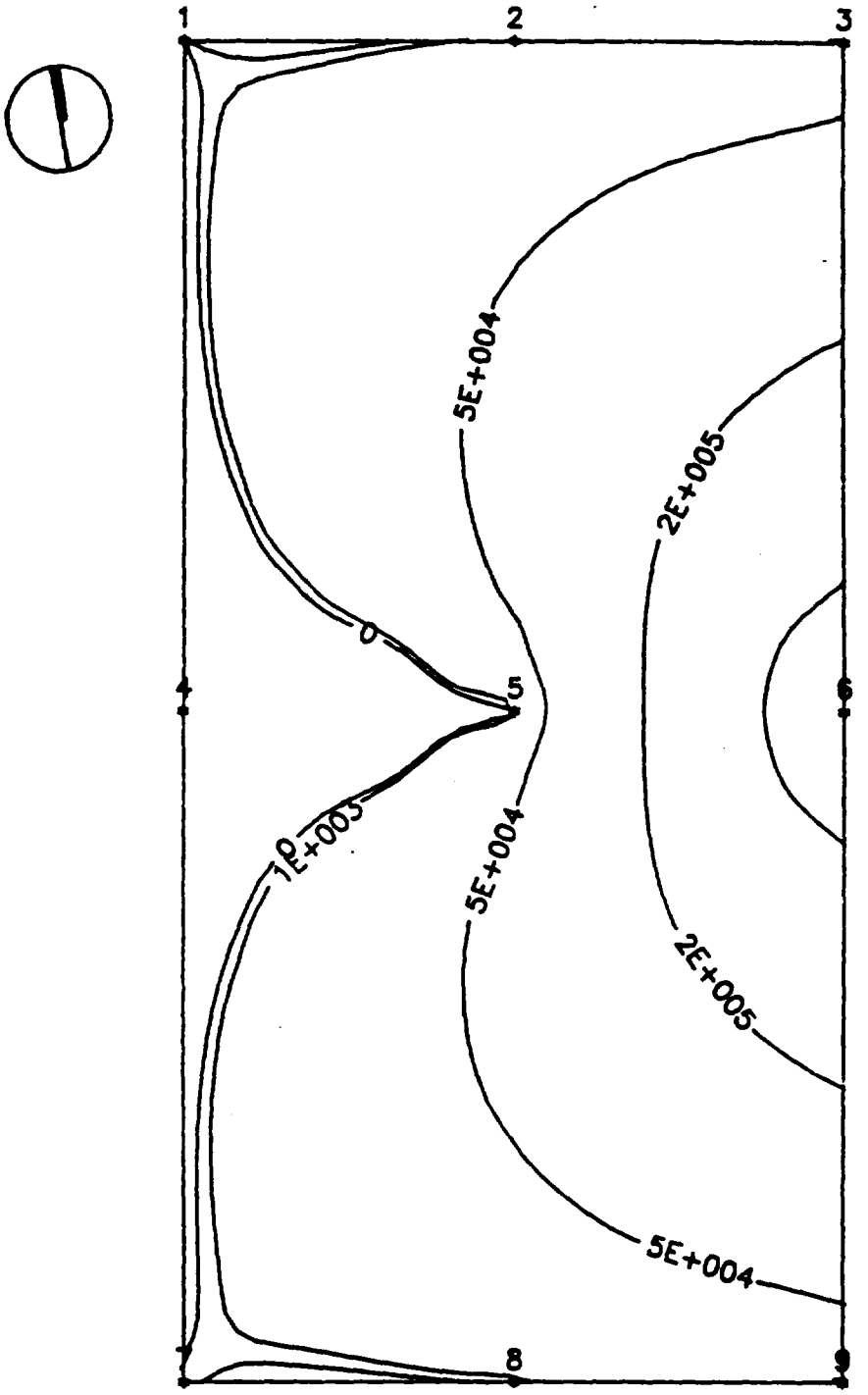


Concentration in ppb or ug/kg

* Sampling Points

FIGURE 6 – ETHYLBENZENE PIT FLOOR

SOIL TECH



Concentration in ppb or ug/kg

* Sampling Points

FIGURE 7 – XYLENE CONTOURS PIT FLOOR

Compound	Sampling Point	Concentration (mg/Kg)
Benzene	5	1.1
Toluene	6	180
Xylene (t)	6	540
Ethylbenzene	6	55

The only soil samples obtained from the tank pit walls that exhibited BTEX concentrations were those of sampling points corresponding to location No. 10 and No. 10-A. These samples revealed concentrations of benzene and ethylbenzene ranging from 9 to 16 ug/Kg.

Figure No. 8 shows Total Petroleum Hydrocarbons in contour format in the tank pit floor area. The only positive value of TPH on the walls of the excavation was at sampling point No. 12 with a concentration of 9 ug/Kg.

In addition to the above listed parameters, the following compounds were reported by Datachem as semi-volatile organics in the pit area:

Compound	Sampling Points
Naphtalene	TP-3 DL, -5, -5A, -6DL, and 8
2-Methylnaphtalene	TP-3 DL, -5, -5A, -6DL, 7, and 8
Fluorene	TP-3, and -6
Phenanthrene	TP-3, and -6

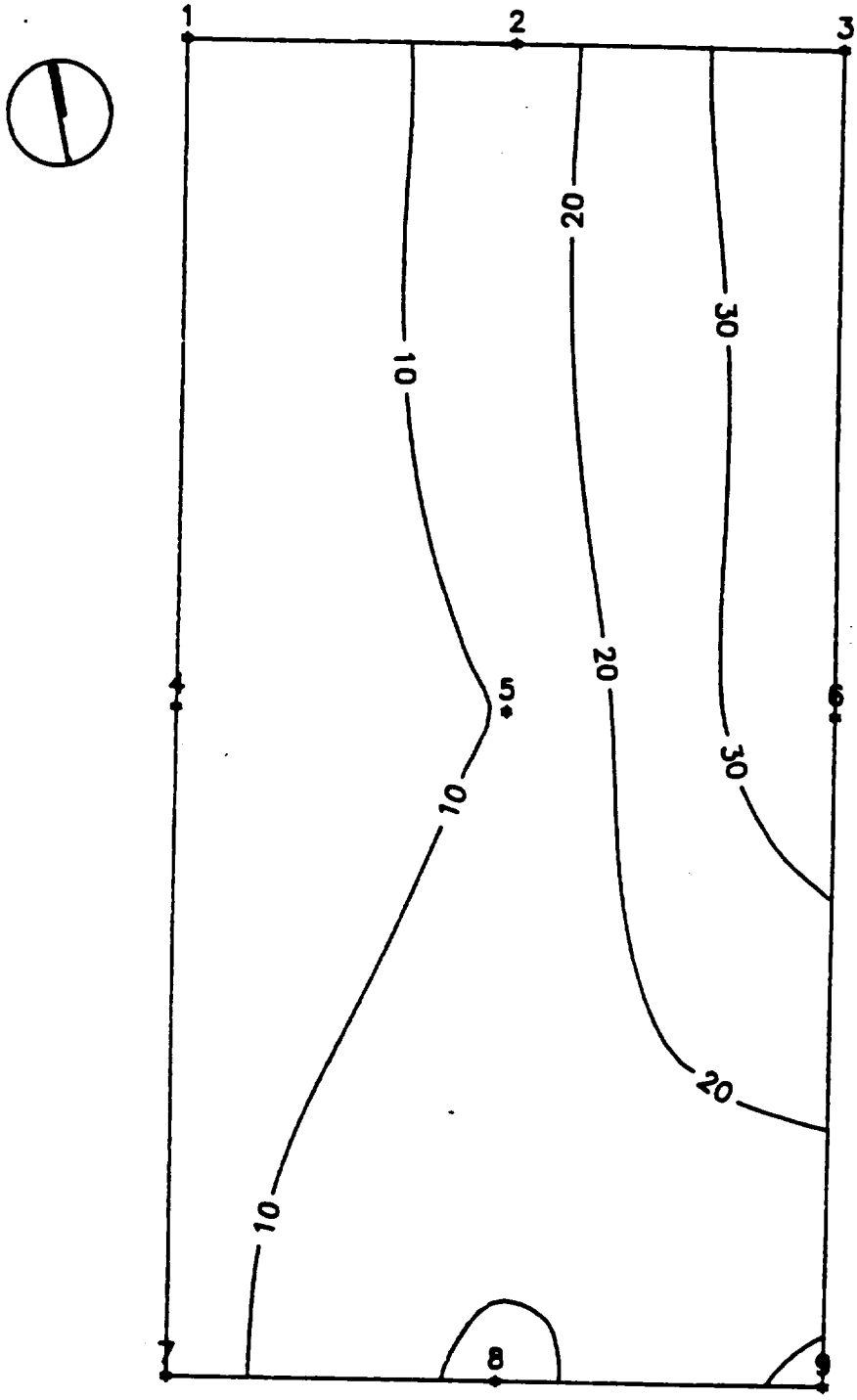


FIGURE 8 – PETROLEUM HYDROCARBON PIT

These are of the functional group of the polynuclear aromatic hydrocarbons.

Concentrations of BTEX and those of other semi-volatile organics (the above listed polynuclear hydrocarbons), are related to unleaded gasoline.

Only soil samples No. TP-3 and TP-6, from the pit area, showed chromium concentrations of 0.2 and 0.1 ug/Kg, respectively.

The laboratory data from the tank pit area did not indicate the presence of chlorinated hydrocarbon compounds. The only chlorinated compound registered in the analyses corresponds to methylene chloride which was found in a field blank. This compound is probably the result of cross contamination in the laboratory.

Acetone was registered in different soil samples, and field and trip blanks. Concentrations of acetone in soil samples are in the same range as those found in the field and trip blanks. Acetone is one of the compounds used for the decontamination process of the field sampling equipment. Therefore, the residues found in the soil and field blanks could be attributed to this activity. The fact of finding acetone concentrations in the trip blanks may be indicative of laboratory cross contamination.

Results of soil samples from the soil pile area are listed on Tables No. 7 through No. 13 as follows:

Table	Content
No. 7 -	Soil Pile area volatile organics
No. 8 -	Soil Pile area volatile organics (Tentatively Identified)
No. 9 -	Soil Pile area semi-volatile organics
No. 10-	Soil Pile area semi-volatile organics (Tentatively Identified)
No. 11-	Soil Pile area Total Petroleum Hydrocarbons
No. 12-	Soil Pile area metals
No. 13-	Soil Pile Ignitability

Chlorinated hydrocarbons, pesticides, and PCB's were not found in samples taken from the soil pile.

Laboratory data from the soil pile on benzene content indicated non-detectable values. This compound which was found in low concentrations (1.1 PPM) at the tank pit, probably vaporized during transportation of the excavated soil to the soil pile. Data on toluene, benzene, and total xylenes in the soil pile indicated only their presence in the following points:

Compound	Sampling Point	Maximum Concentration (mg/Kg)
Toluene	SP-3 Top	1.6
Xylene	SP-3 Top	20.0
Ethylbenzene	SP-3 Top	1.4

SOIL TECH

APPENDIX NO. 1

SUMMARY OF DATACHEM LABORATORY RESULTS

SOIL TECH

Table
Closure Criteria

- Lead < 5 ppm
- TPH $\leq$ 150 ppm
- BTEX $\leq$ 10 ppm
- PAHs $\leq$ 10 ppm
- Ignitability (Flash point > 140 ^{o}F).

Semi-volatile organics were found on samples SP-2 (naphtalene) and SP-2, SP-3 and SP-5 (2-methylnaphtalene).

Values of petroleum hydrocarbons varied from 12 to 24 mg/Kg for the composite samples.

Values of chlorinated hydrocarbons, metals, pesticides, PCBs, and ignitability, were found to be non-detectable and non-ignitable in samples from the soil pile.

Results of laboratory analyses on liquid samples obtained as field and trip blanks are included as part of Appendix No. 1. The results of field blanks indicated the presence of acetone, and methylene chloride. Acetone was used during the decontamination of sampling tools. One trip blank indicated the presence of acetone while carbon disulfide was found in one of the field blanks. The presence of carbon disulfide and methylene chloride may be related to laboratory work or cross contamination.

5.0 SUMMARY OF FINDINGS AND RECOMMENDATIONS

The chemical results reported by the laboratory indicated the following:

(1) No chlorinated hydrocarbons were detected in any of the soil samples obtained from the tank pit or soil pile.

(2) No metals, pesticides, or PCB's were found in any of the soil samples obtained. Ignitability values were below proposed limit (140^{o}).

(3) Concentration of BTEX were found in soil samples from the tank pit and soil pile. These concentrations range from Non-Detectable to not more than 540 mg/Kg.

(4) During the field visual tank inspection, performed by EPA representatives (CDM) and Soil Tech personnel, no evidence of corrosion pits were observed.

(5) Based on the fact that no liquid phase hydrocarbons were observed in the tank pit, the low BTEX concentrations found in soil samples may be related to typical service station operations.

The soil pile venting system has been monitored for the last six months. Vapor samples has been below detection limit during this period. Sample analysis has been performed using an HNU, OVM, and Draeger tubes.

Based on the low BTEX concentrations found originally in the soil samples obtained from the tank pit and soil pile, the monitoring results of the venting system, and closure criteria established in the Work Plan (see enclosed table), we recommend that the soil pile material be released from any further venting requirements and be allowed to be disposed off at the Bovonis Landfill in St. Thomas. Before final disposal of the soil is conducted, a soil pile sampling and chemical analysis shall be performed to verify that the closure criteria established in the Work Plan has been satisfied. The chemical parameters recommended for analysis shall be PAH's and BTEX. The rationale behind this recommendation is that the initial values for chlorinated hydrocarbons, lead, TPH, and ignitability were below closure levels.

Respectfully submitted,

José C. Agrelot, MSCE, P.E.
Consulting Engineer

JCA/lvl/c:88364B

Appendix No. 1 - Summary of Datachem Laboratory Results

SOIL TECH

SOIL SAMPLES

CHEMICAL RESULTS

SOIL TECH

Definition of Terms
Soil Samples

TP	Tank pit sample
SP	Soil pile sample
B	The analyte was found in the method blank. The reported results have been adjusted for the quantity found in the blank.
E	The reported concentration is on estimate only. The response factor was assumed to be 1.000 relative to an internal standard.
J	Indicated an estimated concentration below the Method Detection Limit.
K	The isometer is unknown.
N	Analytical standard were not analyzed for this compound.
U	Not detected with the corresponding Method Detection Limit. The value presented on the table correspond to the Method Detection Limit.
RE	Replicate
DUP	Duplicate
MS	Matrix spike
MSD	Matrix spike duplicate
DL	Diluted

SOIL TECH

TABLE No. 1 PIT AREA (VOLATILE ORGANICS ANALYSIS) - UG/KG

	TP-1	TP-2	TP-3	TP-4	TP-5	TP-5A	TP-5AMS	TP-5AMSD	TP-6
ACETONE	12 U	57 U	1400 U	14	1400 U	1400 U	1400 U	1400 U	47000 U
2-BUTANONE	12 U	57 U	400 BJ	11 U	3600 B	4400 B	4000 B	4500 B	19000 BJ
BENZENE	6 U	28 U	230 J	2 J	1100	870	720 U	720 U	23000 J
TOLUENE	6 U	28 U	5200	6 U	720 U	720 U	720 U	720 U	180000
ETHYLBENZENE	6 U	28 U	2100	5 J	7000	14000	15000	16000	55000
TOTAL XYLENES	6 U	1600 E	31000 E	6 U	720 U	720 U	720 U	720 U	540000

PIT AREA (VOLATILE ORGANICS ANALYSIS) - UG/KG

	TP-7	TP-8	TP-9	TP-10	TP-10A	TP-10RE	TP-11	TP-12	TP-13
ACETONE	29	57 U	5 J	12 U	53	32	12 U	12 U	110
2-BUTANONE	12 U	57 U	12 U	5 J	4 J	12 U	12 U	12 U	4 J
BENZENE	6 U	93	6 U	3 J	13	9	6 U	6 U	6 U
TOLUENE	6 U	29 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U
ETHYLBENZENE	5 J	520	6 U	9	16	14	6 U	6 U	6 U
TOTAL XYLENES	300 E	220	6 U	6 U	6 U	6 U	6 U	6 U	6 U

SOIL TECH

TABLE No. 2 PIT AREA (VOLATILE ORGANICS ANALYSIS) - UG/KG
-TENTATIVELY IDENTIFIED COMPOUNDS-

	TP-1	TP-2	TP-3	TP-4	TP-5	TP-5A	TP-6
2-METHOXY-2-METHYL PROPANE	19 J	4100 J	1100 J	330 BJ	9000 BJ	6300 BJ	24000 BJ
1,4-DIOXANE							
C2-SUBSTITUTED BENZENE	570 J						
C3-SUBSTITUTED BENZENE							
C5-OXY HYDROCARBON	18 J			53 J			
C6-UNSATURATED HYDROCARBON					2600 J	3600 J	
C6-HYDROCARBON		270 J	750 J		8100 J	5000 J	25000 J
C6-HYDROCARBON		430 J	1100 J			13000 J	26000 J
C6-HYDROCARBON		390 J					
C7-UNSATURATED HYDROCARBON					1400 J		
C7-HYDROCARBON	8 J	1000 J	3000 J		20000 J	8900 J	110000 J
C7-HYDROCARBON		790 J	2100 J		16000 J	32000 J	100000 J
C7-HYDROCARBON		660 J				26000 J	80000 J
C8-HYDROCARBON		450 J	1400 J		43000 J	56000 J	
C8-HYDROCARBON		1400 J	2000 J		11000 J	16000 J	
C8-HYDROCARBON		920 J			9500 J	16000 J	
C9-HYDROCARBON					17000 J		

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TABLE No. 2 (Cont'd) PIT AREA (VOLATILE ORGANICS ANALYSIS) - UG/KG
-TENTATIVELY IDENTIFIED COMPOUNDS-

	TP-7	TP-8	TP-9	TP-10	TP-10A	TP-10BE	TP-11	TP-12	TP-13
2-METHOXY-2-METHYL PROPANE	1400 J	3600 J	12 J	1200 BJ	860 BJ	1100 J	160 BJ	32 J	49 J
1,4-DIOXANE			26 BJ						
C2-SUBSTITUTED BENZENE									
C3-SUBSTITUTED BENZENE							35 J		
C5-OXY HYDROCARBON	23 J		13 J	30 J	13 J	26 J	16 J	7.2 J	23 J
C6-UNSATURATED HYDROCARBON	26 J	310 J							
C6-HYDROCARBON	57 J	290 J							
C6-HYDROCARBON	57 J	610 J							
C6-HYDROCARBON									
C7-UNSATURATED HYDROCARBON									
C7-HYDROCARBON	190 J	410 J	8.5 J			5.8 J			
C7-HYDROCARBON	140 J	1500 J	21 J						
C7-HYDROCARBON		1200 J	14 J						
C8-HYDROCARBON	190 J	400 J	47 J	27 J	12 J				
C8-HYDROCARBON	80 J	4600 J	27 J						
C8-HYDROCARBON	180 J	870 J	67 J						
C9-HYDROCARBON			82 J					16 J	

SOIL TECH

TABLE No. 3 PIT AREA (SEMIVOLATILE ORGANICS ANALYSIS) - UG/KG

	TP-1	TP-2	TP-3	TP-3DL	TP-4	TP-4DUP	TP-5	TP-5A	TP-c	TP-cDL
NAPHTHALENE			3200 J	49000			9000	7900	45000 E	55000
2-METHYLNAPHTHALENE	110 J	680 J	45000 E	45000			9600	11000	47000 E	47000
ACENAPHTHENE			400 J							
DIETHYLPHTHALATE								130 J		
FLUORENE		180 J	1400	1600 J				690 J	[illegible]	2000 J
PHENANTHRENE		120 J	1100	1200 J			370 J	470 J	[illegible]	1500 J
ANTHRACENE			130 J							
FLUORANTHENE			120 J					[illegible]		
PYRENE			210 J					90 J	[illegible]	
DI-n-BUTYLPHTHALATE	69 BJ							200 BJ		
BUTYLBENZYLPHTHALATE								1000		
bis-(2-ETHYLHEXYL) PHTHALATE	230 BJ		400 BJ				110 BJ	250 BJ	[illegible]	

TABLE No. 3 (Cont'd) PIT AREA (SEMIVOLATILE ORGANICS ANALYSIS) - UG/KG

	TP-7	TP-8	TP-9	TP-10	TP-10A	TP-10MS	TP-10MSD	TP-11
NAPETHALENE	300 J	1100		190 J				
2-METHYLNAPETHALENE	1100	2000	140 J	180 J				
ACENAPETHENE								
DIETHYLPETHALATE								
FLUORENE	290 J	290 J						
PHENANTHRENE	160 J	180 J						
ANTHRACENE								
FLUORANTHENE								
PYRENE								
DI-n-BUTYLPHTHALATE			63 BJ	94 BJ		53 BJ		
BUTYLBENZYLPHTHALATE				310 J		21 J		
bis-(2-ETHYLHEXYL) PHTHALATE				360 BJ	130 BJ		140 BJ	

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SOIL TECH

TABLE No. 4 PIT AREA (SEMIVOLATILE ORGANICS ANALYSIS) - UG/KG
-TENTATIVELY IDENTIFIED COMPOUNDS-

	TP-1	TP-2	TP-3	TP-3DL	TP-4	TP-4DUP	TP-5	TP-5A	TP-6	TP-6DL
ALDOL CONDENSATION PRODUCT	730 ABJ				630 ABJ	710 ABJ		660 ABJ		
ETHYL METHYL BENZENE		1200 J		520000 J			4500 J	9600 J	230000 J	470000 J
ETHYL METHYL BENZENE		1400 J					14000 J		77000 J	140000 J
ETHYL-DIMETHYL BENZENE	370 J		91000 J	32000 J			5200 J	4300 J	20000 J	30000 J
ETHYL-DIMETHYL BENZENE			94000 J				9700 J	3800 J	54000 J	80000 J
ETHYL-DIMETHYL BENZENE			26000 J					7000 J	55000 J	97000 J
DIMETHYL ETHYL BENZENE			52000 J	140000 J				4000 J	81000 J	69000 J
DIMETHYL ETHYL BENZENE								63000 J		
METHYL-METHYLETHYL BENZENE									130000 J	130000 J
METHYL ETHYL BENZENE			35000 J	44000 J				11000 J		
METHYL ETHYL BENZENE			90000 J	150000 J						

TABLE No. 4 (Cont'd) PIT AREA (SEMIVOLATILE ORGANICS ANALYSIS) - UG/KG
-TENTATIVELY IDENTIFIED COMPOUNDS-

	TP-7	TP-8	TP-9	TP-10	TP-10A	TP-11	TP-12	TP-13
ALDOL CONDENSATION PRODUCT	640 ABJ		740 ABJ	830 ABJ	820 ABJ	780 ABJ	830 ABJ	650 ABJ
ETHYL METHYL BENZENE	2000 J							
ETHYL METHYL BENZENE	680 J							
ETHYL-DIMETHYL BENZENE	1400 J	1200 J						
ETHYL-DIMETHYL BENZENE	1200 J	2700 J						
ETHYL-DIMETHYL BENZENE	1900 J	1900 J						
DIMETHYL ETHYL BENZENE	2200 J							
DIMETHYL ETHYL BENZENE								
METHYL-METHYLETHYL BENZENE								
METHYL ETHYL BENZENE								
METHYL ETHYL BENZENE								

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TABLE No. 4 (Cont'd)

PIT AREA (SEMIVOLATILE ORGANICS ANALYSIS) - UG/KG (CONT.)
-TENTATIVELY IDENTIFIED COMPOUNDS-

	TP-1	TP-2	TP-3	TP-3DL	TP-4	TP-4DUP	TP-5	TP-5A	TP-6	TP-6DL
C5 SUBST. BENZENE		1100 J	45000 J	60000 J			6500 J	7700 J	38000 J	57000 J
C5 SUBST. BENZENE			32000 J	26000 J				5300 J	16000 J	24000 J
C5 SUBST. BENZENE		3200 J		27000 J				3900 J	16000 J	
C5 SUBST. BENZENE/UNKNOWN										
C6 SUBST. BENZENE										
UNKNOWN SUBST. BENZENE										
C10 HYDROCARBON	650 J									
C10 HYDROCARBON/CYCLOHYDROCA										
MIXED SPECTRA-SUBST. BENZENE							2900 J			
1-METHYL NAPETHALENE		1400 J	27000 J	32000 J			6000 J	6400 J	21000 J	30000 J
5-METEYL-1(3H)ISOBENZOFURANO	530 J									
DIHYDRO-DIMETHYL INDENE										
DIMETHYL NAPHTHALENE		990 J	15000 J				3100 J	3100 J		
DIMETHYL NAPHTHALENE		1300 J						3800 J		
1,1'-BIPHENYL							4300 J	4100 J		
OXYHYDROCARBON										
CYCLOHYDROCARBON		1800 J	230000 J	100000 J						100000 J
CYCLOHYDROCARBON			350000 J							
CYCLOHYDROCARBON			47000 J							
DECANE	390 J									
DODECANE										
CARBOXILIC ACID TYPE										

SOIL TECH

TABLE No. 4 (Cont'd) PIT AREA (SEMIVOLATILE ORGANICS ANALYSIS) - UG/KG (CONT.)
-TENTATIVELY IDENTIFIED COMPOUNDS-

	TP-1	TP-2	TP-3	TP-3DL	TP-4	TP-4DUP	TP-5	TP-5A	TP-6	TP-6DL
METHYL PROPYL BENZENE		160 J	30000 J	170000 J			15000 J	4900 J	94000 J	160000 J
METHYL PROPYL BENZENE		910 J		110000 J			37000 J	5700 J	27000 J	41000 J
METHYL PROPYL BENZENE				45000 J						
BUTYL-BENZENE			130000 J							
PROPYL BENZENE				110000 J				2500 J		
DIMETHYL BENZENE			46000 J							
TRIMETHYL BENZENE		2800 J	140000 J	240000 J			11000 J		120000 J	200000 J
TRIMETHYL BENZENE		1000 J		650000 J						
TRIMETHYL BENZENE		2700 J		220000 J						
TRIMETHYL BENZENE ISOMER							7200 J	5600 J		
TRIMETHYL BENZENE ISOMER								11000 J		
TRIMETHYL BENZENE ISOMER								7200 J		
TETRAMETHYL BENZENE		3300 J	66000 J	84000 J						
TETRAMETHYL BENZENE				99000 J						
DIETHYL BENZENE			120000 J				11000 J			
2-ETHYL-1,4DIMETHYL-BENZENE		900 J								
DIMETHYL-BENZENE METHANOL										
C3 SUBST. BENZENE		940 J					4600 J		21000 J	28000 J
C3 SUBST. BENZENE		3400 J					4800 J		53000 J	89000 J
C3 SUBST. BENZENE									110000 J	220000 J
C3 SUBST. BENZENE									290000 J	590000 J
C3 UNSAT. SUBST. BENZENE				63000 J						59000 J
C4 SUBST. BENZENE	340 J	1500 J	52000 J				5200 J	9900 J	62000 J	97000 J
C4 SUBST. BENZENE		2900 J					8900 J			
C4 SUBST. BENZENE							14000 J			
C4 SUBST. BENZENE/UNKNOWN		1400 J								

SOIL TECH

TABLE No. 4 (Cont'd) PIT AREA (SEMIVOLATILE ORGANICS ANALYSIS) - UG/KG (CONT.)
-TENTATIVELY IDENTIFIED COMPOUNDS-

	TP-1	TP-2	TP-3	TP-3DL	TP-4	TP-4DUP	TP-5	TP-5A	TP-6	TP-6DL
C5 SUBST. BENZENE		1100 J	45000 J	60000 J			6500 J	7700 J	35000 J	57000 J
C5 SUBST. BENZENE			32000 J	26000 J				5300 J	16000 J	24000 J
C5 SUBST. BENZENE		3200 J		27000 J				3900 J	16000 J	
C5 SUBST. BENZENE/UNKNOWN										
C6 SUBST. BENZENE										
UNKNOWN SUBST. BENZENE										
C10 HYDROCARBON	650 J									
C10 HYDROCARBON/CYCLOHYDROCA										
MIXED SPECTRA-SUBST. BENZENE							2900 J			
1-METHYL NAPETHALENE		1400 J	27000 J	32000 J			6000 J	6400 J	21000 J	30000 J
5-METHYL-1(3H)ISOBENZOFURANO	530 J									
DIHYDRO-DIMETHYL INDENE										
DIMETHYL NAPETHALENE		990 J	15000 J				3100 J	3100 J		
DIMETHYL NAPETHALENE		1300 J						3800 J		
1,1'-BIPHENYL							4300 J	4100 J		
OXYHYDROCARBON										
CYCLOHYDROCARBON		1800 J	230000 J	100000 J						100000 J
CYCLOHYDROCARBON			350000 J							
CYCLOHYDROCARBON			47000 J							
DECANE	390 J									
DODECANE										
CARBOXILIC ACID TYPE										

SOIL TECH

TABLE No. 4 (Cont'd) PIT AREA (SEMIVOLATILE ORGANICS ANALYSIS) - UG/KG (CONT.)
-TENTATIVELY IDENTIFIED COMPOUNDS-

	TP-7	TP-8	TP-9	TP-10	TP-10A	TP-11	TP-12	TP-13
C5 SUBST. BENZENE	1100 J	1500 J	480 J					
C5 SUBST. BENZENE	640 J	710 J	420 J					
C5 SUBST. BENZENE	760 J							
C5 SUBST. BENZENE/UNKNOWN		1800 J						
C6 SUBST. BENZENE	730 J							
UNKNOWN SUBST. BENZENE			330 J					
C10 HYDROCARBON			340 J					
C10 HYDROCARBON/CYCLOHYDROCA		1000 J						
MIXED SPECTRA-SUBST. BENZENE								
1-METHYL NAPHTHALENE	880 J	1500 J						
5-METHYL-1(3H)ISOBENZOFURANO			500 J					
DIHYDRO-DIMETHYL INDENE	700 J	1200 J						
DIMETHYL NAPHTHALENE	630 J	1100 J						
DIMETHYL NAPHTHALENE		1600 J						
1.1'-BIPHENYL	2300 J	2300 J						
OXYHYDROCARBON		1800 J						
CYCLOHYDROCARBON								
CYCLOHYDROCARBON								
CYCLOHYDROCARBON								
DECANE								
DODECANE		1400 J						
CARBOXILIC ACID TYPE			700 J					

SOIL TECH

TABLE No. 4 (Cont'd) PIT AREA (SEMIVOLATILE ORGANICS ANALYSIS) - UG/KG (CONT.)
-TENTATIVELY IDENTIFIED COMPOUNDS-

	TP-7	TP-8	TP-9	TP-10	TP-10A	TP-11	TP-12	TP-13
METHYL PROPYL BENZENE								
METHYL PROPYL BENZENE								
METHYL PROPYL BENZENE								
BUTYL-BENZENE								
PROPYL BENZENE								
DIMETHYL BENZENE								
TRIMETHYL BENZENE	1300 J	1000 J	480 J	320 J				
TRIMETHYL BENZENE	1400 J	1800 J	460 J					
TRIMETHYL BENZENE	1500 J							
TRIMETHYL BENZENE ISOMER								
TRIMETHYL BENZENE ISOMER								
TRIMETHYL BENZENE ISOMER								
TETRAMETHYL BENZENE	1500 J		960 J					
TETRAMETHYL BENZENE								
DIETHYL BENZENE	2500 J	2600 J	360 J					
2-ETHYL-1,4DIMETHYL-BENZENE								
DIMETHYL-BENZENE METHANOL			1200 J					
C3 SUBST. BENZENE								
C3 SUBST. BENZENE								
C3 SUBST. BENZENE								
C3 SUBST. BENZENE								
C3 UNSAT. SUBST. BENZENE		1400 J						
C4 SUBST. BENZENE	2400 J	2400 J	710 J					
C4 SUBST. BENZENE		3900 J	520 J					
C4 SUBST. BENZENE			1100 J					
C4 SUBST. BENZENE/UNKNOWN								

SOIL TECH

TABLE No. 5

PIT AREA (PETROLEOUM HYDROCARBONS ANALYSIS)

SAMPLE	PETROLEOUM HYDROCARBONS (MG/KG)
TP-1	ND
TP-2	15
TP-3	40
TP-4	ND
TP-5	10
TP-5A	11
TP-6	40
TP-7	6
TP-8	23
TP-9	7
TP-10	ND
TP-10A	ND
TP-11	ND
TP-12	9
TP-13	ND

ND - PARAMETER NOT DETECTED

SOIL TECH

TABLE No. 6

PIT AREA (METAL ANALYSIS)

SAMPLE	LEAD UG/L	ARSENIC UG/L	CHROMIUM UG/L	SELENIUM UG/L
TP-1	ND	ND	ND	ND
TP-2	ND	ND	ND	ND
TP-3	ND	ND	0.2	ND
TP-4	ND	ND	ND	ND
TP-5	ND	ND	ND	ND
TP-5A	ND	ND	ND	ND
TP-6	ND	ND	0.1	ND
TP-7	ND	ND	ND	ND
TP-8	ND	ND	ND	ND
TP-9	ND	ND	ND	ND
TP-10	ND	ND	ND	ND
TP-10A	ND	ND	ND	ND
TP-11	ND	ND	ND	ND
TP-12	ND	ND	ND	ND
TP-13	ND	ND	ND	ND

ND = NOT DETECTED

SOIL TECH

TABLE No. 7 SOIL PILE (VOLATILE ORGANICS ANALYSIS) - UG/KG

	SP-1-TOP	SP-1-MID	SP-1-BOT	SP-2-TOP	SP-2-MID	SP-2-BOT	SP-3-TOP	SP-3-MID	SP-3-BOT
METHYLENE CHLORIDE	3 J	5 U	5 U	14 U	690 U	28 U	690 U	4 J	6 U
ACETONE	6 J	11 U	11 U	28 U	1400 U	56 U	1400 U	7 J	11 U
2-BUTANONE	11 U	11 U	11 U	28 U	3200 B	56 U	3600 B	11 U	3 J
VINYL ACETATE	11 U	11 U	11 U	28 U	1400 U	56 U	210 J	11 U	11 U
BENZENE	5 U	5 U	5 U	14 U	33 J	28 U	690 U	6 U	6 U
TOLUENE	5 U	5 U	5 U	14 U	690 U	28 U	1600	6 U	6 U
ETHYLBENZENE	5 U	5 U	27	25	830	28 U	1400	6 U	3 J
TOTAL XYLENES	46	5 U	140	923 E	16000	580	20000	73	140

	SP-4-TOP	SP-4-DU-T	SP-4-MID	SP-4-DU-M	SP-4-BOT	SP-4-DU-B	SP4DUPMMD	SP4DUPMMS	SP-5-TOP
METHYLENE CHLORIDE	5 U	5 U	6 U	6 U	5 U	5 U	6 U	6 U	5 U
ACETONE	11 U	11 U	11 U	11 U	5 J	11 U	11 U	11 U	11 U
2-BUTANONE	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U
VINYL ACETATE	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U
BENZENE	5 U	5 U	6 U	6 U	5 U	5 U	6 U	6 U	5 U
TOLUENE	5 U	5 U	6 U	6 U	5 U	5 U	6 U	6 U	5 U
ETHYLBENZENE	5 U	5 U	6 U	6 U	5 U	5 U	6 U	6 U	5 U
TOTAL XYLENES	5 U	5 U	6 U	6 U	5 U	5 U	6 U	6 U	5 U

	SP-5-MID	SP-5-BOT	SP-6-TOP	SP-6-MID	SP-6-BOT	SP-7-TOP	SP-7-MID	SP-7-BOT
METHYLENE CHLORIDE	6 U	6 U	6 U	6 U	6 U	690 U	3 J	1 J
ACETONE	11 U	11 U	13 U	11 U	11 U	1400 U	56	9 J
2-BUTANONE	11 U	11 U	13 U	11 U	11 U	2900 B	6 J	11 U
VINYL ACETATE	11 U	11 U	13 U	11 U	11 U	1400 U	11 U	11 U
BENZENE	6 U	6 U	6 U	6 U	6 U	690 U	6 U	5 U
TOLUENE	6 U	6 U	6 U	6 U	6 U	690 U	6 U	5 U
ETHYLBENZENE	6 U	6 U	6 U	6 U	6 U	690 U	6 U	5 U
TOTAL XYLENES	46	6 U	6 U	6 U	9	7000	6 U	72

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SOIL TECH

TABLE No. 8 SOIL PILE (VOLATILE ORGANICS ANALYSIS) - UG/KG (CONT.)

-TENTATIVELY IDENTIFIED COMPOUNDS-

	SP-1-TOP	SP-1-MID	SP-1-BOT	SP-2-TOP	SP-2-MID	SP-2-BOT	SP-3-TOP	SP-3-MID	SP-3-BOT
2-METHOXY-2-METHYL PROPANE	25 J			1200 J		2100 J	20 J		
PENTANE			54 J						
1,4-DIOXANE									
C2-SUBSTITUTED BENZENE									350 J
C3-SUBSTITUTED BENZENE									
C4-SUBSTITUTED BENZENE					280 J				
C5-OXY HYDROCARBON		22 J	20 J						13 J
C6-UNSATURATED HYDROCARBON			22 J	57 J	740 J		1200 J		
C6-HYDROCARBON			110 J	71 J	2500 J	34 J	2600 J	59 J	19 J
C6-HYDROCARBON				170 J	3200 J	62 J	4500 J	60 J	19 J
C6-HYDROCARBON				260 J		72 J	5100 J		
C6-HYDROCARBON				230 J					
C7-HYDROCARBON	8.7 J	6.7 J	180 J	150 J	2400 J	67 J	4300 J	74 J	92 J
C7-HYDROCARBON	30 J		580 J	650 J	9000 J	230 J	15000 J	280 J	76 J
C7-HYDROCARBON	22 J		470 J	820 J	7100 J	180 J	12000 J		
C7-HYDROCARBON	37 J					510 J	22000 J		
C8-UNSATURATED HYDROCARBON									
C8-HYDROCARBON	9.5 J	6.8 J	520 J	430 J	21000 J	240 J	13000 J	610 J	73 J
C8-HYDROCARBON	23 J	10 J	260 J		5700 J	330 J		180 J	150 J
C8-HYDROCARBON	68 J		750 J		5800 J			400 J	97 J
C8-HYDROCARBON	40 J							230 J	330 J
C8-HYDROCARBON								540 J	
C9-UNSATURATED HYDROCARBON		23 J							
C9-HYDROCARBON									
UNKNOWN			92 J						

SOIL TECH

TABLE No. 8 (Cont'd) SOIL PILE (VOLATILE ORGANICS ANALYSIS) - UG/KG (CONT.)

-TENTATIVELY IDENTIFIED COMPOUNDS-

	SP-4-TOP	SP-4-DU-T	SP-4-MID	SP-4-DU-M	SP-4-BOT	SP-4-DU-B	SP-5-TOP	SP-5-MID	SP-5-BOT
2-METHOXY-2-METHYL PROPANE									
PENTANE									
1,4-DIOXANE			28 BJ						
C2-SUBSTITUTED BENZENE									
C3-SUBSTITUTED BENZENE					54 J				
C4-SUBSTITUTED BENZENE					240 J				
C5-OXY HYDROCARBON			14 J	19 J	7.4 J	13 J	7.6 J	6.2 J	16 J
C6-UNSATURATED HYDROCARBON									
C6-HYDROCARBON		6.9 J			6.6 J				22 J
C6-HYDROCARBON									
C6-HYDROCARBON									
C6-HYDROCARBON									
C7-HYDROCARBON	9.1 J	12 J	8.2 J		11 J		8.5 J	12 J	42 J
C7-HYDROCARBON	27 J	15 J	20 J		26 J		27 J	12 J	150 J
C7-HYDROCARBON	20 J	24 J	12 J		16 J		23 J		120 J
C7-HYDROCARBON									
C8-UNSATURATED HYDROCARBON									
C8-HYDROCARBON	25 J	24 J	23 J		21 J		71 J	29 J	270 J
C8-HYDROCARBON	8.7 J	16 J	22 J		42 J		14 J	12 J	80 J
C8-HYDROCARBON	22 J	36 J	48 J		31 J		33 J	43 J	330 J
C8-HYDROCARBON	65 J	24 J	31 J				91 J	29 J	270 J
C8-HYDROCARBON	43 J		60 J				58 J		
C9-UNSATURATED HYDROCARBON		38 J							
C9-HYDROCARBON	60 J						91 J		250 J
UNKNOWN	62 J								

SOIL TECH

TABLE No. 8 (Cont'd) SOIL PILE (VOLATILE ORGANICS ANALYSIS) - UG/KG (CONT.

-TENTATIVELY IDENTIFIED COMPOUNDS-

	SP-6-TOP	SP-6-MID	SP-6-BOT	SP-7-TOP	SP-7-MID	SP-7-BOT
2-METHOXY-2-METHYL PROPANE	23 J	9.3 J				
PENTANE						
1,4-DIOXANE						
C2-SUBSTITUTED BENZENE						
C3-SUBSTITUTED BENZENE						
C4-SUBSTITUTED BENZENE						
C5-OXY HYDROCARBON	41 J	17 J	48 J		110 J	11 J
C6-UNSATURATED HYDROCARBON						
C6-HYDROCARBON				1100 J		
C6-HYDROCARBON				1300 J		
C6-HYDROCARBON						
C6-HYDROCARBON						
C7-HYDROCARBON			13 J	1100 J		
C7-HYDROCARBON			9.1 J	4400 J		
C7-HYDROCARBON				3600 J		
C7-HYDROCARBON						
C8-UNSATURATED HYDROCARBON			9.4 J			
C8-HYDROCARBON			29 J	6700 J		40 J
C8-HYDROCARBON			15 J	1300 J		22 J
C8-HYDROCARBON			12 J	2900 J		16 J
C8-HYDROCARBON				8700 J		
C8-HYDROCARBON				4400 J		
C9-UNSATURATED HYDROCARBON						
C9-HYDROCARBON						
UNKNOWN						

SOIL TECH

TABLE No. 9 SOIL PILE (SEMIVOLATILE ORGANICS ANALYSIS) - UG/KG

	SP-1	SP-2	SP-3	SP-4	SP-4DUP	SP-5	SP-6	SP-6MS
NAPHTHALENE		2600	320 J			160 J		
2-METHYLNAPHTHALENE	180 J	5200	1700	65 J	82 J	810		
FLUORENE	160 J	330 J	260 J			160 J		
PHENANTHRENE	150 J	230 J	220 J			120 J		
DI-n-BUTYLPHTHALATE	48 BJ			98 BJ	100 BJ	45 BJ		
bis-(2-ETHYLHEXYL) PHTHALATE	160 BJ	130 BJ	110 BJ	130 BJ				100 BJ

TABLE No. 10 SOIL PILE (SEMIVOLATILE ORGANICS ANALYSIS) - UG/KG
-TENTATIVELY IDENTIFIED COMPOUNDS-

	SP-1	SP-2	SP-3	SP-4	SP-4DUP	SP-5	SP-6	SP-7
ALDOL CONDENSATION PRODUCT				530 AJ	600 ABJ		920 ABJ	730 ABJ
ETHYL METHYL BENZENE		5900 J				1300 J		2600 J
ETHYL METHYL BENZENE		3100 J				3500 J		
ETHYL-DIMETHYL BENZENE	2200 J	4700 J	3300 J			1200 J		
ETHYL-DIMETHYL BENZENE			1900 J					
ETHYL-DIMETHYL BENZENE			9300 J					
METHYL PROPYL BENZENE		4600 J	3500 J			1100 J		6200 J
METHYL PROPYL BENZENE		3500 J						3600 J
METHYL PROPYL BENZENE		2000 J						2000 J
TRIMETHYL BENZENE	1700 J	6400 J	4700 J			3200 J		2500 J
TRIMETHYL BENZENE	2100 J	7000 J	5300 J					5100 J
TRIMETHYL BENZENE								6700 J
TETRAMETHYL BENZENE	2200 J	4500 J	4700 J			2600 J		6100 J
TETRAMETHYL BENZENE		5500 J	5200 J			3100 J		6700 J
PENTAMETHYL BENZENE	800 J							

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SOIL TECH

TABLE No. 10 (Cont'd) SOIL PILE (SEMIVOLATILE ORGANICS ANALYSIS) - UG/KG (CONT.)
-TENTATIVELY IDENTIFIED COMPOUNDS-

	SP-1	SP-2	SP-3	SP-4	SP-4DUP	SP-5	SP-6	SP-7
DIETHYL BENZENE	820 J					2200 J		
C3 SUBST. BENZENE		6300 J						
C4 SUBST. BENZENE	2800 J	3400 J	4800 J	350 J	350 J	3100 J		6900 J
C4 SUBST. BENZENE	2900 J	5400 J	2000 J			3400 J		
C4 SUBST. BENZENE			6000 J					
C4-C5 SUBST. BENZENE								5500 J
C5 SUBST. BENZENE	1100 J	3300 J	2900 J			1600 J		3500 J
C5 SUBST. BENZENE	810 J	1800 J	1900 J			1000 J		1600 J
C5 SUBST. BENZENE	1100 J		2100 J			1100 J		2300 J
C5 SUBST. BENZENE	770 J							1500 J
C5 SUBST. BENZENE	950 J							1500 J
C5 SUBST. BENZENE	850 J							2000 J
C5 SUBST. BENZENE/UNKNOWN						710 J		
C10 SUBST. BENZENE/C10 HYDRO			2400 J					
C10 HYDROCARBON	640 J	3600 J	2800 J	370 J	340 J			
C10 ALKALANE/C3 SUBST BENZEN						1200 J		
C11 HYDROCARBON/C4 SUBST BEN				370 J				
C11 ALKALANE								1900 J
C18 BRANCHED ALKALANE				450 J				
C19 BRANCHED ALKALANE				440 J				
C27 BRANCHED ALKALANE				430 J				
1-METHYL NAPHTHALENE	840 J	2600 J	2200 J	1100 J				3500 J
DIMETHYL NAPHTHALENE	860 J	1300 J	1800 J	1100 J				
DIMETHYL NAPHTHALENE	1500 J	1600 J						
4-PROPYL-HEPTANE								1900 J

SOIL TECH

TABLE No. 10 (Cont'd) SOIL PILE (SEMIVOLATILE ORGANICS ANALYSIS) - UG/KG (CONT.)
-TENTATIVELY IDENTIFIED COMPOUNDS-

	SP-1	SP-2	SP-3	SP-4	SP-4DUP	SP-5	SP-6	SP-7
PNA		1300 J						
POLYCYCLOHYDROCARBON			2300 J					
CYCLOHYDROCARBON						600 J		
CYCLOHYDROCARBON						1400 J		
DECANE			2500 J	360 J	360 J	1300 J		
UNDECANE	550 J			360 J	290 J			
DODECANE	840 J			360 J				
TRIDECANE				410 J	320 J			
TETRADECANE				410 J				
HEXADECANE				450 J				
HEPTADECANE				400 J				
OCTADECANE				470 J	280 J			
NONADECANE				510 J	270 J			
EICOSANE				360 J				
HENEICOSANE				400 J				
TETRACOSANE				360 J				
PENTACOSANE				470 J				

SOIL TECH

TABLE No. 11

SOIL PILE (PETROLEOUM HYDROCARBONS ANALYSIS)

SAMPLE	PETROLEOUM HYDROCARBONS (MG/KG)
SP-1	18
SP-2	24
SP-3	21
SP-4	20
SP-4DUP	14
SP-5	19
SP-6	12
SP-7	12

SOIL TECH

TABLE No. 10 (Cont'd) SOIL PILE (SEMIVOLATILE ORGANICS ANALYSIS) - UG/KG (CONT.)
-TENTATIVELY IDENTIFIED COMPOUNDS-

	SP-1	SP-2	SP-3	SP-4	SP-4DUP	SP-5	SP-6	SP-7
DIETHYL BENZENE	820 J					2200 J		
C3 SUBST. BENZENE		6300 J						
C4 SUBST. BENZENE	2800 J	3400 J	4800 J	350 J	350 J	3100 J		6900 J
C4 SUBST. BENZENE	2900 J	5400 J	2000 J			3400 J		
C4 SUBST. BENZENE			6000 J					
C4-C5 SUBST. BENZENE								5500 J
C5 SUBST. BENZENE	1100 J	3300 J	2900 J			1600 J		3500 J
C5 SUBST. BENZENE	810 J	1800 J	1900 J			1000 J		1600 J
C5 SUBST. BENZENE	1100 J		2100 J			1100 J		2300 J
C5 SUBST. BENZENE	770 J							1500 J
C5 SUBST. BENZENE	950 J							1500 J
C5 SUBST. BENZENE	850 J							2000 J
C5 SUBST. BENZENE/UNKNOWN						710 J		
C10 SUBST. BENZENE/C10 HYDRO			2400 J					
C10 HYDROCARBON	640 J	3800 J	2800 J	370 J	340 J			
C10 ALKALANE/C3 SUBST BENZEN						1200 J		
C11 HYDROCARBON/C4 SUBST BEN				370 J				
C11 ALKALANE								1900 J
C18 BRANCHED ALKALANE				450 J				
C19 BRANCHED ALKALANE				440 J				
C27 BRANCHED ALKALANE				430 J				
1-METHYL NAPHTHALENE	840 J	2600 J	2200 J	1100 J				3500 J
DIMETHYL NAPHTHALENE	860 J	1300 J	1800 J	1100 J				
DIMETHYL NAPHTHALENE	1500 J	1600 J						
4-PROPYL-HEPTANE								1900 J

TABLE No. 10 (Cont'd) SOIL PILE (SEMIVOLATILE ORGANICS ANALYSIS) - UG/KG (CONT.)
-TENTATIVELY IDENTIFIED COMPOUNDS-

	SP-1	SP-2	SP-3	SP-4	SP-4DUP	SP-5	SP-6	SP-7
PNA		1300 J						
POLYCYCLOHYDROCARBON			2300 J					
CYCLOHYDROCARBON						600 J		
CYCLOHYDROCARBON						1400 J		
DECANE			2500 J	360 J	360 J	1300 J		
UNDECANE	550 J			360 J	290 J			
DODECANE	840 J			360 J				
TRIDECANE				410 J	320 J			
TETRADECANE				410 J				
HEXADECANE				450 J				
HEPTADECANE				400 J				
OCTADECANE				470 J	280 J			
NONADECANE				510 J	270 J			
EICOSANE				360 J				
HENEICOSANE				400 J				
TETRACOSANE				360 J				
PENTACOSANE				470 J				

SOIL TECH

TABLE No. 11

SOIL PILE (PETROLEOUM HYDROCARBONS ANALYSIS)

SAMPLE	PETROLEOUM HYDROCARBONS (MG/KG)
SP-1	18
SP-2	24
SP-3	21
SP-4	20
SP-4DUP	14
SP-5	19
SP-6	12
SP-7	12

SOIL TECH

TABLE No. 12

SOIL PILE (METAL ANALYSIS)

SAMPLE	LEAD UG/L	ARSENIC UG/L	CHROMIUM UG/L	SELENIUM UG/L
SP-1	ND	ND	ND	ND
SP-2	ND	ND	ND	ND
SP-3	ND	ND	ND	ND
SP-4	ND	ND	ND	ND
SP-4DUP	ND	ND	ND	ND
SP-5	ND	ND	ND	ND
SP-6	ND	ND	ND	ND
SP-7	ND	ND	ND	ND

ND = NOT DETECTED

SOIL TECH

TABLE No. 13

SOIL PILE (IGNITABILITY ANALYSIS)

SAMPLE	IGNIABILITY C-DEGREE	IGNIABILITY TORCH
SP-1	>60	N-I
SP-2	>60	N-I
SP-3	>60	N-I
SP-4	>60	N-I
SP-4DUP	>60	N-I
SP-5	>60	N-I
SP-6	>60	N-I
SP-7	>60	N-I

NOTE: FLASHPOINT >60 C-DEGREES DEFINES SAMPLE AS NONIGITABLE

N-I = NONIGNITABLE WHEN TESTED WITH TORCH

SOIL TECH

LIQUID SAMPLES

CHEMICAL RESULTS

SOIL TECH

Definition of Terms
Liquid Samples

T-E-1 Tank Extraction Sample: This sample was collected from a 55 gallons drum which stored liquid residues pumped out from tanks at site.

DW Decontamination Water: Sample collected from a 30-gal. drum which stored all decontamination liquid resulting from this activity.

FB Field Blanks: The sampling equipment was decontaminated, deionized water was poured over the equipment and a sample collected. One per day.

TB Trip Blanks: Were sent by the laboratory in a 40 ml vial. These vials are not opened in the field and they were a check on sample contamination originally from sample transport, shipping, and site conditions. One per shipment.

WB Water Blank: Water samples collected from the deionized water.

SOIL TECH

WATER SAMPLES (VOLATILE ORGANICS ANALYSIS) - UG/KG (CONT.)

-TENTATIVELY IDENTIFIED COMPOUNDS-

	DW-1	FB-1	FB-2	FB-3	TB-6-8-89	TB-6-9-89	TB-6-10-89	T-E-1
2-METHOXY-2-METHYL PROPANE	130000 BJ							110000 BJ
TRICHLOROFLUOROMETHANE								
PENTANE								
1,4-DIOXANE								
C2-SUBSTITUTED BENZENE								
C3-SUBSTITUTED BENZENE								
C4-UNSATURATED HYDROCARBON								
C4-SUBSTITUTED BENZENE								
C5-DAY HYDROCARBON								
C5-UNSATURATED HYDROCARBON								
C6-HYDROCARBON								
C6-HYDROCARBON								
C6-HYDROCARBON								
C6-HYDROCARBON								
C7-UNSATURATED HYDROCARBON								
C7-HYDROCARBON								
C7-HYDROCARBON								
C7-HYDROCARBON								
C7-HYDROCARBON								
C8-UNSATURATED HYDROCARBON								
C8-HYDROCARBON								
C8-HYDROCARBON								
C8-HYDROCARBON								
C8-HYDROCARBON								
C8-HYDROCARBON								
C9-UNSATURATED HYDROCARBON								
C9-HYDROCARBON								
UNKNOWN								

SOIL TECH

WATER SAMPLES (VOLATILE ORGANICS ANALYSIS) - UG/KG

	WB-1		VOA-W-MS	VOA-W-MS
METHYLENE CHLORIDE				
ACETONE				
CARBON DISULFIDE				
2-BUTANONE				
VINYL ACETATE				
BENZENE				
TOLUENE				
ETHYLBENZENE			1600	1300
TOTAL XYLENES			4600	4400

SOIL TECH

WATER SAMPLES (VOLATILE ORGANICS ANALYSIS) - UG/KG

	BW-1	FB-1	FB-2	FB-3	FB-4	TB-6-8-89	TB-6-9-89	TB-6-10-89	T-E-1
METHYLENE CHLORIDE		3 J							
ACETONE	190000 B	260 B	15				17		
CARBON DISULFIDE			1J						
2-BUTANONE									
VINYL ACETATE									
BENZENE	3500 J								3900
TOLUENE			-						3500
ETHYLBENZENE									1300
TOTAL XYLENES									5500

SOIL TECH

WATER SAMPLES (VOLATILE ORGANICS ANALYSIS) - UG/KG (CONT.)

-TENTATIVELY IDENTIFIED COMPOUNDS-

	DW-1	FB-1	FB-2	FB-3	TB-a-8-89	TB-a-9-89	TB-a-10-89	T-E-1
2-METHOXY-2-METHYL PROPANE	130000 BJ							110000 BJ
TRICHLOROFLUOROMETHANE								
PENTANE								
1,4-DIOXANE								
C2-SUBSTITUTED BENZENE								
C3-SUBSTITUTED BENZENE								
C4-UNSATURATED HYDROCARBON								
C4-SUBSTITUTED BENZENE								
C5-OXY HYDROCARBON								
C6-UNSATURATED HYDROCARBON								
C6-HYDROCARBON								
C6-HYDROCARBON								
C6-HYDROCARBON								
C6-HYDROCARBON								
C7-UNSATURATED HYDROCARBON								
C7-HYDROCARBON								
C7-HYDROCARBON								
C7-HYDROCARBON								
C7-HYDROCARBON								
C8-UNSATURATED HYDROCARBON								
C8-HYDROCARBON								
C8-HYDROCARBON								
C8-HYDROCARBON								
C8-HYDROCARBON								
C8-HYDROCARBON								
C9-UNSATURATED HYDROCARBON								
C9-HYDROCARBON								
UNKNOWN								

SOIL TECH

WATER SAMPLES (VOLATILE ORGANICS ANALYSIS) - UG/KG

	WB-1		VOA-W-MS	VOA-W-MS
METHYLENE CHLORIDE				
ACETONE				
CARBON DISULFIDE				
2-BUTANONE				
VINYL ACETATE				
BENZENE				
TOLUENE				
ETHYLBENZENE			1600	1300
TOTAL XYLENES			4600	4400

SOIL TECH

WATER SAMPLES (VOLATILE ORGANICS ANALYSIS) - UG/KG (CONT.)
-TENTATIVELY IDENTIFIED COMPOUNDS-

	WB-1	WB-2
2-METHOXY-2-METHYL PROPANE		
TRICHLOROFLUOROMETHANE		
PENTANE		
1,4-DIOXANE		
C3-SUBSTITUTED BENZENE		
C3-SUBSTITUTED BENZENE		
C4-UNSATURATED HYDROCARBON		
C4-SUBSTITUTED BENZENE		
C5-OXY HYDROCARBON		
C6-UNSATURATED HYDROCARBON		
C6-HYDROCARBON		
C6-HYDROCARBON		
C6-HYDROCARBON		
C6-HYDROCARBON		
C7-UNSATURATED HYDROCARBON		
C7-HYDROCARBON		
C7-HYDROCARBON		
C7-HYDROCARBON		
C7-HYDROCARBON		
C8-UNSATURATED HYDROCARBON		
C8-HYDROCARBON		
C8-HYDROCARBON		
C8-HYDROCARBON		
C8-HYDROCARBON		
C8-HYDROCARBON		
C9-UNSATURATED HYDROCARBON		
C9-HYDROCARBON		

SOIL TECH

WATER SAMPLES (SEMIVOLATILE ORGANICS ANALYSIS) - UG/KG

	DW-1	FB-1	FB-2	FB-3	MB-1	MB-2	TE -1	TE-1MS	TE-1MSD	TE-1DL
PHENOL	20						150			130
BENZYL ALCOHOL	41									
2-METHYLPHENOL							28			
4-METHYLPHENOL							36			
NAPHTHALENE	67						670 E	430 E	410 E	720
2-METHYLNAPHTHALENE	31						440 E	240	230	350
ACENAPHTHENE										
DIETHYLPHTHALATE										
FLUORENE	4 J						15	12	13	20 J
PHENANTHRENE	5 J						9 J	5 J	7 J	12 J
ANTHRACENE										
FLUORANTHENE										
PYRENE										5 J
DI-n-BUTYLPHTHALATE										
BUTYLBENZYLPHTHALATE										
bis-(2-ETHYLHEXYL) PHTHALATE	84						46	35	34 J	49

SOIL TECH

WATER SAMPLES (SEMIVOLATILE ORGANICS ANALYSIS) - UG/KG (CONT.)
-TENTATIVELY IDENTIFIED COMPOUNDS-

	DW-1	FB-1	FB-2	FB-3	MB-1	MB-2	TE -1	TE-1MS	TE-1MSD	TE-1L
ALDOL CONDENSATION PRODUCT										
ETHYL METHYL BENZENE										
ETHYL METHYL BENZENE										
ETHYL-DIMETHYL BENZENE										
ETHYL-DIMETHYL BENZENE										
ETHYL-DIMETHYL BENZENE										
DIMETHYL ETHYL BENZENE										
DIMETHYL ETHYL BENZENE										
METHYL-METHYLETHYL BENZENE										
METHYL ETHYL BENZENE										
METHYL ETHYL BENZENE										
METHYL PROPYL BENZENE										650 J
METHYL PROPYL BENZENE										
METHYL PROPYL BENZENE										
BUTYL-BENZENE										
PROPYL BENZENE							230 J			240 J
DIMETHYL BENZENE										
TRIMETHYL BENZENE							340 J			
TRIMETHYL BENZENE										
TRIMETHYL BENZENE										
TRIMETHYL BENZENE ISOMER	240 J						2300 J			2700 J
TRIMETHYL BENZENE ISOMER	91 J						1200 J			1300 J
TRIMETHYL BENZENE ISOMER	86 J						1100 J			1000 J
TRIMETHYL BENZENE ISOMER	320 J						2900 J			3600 J
TRIMETHYL BENZENE ISOMER	140 J						1300 J			1400 J
TETRAMETHYL BENZENE ISOMER	43 J						740 J			740 J
TETRAMETHYL BENZENE ISOMER	84 J						520 J			510 J

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SOIL TECH

WATER SAMPLES (SEMIVOLATILE ORGANICS ANALYSIS) - UG/KG (CONT.)
-TENTATIVELY IDENTIFIED COMPOUNDS-

	DW-1	FB-1	FB-2	FB-3	WB-1	WB-2	TE -1	TE-1MS	TE-1MSD	TE-1DL
TETRAMETHYL BENZENE ISOMER	98 J						390 J			810 J
TETRAMETHYL BENZENE ISOMER							410 J			350 J
TETRAMETHYL BENZENE										420 J
TETRAMETHYL BENZENE										
TRIMETHYL HEXENE ISOMER	800 J									
DIETHYL BENZENE										
DIETHYL BENZENE ISOMER							720 J			
2-ETHYL-1,4DIMETHYL-BENZENE										
DIMETHYL-BENZENE METHANOL										
BENZOPHENONE	530 J									
C3 SUBST. BENZENE										
C3 SUBST. BENZENE										
C3 SUBST. BENZENE										
C3 SUBST. BENZENE										
C3 UNSAT. SUBST. BENZENE							840 J			820 J
C4 SUBST. BENZENE										
C4 SUBST. BENZENE										
C4 SUBST. BENZENE										
C4 SUBST. BENZENE/UNKNOWN							280 J			
C4 SUBST. BENZENE/UNKNOWN							710 J			
C5 SUBST. BENZENE										
C5 SUBST. BENZENE										
C5 SUBST. BENZENE										
C5 SUBST. BENZENE/UNKNOWN										

SOIL TECH

WATER SAMPLES (SEMIVOLATILE ORGANICS ANALYSIS) - UG/KG (CONT.)
-TENTATIVELY IDENTIFIED COMPOUNDS-

	DW-1	FB-1	FB-2	FB-3	WB-1	WB-2	TE -1	TE-1MS	TE-1MSD	TE-1DL
C6 SUBST. BENZENE										
UNKNOWN SUBST. BENZENE							190 J			
C10 HYDROCARBON										
C10 HYDROCARBON/CYCLOHYDROCA										
C16 UNSATURATED HYDROCARBON	89 J									
C20 UNSATURATED HYDROCARBON	30 J									
C22 HYDROCARBON							7700 J			
C24 OXYHYDROCARBON							870 J			
C26 HYDROCARBON	92 J									
MIXED SPECTRA-SUBST. BENZENE										
1-METHYL NAPHTHALENE										
5-METHYL-1(3H)ISOBENZOFURANO										
DIHYDRO-DIMETHYL INDENE										
DIMETHYL NAPHTHALENE										
DIMETHYL NAPHTHALENE										
METHYL NAPHTHALENE ISOMER							410 J			
1,1'-BIPHENYL										
OXYHYDROCARBON	180 J									11000 J
OXYHYDROCARBON	270 J									870 J
POLYCYCLIC HYDROCARBON	92 J									
CYCLOHYDROCARBON	87 J						320 J			260 J
CYCLOHYDROCARBON										400 J
CYCLOHYDROCARBON										
DECANE										
DODECANE										

SOIL TECH

WATER SAMPLES (PETROLEOUMS HYDROCARBON ANALYSIS)

SAMPLE	PETROLEOUM HYDROCARBONS (MG/KG)
T-E-1	7.5
FB-1	ND
FB-2	ND
FB-3	ND
WB-1	ND
WB-2	ND
DW-1 RINSE	39

NOTE: ND - PARAMETER NOT DETECTED

SOIL TECH

WATER SAMPLES (IGNITABILITY ANALYSIS)

SAMPLE	IGNIABILITY C-DEGREE	IGNIABILITY TORCH
T-E-1	>60	N-I
FB-1	>60	N-I
FB-2	>60	N-I
FB-3	>60	N-I
WB-1	>60	N-I
WB-2	>60	N-I
DW-1	>60	N-I

NOTE: FLASHPOINT >60 C-DEGREES DEFINE SAMPLE AS NONIGNITABLE

N-I = NONIGNITABLE WHEN TESTED WITH TORCH

REFERENCE NO. 24

02-9102-11-HR
REV. NO. 0

FINAL DRAFT
HAZARD RANKING SYSTEM DOCUMENTATION
TUTU WELLFIELD
ST. THOMAS, USVI
VOLUME 3 OF 5

PREPARED UNDER
TECHNICAL DIRECTIVE DOCUMENT NO. 02-9102-11
CONTRACT NO. 68-01-7346

FOR THE

ENVIRONMENTAL SERVICES DIVISION
U.S. ENVIRONMENTAL PROTECTION AGENCY

JUNE 5, 1991

NUS CORPORATION
SUPERFUND DIVISION

TUT 001 1006

02-8902-42-PA
REV. NO. 1

FINAL DRAFT
PRELIMINARY ASSESSMENT
RAMSEY MOTORS
ST. THOMAS, U.S. VIRGIN ISLANDS

PREPARED UNDER

TECHNICAL DIRECTIVE DOCUMENT NO. 02-8902-42
CONTRACT NO. 68-01-7346

FOR THE

ENVIRONMENTAL SERVICES DIVISION
U.S. ENVIRONMENTAL PROTECTION AGENCY

MARCH 24, 1989

NUS CORPORATION
SUPERFUND DIVISION

SUBMITTED BY:

DIANE TRUBE
PROJECT MANAGER

JOSEPH MAYO
SITE MANAGER

REVIEWED/APPROVED BY:

RONALD M. NAMAN
FIT OFFICE MANAGER

TUT 001 1007

POTENTIAL HAZARDOUS WASTE SITE PRELIMINARY ASSESSMENT

PART I: SITE INFORMATION

1. Site Name/Alias Ramsey Motors

   Street Route 384

   City Tutu District, St. Thomas State U.S. Virgin Islands Zip 08002

2. County N/A County Code N/A Cong. Dist. N/A

3 EPA ID No. New Site

4. Latitude 18° 20' 41" Longitude 64° 53' 20"

   USGS Quad. Eastern St. Thomas, U.S. Virgin Islands

5. Owner Rita Ramsey Tel. No. (809) 775-4900

   Street Route 384, Tutu District

   City St. Thomas State U.S. Virgin Islands Zip 08002

6. Operator Same as above Tel. No. N/A

   Street N/A

   City N/A State N/A Zip N/A

7. Type of Ownership

   ☒ Private ☐ Federal ☐ State
   ☐ County ☐ Municipal ☐ Unknown ☐ Other _____

8. Owner/Operator Notification on File

   ☐ RCRA 3001 Date _____ ☐ CERCLA 103c Date _____
   ☒ None ☐ Unknown

9. Permit Information

Permit	Permit No.	Date Issued	Expiration Date	Comments
None				

10. Site Status

    ☒ Active ☐ Inactive ☐ Unknown

11. Years of Operation Unknown to Present

12. **Identify the types of waste units (e.g., landfill, surface impoundment, piles, stained soil, above- or below-ground tanks or containers, land treatment, etc.) on site. Initiate as many waste unit numbers as needed to identify all waste sources on site.**

(a) Waste Management Areas

Waste Unit No.	Waste Unit Type	Facility Name for Unit
1	Drums	Waste Oil Drums
2	Underground Storage Tank	Waste Oil Underground Storage Tank

(b) Other Areas of Concern

Identify any miscellaneous spills, dumping, etc. on site; describe the materials and identify their locations on site.

Waste oil was discharging onto the Ramsey Motors property from the adjacent Gassett Motors property.

13. **Information available from**

Contact Amy Brochu **Agency** U.S. EPA **Tel. No.** (201) 906-6802

Preparer Joseph Mayo **Agency** NUS Corp. Region 2 FIT **Date** 03/24/89

PART II: WASTE SOURCE INFORMATION

For each of the waste units identified in Part I, complete the following six items.

Waste Unit 1 - Drums, Waste Oil Drums

1. **Identify the RCRA status and permit history, if applicable, and the age of the waste unit.**

   There are no known current or previous RCRA permits for the Ramsey Motors Site. The age of the waste unit is unknown. The Water and Power Authority (WAPA) stopped accepting waste oil, which it used for fuel, in 1986 when it was found to contain PCBs. Since that time nearly all waste oil on St. Thomas has been stored, as there is no acceptable method of disposal.

2. **Describe the location of the waste unit and identify clearly on the site map.**

   The waste unit is located inside an overhang garage in the northeast corner of the Ramsey Motors property.

3. **Identify the size or quantity of the waste unit (e.g., area or volume of a landfill or surface impoundment, number and capacity of drums or tanks). Specify the quantity of hazardous substances in the waste unit.**

   Twenty-five 55-gallon drums of waste oil are stored along the inside perimeter of an automotive repair garage.

4. **Identify the physical state(s) of the waste type(s) as disposed of in the waste unit. The physical state(s) should be categorized as follows: solid, powder or fines, sludge, slurry, liquid, or gas.**

   The drums on site contain automotive waste oil, which is a liquid.

5. **Identify specific hazardous substance(s) known or suspected to be present in the waste unit.**

   The waste units contain automotive waste oil. Readings ranging from 10 to 90 ppm and 60 to 300 ppm were detected on the HNu photoionization detector and OVA flame ionization detector, respectively, in open drums in the garage. Substances such as gasoline, kerosene, and degreasing solvents may also be present in the drums. Soil sampling indicates the presence of toluene, ethylbenzene, and xylene on site.

6. **Describe the containment of the waste unit as it relates to contaminant migration via groundwater, surface water, and air.**

   The waste oil drums are located inside a garage on a cement floor. Some of the drums were open, and there were spills on the floor of the garage. Small quantities of oil apppeared to be leaking out of the garage onto the soil.

Ref. Nos. 1, 20, 21, 23

PART II: WASTE SOURCE INFORMATION

For each of the waste units identified in Part I, complete the following six items.

Waste Unit 2 - Underground Storage Tank, Waste Oil Underground Storage Tank

1. **Identify the RCRA status and permit history, if applicable, and the age of the waste unit.**

   There is no known RCRA permit for the underground storage tank for waste oil. The age of this waste unit is unknown.

2. **Describe the location of the waste unit and identify clearly on the site map.**

   The waste unit is located underground below the workshop area near Estate Road.

3. **Identify the size or quantity of the waste unit (e.g., area or volume of a landfill or surface impoundment, number and capacity of drums or tanks). Specify the quantity of hazardous substances in the waste unit.**

   The volume of the storage tank is unknown.

4. **Identify the physical state(s) of the waste type(s) as disposed of in the waste unit. The physical state(s) should be categorized as follows: solid, powder or fines, sludge, slurry, liquid, or gas.**

   The physical state of the waste oil in the tank is liquid.

5. **Identify specific hazardous substance(s) known or suspected to be present in the waste unit.**

   The waste unit contains waste oil from automotive repair and servicing activities. On-site sampling indicates the presence of tetrachloroethane, ethylbenzene, and xylene in the groundwater. Ethylbenzene, xylene, 2-hexane, and toluene have been detected in soil samples analyzed by Cenref Labs. It should be noted, however, that the groundwater in the entire area is contaminated, and therefore, the tetrachloroethane may or may not be associated with this site.

6. **Describe the containment of the waste unit as it relates to contaminant migration via groundwater, surface water, and air.**

   The waste is contained in an underground storage tank. There is no information that indicates that the tank is leaking; therefore, there is little potential for contaminant migration to air, groundwater, or surface water.

Ref. Nos. 1, 22, 23

PART III: HAZARD ASSESSMENT

GROUNDWATER ROUTE

1. **Describe the likelihood of a release of contaminant(s) to the groundwater as follows: observed, alleged, potential, or none. Identify the contaminant(s) detected or suspected, and provide a rationale for attributing the contaminant(s) to the facility.**

The likelihood of a release of contaminants to the groundwater from the waste unit on site is small. Although some of the drums were not properly closed, all the drums were stored inside on a cement floor. There are no berms or curbs to contain the waste in the event of a spill.

The drums contain automotive waste oil. Air monitoring instrument readings inside the drums ranged from 10 to 300 ppm. This suggested that the drums may contain volatile components, possibly gasoline, kerosene, or degreasing solvents. These substances are typically associated with automotive facilities.

Additionally, an underground storage tank exists on site; however, there is no indication of any leaking.

Groundwater sampling on site has found the presence of tetrachloroethane. The entire area, however, has contaminated groundwater which may or may not have been associated with this site.

Ref. Nos. 1, 22, 23

2. **Describe the aquifer of concern; include information such as depth, thickness, geologic composition, permeability, overlying strata, confining layers, interconnections, discontinuities, depth to water table, groundwater flow direction.**

The rock units of St. Thomas and St. John are divided into three major groups. The Water Island Formation, which is late lower Cretaceous in age, consists of keratophyre and spillates. The Virgin Island Group, which is probably early Cretaceous or Albian in age, consists of andesitic-pyroclastic rocks and sedimentary formations. The Virgin Island Group is divided into four formations: the Louisenhoj Formation, which consists of augite-andesite breccia, tuff, and conglomerate; the Outer Brass Limestone which consists of partially silicified-tuffaceous-radiolarian-limestone; the Tutu Formation, which consists of tuffaceous wacke, including megabreccia near the base and limestone near the top; the Hans Lollik Formation, which may be Eocene in age, consists of augite-andesite breccia and tuff. The final group is made up of one or more dioritic plutons. These unnamed dikes and plugs of quartz-andesine hornblende-porphyry are Upper Cretaceous and Lower Tertiary in age. Alluvian deposits are quarternary in age.

The Water Island Formation, which consists of 95 percent volcanic flow breccias, was probably extruded on a relatively level ocean floor. The absence of terrigenous sediments from this formation indicates that there were no emergent islands present in the area at the time of extrusion. Emergent islands would have served as a source of weather sediments or detritus, which is not present in this formation. There is evidence that sea floor subsidence occurred during the greater part of the accumulation of this formation. However, the subsidence was not rapid enough to maintain a constant water level thereby causing explosive erruptions near the top of the formation. Regional uplift occurred near the end of the Water Island.

The Louisenhoj Formation of the Virgin Island Group unconformably overlies the Water Island Formation and crops out on about half of the land area on St. Thomas. Pillsbury Sound between St. Thomas and St John was the origin of this formation. Evidence of this center is based upon the coarseness of volcanic ejecta in the formation in nearby eastern St. Thomas and western St. John. Material is less coarse and tuffs are more predominant as you move further east and west away from the center or origin. This augite-andesite formation ranges in thickness from 4,000 to 13,000 feet. In certain areas of St. Thomas and St. John, conglomerates are interbedded with andesitic rocks at the base of this formation. The depositional environment of this conglomerate varies from location to location throughout the formation.

The Outer Brass Formation of the Virgin Island Group is mostly siliceous limestone which overlies the Louisenhoj Formation. This limestone formation is an offshore deposit formed by radiolarian and foraminiferal remains including a minor amount of tuff. Thicknesses are known to be up to at least 600 feet.

Overlying the Outer Brass Formation is the Tutu Formation. The Tutu Formation is fine- to coarse-grained volcanic wackes, which are termed flysch. This formation is derived from eroding sediments from the Louisenhoj andesites. Exposed thicknesses are known to be as much as 6000 feet. Within this formation, a megabreccia lithofacies with an average thickness of 30 feet and a limestone member with a thickness up to 300 feet is worth mentioning.

The Hans Lollik Formation, which consists of at least 10,000 feet of augite-andesite pyroclastic rocks, crops out on Little Hans Lollik Island. Dioritic plutons are located in Pillsbury Sound between St. Thomas and St. John; in the narrows, between St. John and the British Virgin Islands; and south of St. Thomas. The exact delineation of these plutons is uncertain. Throughout the islands isolated dikes of quartz-andesine porphyries, andesine-hornblende porphyries, lamprophyres, breccias, and pegmatites appear.

Folding occurred after the deposition of the Virgin Island Group. Rocks were tilted to form a northward-dipping homocline, which is cut by sets of faults trending N 45°W, N 55°E and north. Well-defined joint sets parallel each of the major fault trends. Dips range from 15° to 90° with the average being 40°. Strike-slip faults have horizontal offsets of less than 1 mile. Two major strike-slip graben structures or fault systems exist. The first passes through Redhook, St. Thomas and the eastern edge of Lovango Cay. The second crosses St. John, from Contact Point on the southwest to Brown's Bay on the northeast.

Most recently, Pleistocene to Holocene alluvial deposits occurred primarily in coastal embayments. However, a narrow bank of alluvium extends up to Turpentine Run on the east end of the island. Most of these deposits are composed of silt, clay, and thin, discontinuous beds of sand and gravel. Maximum thickness of these is 50 feet.

Groundwater movement is limited to openings and joints along fault zones. Regional geologic information is insufficient to determine whether these fractures and fault zones are present in all of the above-described formations; however, for this report it is assumed that the fractures and fault zones are present in all of these formations. The valleys on the island are the result of weak zones caused by faulting and jointing and are primary recharge areas for groundwater. Alluvial deposits have a high porosity but low permeability, making this aquifer unfavorable for groundwater production. In coastal embankments throughout the island, saltwater intrusion is widespread in alluvial deposits. In most areas, alluvial deposits are interconnected with bedrock and act to recharge precipitation to the underlying bedrock.

The direction of groundwater flow in the Turpentine Run Basin Aquifer is south-southeast which is generally along the direction of flow of Turpentine Run. Depth to groundwater in the aquifer ranges from 5 to 60 feet, and the altitude of the water levels ranges from 1 to 209 feet above mean sea level.

Ref. Nos. 11, 16

3. **Is a designated sole source aquifer within 3 miles of the site?**

No sole source aquifer, as designated in the Federal Register, is located within 3 miles of the site.

Ref. No. 8

4. **What is the depth from the lowest point of waste disposal/storage to the highest seasonal level of the saturated zone of the aquifer of concern?**

Drums in the waste unit were stored on a cement floor at ground level. The underground tank is assumed to be 6 feet underground. Depth to groundwater in Virgin Island Housing Authority (VIHA) well Nos. 1 and 2 was reported to be 56 and 60 feet, respectively. The VIHA wells are located about 900 feet southeast of Ramsey Motors. There is a well on the Ramsey Motors property that is used for washing cars. The well is approximately 100 feet deep, but the depth to water in the well is unknown.

Ref. Nos. 1, 2, 9, 22

5. **What is the permeability value of the least permeable continuous intervening stratum between the ground surface and the aquifer of concern?**

There are no continuous intervening strata between the ground surface and the bedrock aquifer. Soils are generally thin in the area around the site. The water-bearing formations in the Turpentine Run Basin Aquifer are composed primarily of fractured and jointed volcanic rocks. The range of hydraulic conductivities associated with these formations is 10^{-3} to 10^{-5} cm/sec.

Ref. Nos. 10, 11, 16

6. **What is the net precipitation for the area?**

Net precipitation is usually calculated by subtracting mean annual lake evaporation (a surrogate measure for evapotranspiration) from normal annual total precipitation. Mean annual lake evaporation information was not available for St. Thomas; however, evapotranspiration data were available. These data indicate that 95.8 percent of the incident precipitation on St. Thomas is lost through evapotranspiration. The normal annual total precipitation for St. Thomas is 43.74 inches, but because of orographic effects on the Island, normal annual total precipitation can range from 35 inches to 50 inches over short distances. In the Turpentine Run Basin, normal annual precipitation is 40 inches. Calculations for net precipitation are provided below:

40 inches precipitation x 95.8 percent lost to evapotranspiration = 38.32 inches lost to evapotranspiration

40 inches precipitation - 38.32 inches lost to evapotranspiration = 1.68 inches net precipitation.

Ref. Nos. 3, 5, 12, 13

7. **Identify uses of groundwater within 3 miles of the site (i.e., private drinking source, municipal source, commercial, industrial, irrigation, unusable).**

Groundwater within 3 miles of the site is used as a source of private and municipal drinking water, and for commercial purposes. There are at least 41 wells within 2 miles of the site. Thirty-four of these wells are within 1 mile of the site. Sixteen of these wells have been closed because they are contaminated with volatile organic compounds.

Ref. Nos. 6, 9

8. **What is the distance to and depth of the nearest well that is currently used for drinking or irrigation purposes?**

Distance 780 feet **Depth** 150 feet

Nearest well is the VIHA well No. 2, which is located approximately 780 feet southeast of Ramsey Motors. This well is believed to be used for drinking. A nearby well, VIHA No. 1, was ordered closed because of contamination with volatile organic compounds. VIHA well No. 2 is not listed as being closed for contamination, and its designated use is for domestic purposes.
Ref. Nos. 6, 9

9. Identify the population served by the aquifer of concern within a 3-mile radius of the site.

It is difficult to estimate the population served by groundwater on St. Thomas as there are few records available on groundwater withdrawal, sale, and transport. The locations of some wells in St. Thomas are unknown, and there are reports of illegal drilling on the island. It is estimated that there are 500 to 600 private wells on St. Thomas. Most of these are used for nondrinking domestic purposes such as washing and flushing, although some may be used for drinking. There are a number of wells that are used for commercial purposes. Water from these wells is trucked to private houses and pumped into cisterns to augment the rainwater collected from roofs. Groundwater is also bottled and sold in supermarkets.

There are at least 41 wells in the Turpentine Run Basin. Recently 16 of these wells have been ordered closed because they were found to be contaminated with volatile organic compounds. One of these wells was a major supplier of water to the eastern end of the island.

Estimates of the population using groundwater as a source of drinking water range from none to approximately 11,000--the population of the Turpentine Run Basin which is not served by water from the desalinization plant. The actual population served by groundwater is probably less than 11,000, as desalinated water and water from wells outside the 3-mile radius is trucked into the area.

Ref. Nos. 9, 13, 15, 18, 19

SURFACE WATER ROUTE

10. Describe the likelihood of a release of contaminant(s) to surface water as follows: observed, alleged, potential, or none. Identify the contaminant(s) detected or suspected, and provide a rationale for attributing the contaminants to the facility.

A very small potential exists for contaminants to be transported to surface water. The waste oil drums are stored inside a garage on a cement floor. There were some minor spills in the area, and there were no containment structures around the drums to prevent migration of spills.

The drums contain waste oil generated from automotive repair and maintenance activities. Air monitoring instruments indicated the presence of organic vapors in the open drums. Substances such as gasoline, kerosene, and degreasing solvents may also be present in the drums.

Waste oil was draining from a ditch on the adjacent Gassett Motors Site onto the Ramsey Motors Site.

Ref. Nos. 1, 2

11. Identify and locate the nearest downslope surface water. If possible, include a description of possible surface drainage patterns from the site.

The nearest downslope surface water is the Mangrove Lagoon, which is hydraulically connected to the Caribbean Sea. The distance from the site to the nearest surface water along the course of Turpentine Run is 2.5 miles. There are a number of storm sewers on the site, and it is possible that these sewers may intercept much of the runoff from the site. It is unknown where the storm sewers discharge, but it is suspected that they discharge to Turpentine Run as it is the only drainage pathway from the basin.

Ref. Nos. 2, 4, 5

12. What is the facility slope in percent? (Facility slope is measured from the highest point of deposited hazardous waste to the most downhill point of the waste area or to where contamination is detected.)

The facility is relatively flat with a slight slope toward the south-southeast. Facility slope is estimated to be 0 to 3 percent.

Ref. Nos. 1, 2

13. **What is the slope of the intervening terrain in percent? (Intervening terrain slope is measured from the most downhill point of the waste area to the probable point of entry to surface water.)**

The slope of the intervening terrain is as follows:

- Elevation of waste area - 240 ft
- Elevation at point of entry - 0 ft
- Path length - 13,200 ft

$\frac{240 \text{ ft} - 0 \text{ ft}}{13{,}200 \text{ ft}} \times 100 = 1.8\%$ slope

Ref. Nos. 1, 2

14. **What is the 1-year 24-hour rainfall?**

One-year 24-hour rainfall data were not available for the U.S. Virgin Islands. However, it is known that rains exceeding 1 inch in 24 hours occur six or seven times a year on St. Thomas. Two-year 48-hour rainfalls range from 4 to 15 inches. It has also been reported that it is not uncommon for 24-hour rainfalls to be 2 to 3 inches.

Ref. Nos. 4, 6

15. **What is the distance to the nearest downslope surface water? Measure the distance along a course that runoff can be expected to follow.**

The nearest downslope surface water is the Mangrove Lagoon which is hydraulically connected to the Caribbean Sea. The distance from the site to the lagoon is 2.5 miles. It appears that most runoff from the site enters storm drains near the site. Since the point of discharge and the route of these storm drains are unknown, the distance to the nearest downslope surface water along the pathway is unknown.

Ref. No. 2

16. **Identify uses of surface waters within 3 miles downstream of the site (i.e., drinking, irrigation, recreation, commercial, industrial, not used).**

Surface water within 3 miles downstream of the site is used for recreation including swimming, fishing, and boating. The DPNR has designated the area of the Mangrove Lagoon for preservation and conservation recreation.

Ref. Nos. 2, 14

17. **Describe any wetlands, greater than 5 acres in area, within 2 miles downstream of the site. Include whether it is a freshwater or coastal wetland.**

There are no wetlands greater than 5 acres within 2 miles downstream of the site. However, there is a coastal mangrove wetland approximately 2.5 miles downstream. The Mangrove Swamp is designated as a preservation area in the Coastal Zone Management Program of the DPNR.

Ref. Nos. 2, 14

18. **Describe any critical habitats of federally listed endangered species within 2 miles of the site along the migration path.**

There are no known critical habitats of federally endangered species within 2 miles of the site. The Virgin Islands Tree Boa (Epicrates monensis granti) is an endangered species in the U.S. Virgin Islands; however, no critical habitat has been identified for this species.

Ref. No. 7

19. **What is the distance to the nearest sensitive environment along or contiguous to the migration path (if any exist within 2 miles)?**

There are no sensitive environments within 2 miles of the site that lie along or contiguous to the migration pathway.

Ref. Nos. 2, 7, 14

20. **Identify the population served or acres of food crops irrigated by surface water intakes within 3 miles downstream of the site and the distance to the intake(s).**

There is no population served or food crops irrigated by surface water intakes within 3 miles downstream of the site. The nearest surface water is saline. There is a desalinization plant which uses sea water to supply drinking water, but the intake is greater than 3 miles from the site.

Ref. Nos. 2, 13

21. **What is the state water quality classification of the water body of concern?**

No water quality classification is known to exist for the Mangrove Lagoon or the Caribbean Sea, although the mangrove swamp surrounding the lagoon is designated as a preservation area by the DPNR.

Ref. No. 14

22. **Describe any apparent biota contamination that is attributable to the site.**

No apparent biota contamination was observed during the on-site reconnaissance conducted by NUS Corp. Region 2 FIT on February 15, 1989.

Ref. No. 1

AIR ROUTE

23. **Describe the likelihood of a release of contaminant(s) to the air as follows: observed, alleged, potential, none. Identify the contaminant(s) detected or suspected, and provide a rationale for attributing the contaminant(s) to the facility.**

The potential for release of contaminants to the air is very small. An OVA and HNu detected above-background concentrations of organic vapors in drums; however, no readings above background were detected in the ambient air in the drum storage areas.

The drums on site contain waste oil from automotive repair and servicing operations. The drums may also contain small quantities of gasoline, kerosene, or degreasing solvents.

Ref. Nos. 1, 2

24. **What is the population within a 4-mile radius of the site?**

Based on the 1980 census, the population within 4 miles of the site is approximately 36,000.

Ref. No. 17

FIRE AND EXPLOSION

25. **Describe the potential for a fire or explosion to occur with respect to the hazardous substance(s) known or suspected to be present on site. Identify the hazardous substance(s) and the method of storage or containment associated with each.**

No significant fire or explosion conditions are known or suspected to be present on the site.

Ref. No 1

26. What is the population within a 2-mile radius of the hazardous substance(s) at the facility?

Based on the 1980 census, the population within 2 miles of the site is approximately 19,000.

Ref. No. 17

DIRECT CONTACT/ON-SITE EXPOSURE

27. Describe the potential for direct contact with hazardous substance(s) stored in any of the waste units on site or deposited in on-site soils. Identify the hazardous substance(s) and the accessibility of the waste unit.

There is little potential for direct contact with substances stored in the waste unit. Although the bungs are open on some of the drums and there are some spills, the drums are not located in an area that is frequented by customers. Access to the site is controlled by a fence. There is potential for workers to come in contact with waste oil in the course of performing their jobs.

Ref. No. 1

28. How many residents live on a property whose boundaries encompass any part of an area contaminated by the site?

There is no evidence that any residential areas have been contaminated by the site.

Ref. No. 1

29. What is the population within a 1-mile radius of the site?

Based on the 1980 census data, the population within 1 mile of the site is approximately 11,000.

Ref. No. 17

PART IV: SITE SUMMARY AND RECOMMENDATIONS

The Ramsey Motors Site is located in the Tutu area of St. Thomas, U.S. Virgin Islands. Ramsey Motors is engaged in the sale, maintenance, and repair of automobiles. The area within approximately 1 mile of the site is densely populated and contains some commercial properties. There are large housing developments northeast, southeast, and west of the site. The nearest residence is approximately 400 feet southwest of the site. The densely populated and highly commercial town of Charlotte Amalie, which is the capital of St Thomas, is located 2.3 miles east of the site.

There are twenty-five 55-gallon drums of waste oil stored on a concrete floor along the inside perimeter of the Ramsey Motors automotive garage. Some of the drums were open, and there were spills on the garage floor during the on-site reconnaissance conducted by NUS Corp. on February 15, 1989. Readings ranging from 10 to 90 ppm and 60 to 300 ppm were detected on the HNu photoionization detector and the OVA flame ionization detector, respectively, during the reconnaissance. Waste oil was noted discharging from a pool on the adjacent Gassett Motors Property into a drainage ditch on the Ramsey Motors Site. Additionally, an underground storage tank is located under the workshop area on site.

Until June 1986, the Virgin Islands Water and Power Authority (WAPA) accepted waste oil generated by marinas, airports, and auto maintenance facilities. The waste oil was blended with fuel and burned as a source of power. WAPA stopped accepting waste oil when a batch was found to contain PCBs. The source of the PCBs is unknown. Since 1986, there has been no permitted method of waste oil disposal on St. Thomas. Generators must store their waste oil, but the facilities are not inspected or issued storage permits. These conditions combined with drum shortages and poor housekeeping have resulted in generally poor waste containment at many of the facilities.

As mentioned previously, the waste oil drums on the Ramsey Motors property are not properly stored or contained. Many of the drums are open and there is oil pooled on the floor. The garage where the drums are stored has a concrete floor and an overhang roof, but the walls are not continuous and small quantities of oil appeared to be leaking into the soil in a few areas. There are no berms to contain the oil in the event of a spill. Sampling indicates the presence of ethylbenzene, xylene, 2-hexane, and toluene in soils associated with this site. Whereas there is no indication of any leaks associated with the underground tank, recent groundwater sampling has determined the presence of tetrachloroethane. However, the entire area's groundwater is contaminated, and the origin of this contamination remains unknown. Due to groundwater and soil contamination, a recommendation of **MEDIUM PRIORITY** for further action is provided.

Any potential for release of the oil to the environment could be significantly reduced if the drums are properly stored and contained, and the spilled oil is cleaned up. It is recommended that the responsible local or federal department ensure that the waste is properly stored and contained. Also, the tank should be tested to ensure that it is sound and not leaking.

No enforcement actions have been taken against Ramsey Motors in the past. The owners of the Ramsey Motors property have been identified as one of nine potentially responsible parties in the contamination of groundwater in the Tutu area. In July and August of 1987, EPA confirmed by sampling that volatile organic compounds were present in a number of wells in the Tutu area. DPNR has issued orders to close 16 wells in the area. EPA removal action activities in the Tutu area included sampling of wells and cisterns, removal of contaminated water from cisterns, and supplying clean water on a regular basis to affected residents. Additional sampling is also recommended to ascertain the extent of contamination associated with this site.

RAMSEY MOTORS
ST. THOMAS, U.S. VIRGIN ISLANDS

CONTENTS

Figure 1: Site Location Map
Figure 2: Site Map
Exhibit A: Photograph Log

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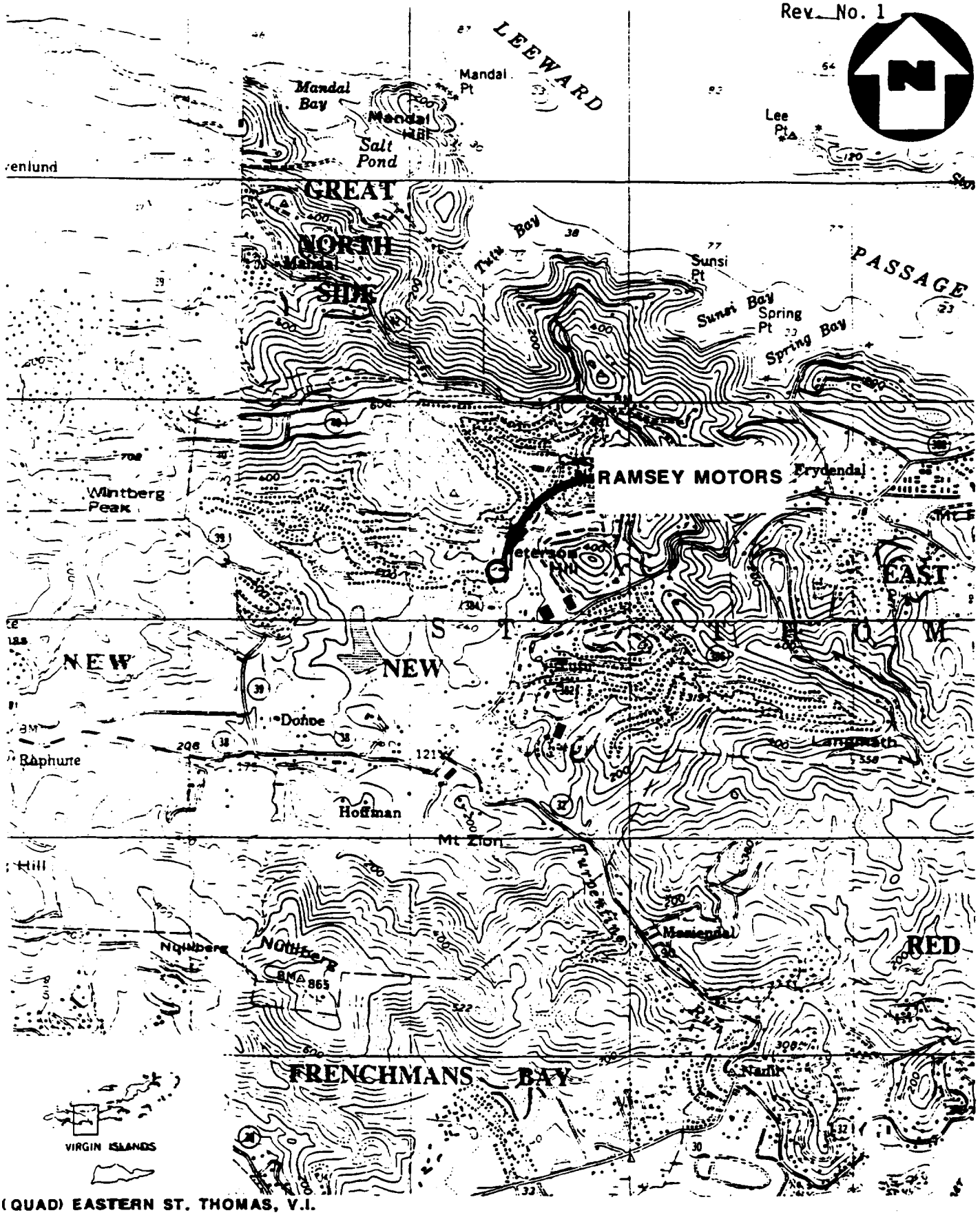

(QUAD) EASTERN ST. THOMAS, V.I.

FIGURE 1

SITE LOCATION MAP

RAMSEY MOTORS

ST. THOMAS, U.S. VIRGIN ISLANDS

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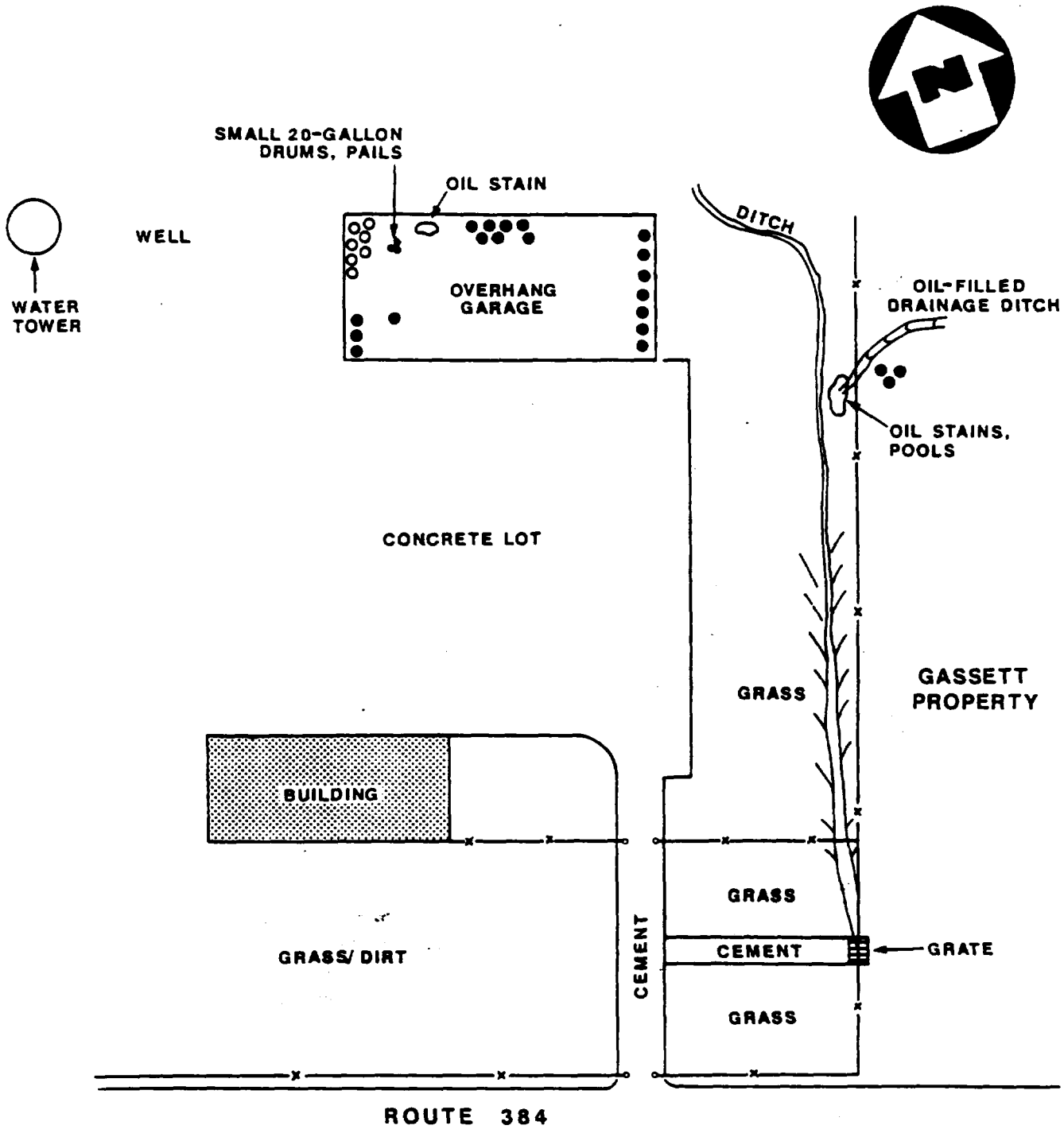
TUT 001 1022



LEGEND

o OPEN DRUM

● CLOSED DRUM

SITE MAP

RAMSEY MOTORS

ST. THOMAS, U.S. VIRGIN ISLANDS

NOT TO SCALE

FIGURE 2

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RAMSEY MOTORS
ST. THOMAS, U.S. VIRGIN ISLANDS
FEBRUARY 15, 1989

PHOTOGRAPH INDEX

ALL PHOTOGRPAHS TAKEN BY DIANE TRUBE

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R3-P13	Ramsey Motors waste oil drums inside garage.	1426
R3-P14	Small 20-gallon drums in garage.	1431
R3-P15	Ramsey Motors. Pooled oil from drainage ditch at Gassett Motors.	1436
R3-P16	Groundwater supply well and water storage tank.	1447

RAMSEY MOTORS
ST. THOMAS, U.S. VIRGIN ISLANDS

R3-P13 February 15, 1989 1426
Ramsey Motors waste oil drums inside garage.

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R3-P14 February 15 , 1989 1431
Small 20-gallon drums in garage.

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R3-P15 February 15, 1989 1436
Ramsey Motors. Pooled oil from drainage ditch at Gassett Motors.

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RAMSEY MOTORS

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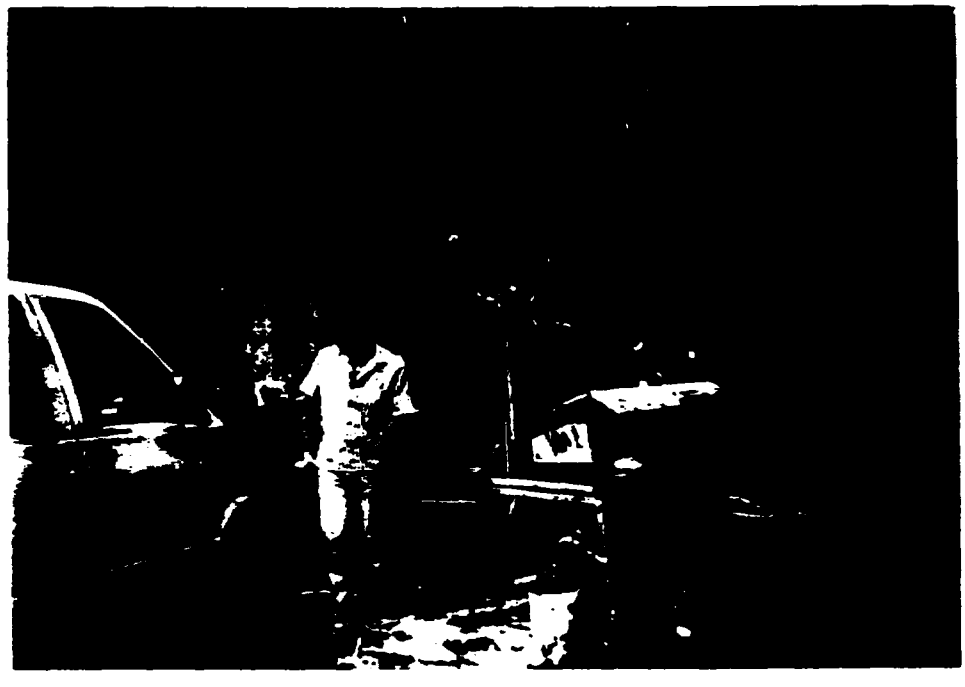

R3-P16 February 15, 1989 1447
Groundwater supply well and water storage tank.

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19. Telecon Note: Conversation between D. Goetz of Polycaribe and D. Trube, NUS Corp., on 3/14/89 at 1430 hours. Re: Wells and water use on St. Thomas.

20. Telecon Note: Conversation between L. Reed, DPNR, and D. Trube, NUS Corp., on 3/3/89 at 1640 hours. RE: Permits for site on St. Thomas.

21. Record of Communication, Telephone conversation between L. Reid, DPNR, and A. Brochu, U.S. EPA Region 2, on 1/30/89 at 1400 hours.

22. Layout of Ramsey Motors including tank location, July 11, 1978.

23. Tutu Well Field Area Sample Analysis Data Summary, Ramsey Motors, St. Thomas, U.S. Virgin Islands. Prepared for U.S. EPA Region 2 by Cenref, CDM Federal Programs Corporation, March 31, 1989.

REFERENCE NO. 26

02-9102-11-HR
REV. NO. 0

FINAL DRAFT
HAZARD RANKING SYSTEM DOCUMENTATION
TUTU WELLFIELD
ST. THOMAS, USVI
VOLUME 4 OF 5

PREPARED UNDER
TECHNICAL DIRECTIVE DOCUMENT NO. 02-9102-11
CONTRACT NO. 68-01-7346

FOR THE

ENVIRONMENTAL SERVICES DIVISION
U.S. ENVIRONMENTAL PROTECTION AGENCY

JUNE 5, 1991

NUS CORPORATION
SUPERFUND DIVISION

TUT 001 1032

02-8902-44-PA
REV. NO. 0

FINAL DRAFT
PRELIMINARY ASSESSMENT
LAGA BUILDING/VIRGIN ISLANDS
DEPARTMENT OF EDUCATION
ST. THOMAS, U.S. VIRGIN ISLANDS

PREPARED UNDER

TECHNICAL DIRECTIVE DOCUMENT NO. 02-8902-44
CONTRACT NO. 68-01-7346

FOR THE

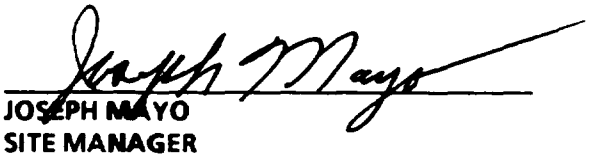
ENVIRONMENTAL SERVICES DIVISION
U.S. ENVIRONMENTAL PROTECTION AGENCY

MARCH 24, 1989

NUS CORPORATION
SUPERFUND DIVISION

SUBMITTED BY:

DIANE TRUBE
PROJECT MANAGER



JOSEPH MAYO
SITE MANAGER

REVIEWED/APPROVED BY:

RONALD M. NAMAN
FIT OFFICE MANAGER

POTENTIAL HAZARDOUS WASTE SITE PRELIMINARY ASSESSMENT

PART I: SITE INFORMATION

1. Site Name/Alias Laga Building /Virgin Islands Department of Education

   Street Route 38, Tutu District

   City Tutu District State U.S.V.I. Zip 00802

2. County NA County Code NA Cong. Dist. NA

3. EPA ID No. New Site

4. Latitude 18° 20' 37" N. Longitude 64° 53' 10" W.

   USGS Quad. Eastern St. Thomas, U.S. Virgin Islands

5. Owner Virgin Islands Dept. of Education Tel. No. 809-774-2183

   Street Route 38, Tutu District

   City St. Thomas State U.S. Virgin Islands Zip 00802

6. Operator Same as above Tel. No.

   Street

   City State Zip

7. Type of Ownership

   ☐ Private ☐ Federal ☐ State
   ☐ County ☐ Municipal ☐ Unknown ☒ Other U.S.V.I. Dept of Education

8. Owner/Operator Notification on File

   ☐ RCRA 3001 Date ☐ CERCLA 103c Date
   ☒ None ☐ Unknown

9. Permit Information

Permit	Permit No.	Date Issued	Expiration Date	Comments
None				

10. Site Status

    ☒ Active ☐ Inactive ☐ Unknown

11. Years of Operation Unknown to Present

12. Identify the types of waste units (e.g., landfill, surface impoundment, piles, stained soil, above- or below-ground tanks or containers, land treatment, etc.) on site. Initiate as many waste unit numbers as needed to identify all waste sources on site.

(a) Waste Management Areas

Waste Unit No.	Waste Unit Type	Facility Name for Unit
1	Drums	Drums behind Laqa Building

(b) Other Areas of Concern

Identify any miscellaneous spills, dumping, etc. on site; describe the materials and identify their locations on site.

No other spills, incidents of dumping, etc. were observed on the site during the NUS Corp. Region 2 FIT on-site reconnaissance on 2/15/89.

13. Information available from

Contact Amy Brochu Agency U.S. EPA Tel. No. (201) 906-6802

Preparer Joseph Mayo Agency NUS Corp. Region 2 FIT Date 3/31/89

PART II: WASTE SOURCE INFORMATION

For each of the waste units identified in Part I, complete the following six items.

Waste Unit 1 - Drums, Drums behind Laga Building

1. **Identify the RCRA status and permit history, if applicable, and the age of the waste unit.**

   There are no known current or previous RCRA permits for the Laga Building site. The age of the waste unit is unknown.

2. **Describe the location of the waste unit and identify clearly on the site map.**

   The drums are located less than 100 feet northwest of the northwest corner of the Laga Building.

3. **Identify the size or quantity of the waste unit (e.g., area or volume of a landfill or surface impoundment, number and capacity of drums or tanks). Specify the quantity of hazardous substances in the waste unit.**

   Twenty-two drums were visible in the brush behind the Laga Building. The area where the drums are located is overgrown with thick brush. The drums were deposited in an uncontrolled manner; some were on their sides, and some were corroded and empty. At least one was full. Twenty-one of the drums were steel and one was plastic. All of the drums in the disposal area had capacities of 55 gallons each.

4. **Identify the physical state(s) of the waste type(s) as disposed of in the waste unit. The physical state(s) should be categorized as follows: solid, powder or fines, sludge, slurry, liquid, or gas.**

   At least one of the drums in the waste unit contained liquid. The physical state of the waste in the remaining drums is unknown.

5. **Identify specific hazardous substance(s) known or suspected to be present in the waste unit.**

   No specific hazardous substances are known to be present in the waste unit. The Virgin Islands Department of Planning and Natural Resources (DPNR) indicated that prior to ownership by the Department of Education, the Laga Building was a textile facility which used solvents in textile processing.

6. **Describe the containment of the waste unit as it relates to contaminant migration via groundwater, surface water, and air.**

   There is essentially no containment of the waste unit. Drums are deposited in a haphazard manner; some are on their sides and some are badly corroded. There are no containment structures associated with the drums; therefore, the potential exists for waste in the unmaintained and corroding drums to be released to the environment and transported to groundwater and surface water.

Ref. Nos. 1, 20

PART III: HAZARD ASSESSMENT

GROUNDWATER ROUTE

1. **Describe the likelihood of a release of contaminant(s) to the groundwater as follows: observed, alleged, potential, or none. Identify the contaminant(s) detected or suspected, and provide a rationale for attributing the contaminant(s) to the facility.**

   The potential exists for contaminants to be released to groundwater. The drums are deposited in a haphazard manner, and some are corroded through. There are no containment structures surrounding the drums to prevent a release of the contents to the environment. The drums have not been sampled and there is no historical information that indicates what their contents were. The DPNR indicated that the Laga Building was a former textile processing facility that used solvents in its processes.

   Ref. No. 1

2. **Describe the aquifer of concern; include information such as depth, thickness, geologic composition, permeability, overlying strata, confining layers, interconnections, discontinuities, depth to water table, groundwater flow direction.**

   The rock units of St. Thomas and St. John are divided into three major groups: the Water Island Formation, the Virgin Island Group, and an unnamed group of dioritic plutons. The Water Island Formation, which is late lower Cretaceous in age, consists of keratophyre and spillates. The Virgin Island Group, which is probably early Cretaceous or Albian in age, consists of andesitic-pyroclastic rocks and sedimentary formations. The Virgin Island Group is divided into four formations: the Louisenhoj Formation, which consists of augite-andesite breccia, tuff, and conglomerate; the Outer Brass Limestone, which consists of partially silicified-tuffaceous-radiolarian-limestone; the Tutu Formation, which consists of tuffaceous wacke, including megabreccia near the base and limestone near the top; the Hans Lollik Formation, which may be Eocene in age and consists of augite-andesite breccia and tuff. The final group is made up of one or more dioritic plutons. These unamed dikes and plugs of quartz-andesine hornblende porphory are Upper Cretaceous and Lower Tertiary in age. Alluvian deposits are quarternary in age.

   The Water Island Formation, which consists of 95 percent volcanic flow breccias, was probably extruded on a relatively level ocean floor. The absence of terrigenous sediments from this formation indicates that there were no emergent islands present in the area at the time of extrusion. Emergent islands would have served as a source of weather sediments or detritus, which are not present in this formation. There is evidence that sea floor subsidence occurred during the greater part of the accumulation of this formation. However, the subsidence was not rapid enough to maintain a constant water level, thereby causing explosive eruptions near the top of the formation. Regional uplift occurred near the end of the Water Island.

   The Louisenhoj Formation of the Virgin Island Group unconformably overlies the Water Island Formation and crops out on about half of the land area on St. Thomas. Pillsbury Sound between St. Thomas and St. John was the origin of this formation. Evidence of this center is based upon the coarseness of volcanic ejecta in the formation in nearby eastern St. Thomas and western St. John. Material is less coarse and tuffs are more predominant as one moves further east and west away from the center or origin. This augite-andesite formation ranges in thickness from 4,000 to 13,000 feet. In certain areas of St. Thomas and St. John conglomerates are interbedded with andesitic rocks at the base of this formation. The depositional environment of this conglomerate varies from location to location throughout this formation.

   The Outer Brass Formation of the Virgin Island Group is mostly siliceous limestone which overlies the Louisenhoj Formation. This limestone formation is an offshore deposit formed by radiolarian and foraminiferal remains including a minor amount of tuff. Thicknesses are known to be at least 600 feet

Overlying the Outer Brass Formation is the Tutu Formation. The Tutu Formation is fine- to coarse-grained volcanic wackes, which are termed flysch. This formation is derived from eroding sediments from the Louisenhoj andesites. Exposed thicknesses are known to be as much as 6000 feet. Within this formation is a megabreccia lithofacies with an average thickness of 30 feet, and a limestone member with thickness up to 300 feet.

The Hans Lollik Formation, which consists of at least 10,000 feet of augite-andesite pyroclastic rocks, crops out on Little Hans Lollik Island. Dioritic plutons are located in Pillsbury Sound between St. Thomas and St. John; in the narrows, between St. John and the British Virgin Islands; and south of St. Thomas. The exact delineation of these plutons is uncertain. Throughout the islands isolated dikes of quartz-andesine porphyries, andesine-hornblende porphyries, lamprophyres, breccias, and pegmatites appear.

Folding occurred after the deposition of the Virgin Island Group. Rocks were tilted to form a northward-dipping homocline, which is cut by sets of faults trending N 45°W, N 55°E, and north. Well-defined joint sets parallel each of the major fault trends. Dips range from 15° to 90° with the average being 40°. Strike-slip faults have horizontal offsets of less than 1 mile. Two major strike-slip graben structures or fault systems exist. The first passes through Redhook, St. Thomas, and the eastern tip of Lovango Cay. The second crosses St. John, from Contact Point on the southwest to Brown's Bay on the northeast.

Most recent Pleistocene to Holocene alluvial deposits occurred primarily in coastal embayments. However, a narrow bank of alluvium extends up to Turpentine Run on the east end of the island. Most of these deposits are composed of silt, clay, and thin, discontinuous beds of sand and gravel. Maximum thickness of these is 50 feet.

Groundwater movement is limited to openings and joints along fault zones. Regional geologic information is insufficient to determine whether these fractures and fault zones are present in all of the above-described formations; however, for this report it is assumed that the fractures and fault zones are present in all of these formations. The valleys on the island are the result of weak zones caused by faulting and jointing and are primary recharge areas for groundwater. Alluvial deposits have a high porosity but low permeability, making this aquifer unfavorable for groundwater production. In coastal embankments throughout the island, saltwater intrusion is widespread in alluvial deposits. In most areas, alluvial deposits are interconnected with bedrock and act to recharge precipitation to the underlying bedrock.

The direction of groundwater flow in the Turpentine Run Basin Aquifer is south-southeast which is generally along the direction of flow of Turpentine Run. Depth to groundwater in the aquifer ranges from 5 to 60 feet, and the altitude of the water levels ranges from 1 to 209 feet above mean sea level.

Ref. Nos. 11, 16

3. **Is a designated sole source aquifer within 3 miles of the site?**

There are no sole source aquifers, as designated in the Federal Register, within 3 miles of the site.

Ref. No. 8

4. **What is the depth from the lowest point of waste disposal/storage to the highest seasonal level of the saturated zone of the aquifer of concern?**

Drums in the waste unit were deposited on the ground surface. Depth to groundwater in Virgin Island Housing Authority (VIHA) Well Nos. 1 and 2 was reported to be 56 and 60 feet, respectively. VIHA well Nos. 1 and 2 are located approximately 175 feet west of the Laga Building.

Ref. Nos. 1, 9

5. **What is the permeability value of the least permeable continuous intervening stratum between the ground surface and the aquifer of concern?**

There are no continuous intervening strata between the ground surface and the bedrock aquifer. Soils are generally thin in the area around the site. The water-bearing formations in the Turpentine Run Basin are composed primarily of fractured and jointed volcanic rocks. The range of hydraulic conductivities associated with these formations is 10^{-3} to 10^{-5} cm/sec.

Ref. Nos. 10, 11, 16

6. **What is the net precipitation for the area?**

Net precipitation is usually calculated by subtracting mean annual lake evaporation (a surrogate measure for evapotranspiration) from normal annual total precipitation. Mean annual lake evaporation was not available for St. Thomas; however, evapotranspiration data were available. These data indicate that 95.8 percent of the incident precipitation on St. Thomas is lost through evapotranspiration. The normal annual total precipitation for St. Thomas is 43.74 inches, but because of orographic effects on the Island, normal annual total precipitation can range from 35 inches to 50 inches over short distances. In the Turpentine Run Basin, normal annual precipitation is 40 inches. Calculations for net precipitation are provided below:

40 inches precipitation x 95.8 percent lost to evapotranspiration = 38.32 inches lost to evapotranspiration

40 inches precipitation - 38.32 inches lost to evapotranspiration = 1.68 inches net precipitation.

Ref. Nos. 3, 5, 12, 13

7. **Identify uses of groundwater within 3 miles of the site (i.e., private drinking source, municipal source, commercial, industrial, irrigation, unusable).**

Groundwater within 3 miles of the site is used as a source of private and municipal drinking water, and for commercial purposes. There are at least 41 wells within 2 miles of the site. Thirty-five of these wells are within 1 mile of the site.

Ref. Nos. 6, 9

8. **What is the distance to and depth of the nearest well that is currently used for drinking or irrigation purposes?**
Distance 175 feet **Depth** 150 feet

The nearest well is the VIHA well No. 2, which is located approximately 175 feet west of the Laga building. This well is believed to be used for drinking. A nearby well, VIHA No. 1, was ordered closed because of contamination with volatile organic compounds. VIHA well No. 2 is not listed as being closed due to contamination, and its designated use is for domestic purposes.

Ref. Nos. 6, 9

9. **Identify the population served by the aquifer of concern within a 3-mile radius of the site.**

It is difficult to estimate the population served by groundwater on St. Thomas as there are few records available on groundwater withdrawal, sale, and transport. The locations of some wells in St. Thomas are unknown, and there are reports of illegal drilling on the island. It is estimated that there are 500 to 600 private wells on St. Thomas. Most of these are used for nondrinking domestic uses such as washing and flushing, although some may be used for drinking. There are a number of wells that are used for commercial purposes. Water from these wells is trucked to private houses and pumped into cisterns to augment the rainwater collected from roofs. Groundwater is also bottled and sold in supermarkets.

There are at least 41 wells in the Turpentine Run Basin. Recently, 16 of these wells have been ordered closed because they were found to be contaminated with volatile organic compounds. One of these wells was a major supplier of water to the eastern end of the island. Estimates of the population using groundwater as a source of drinking water range from none to approximately 11,000--the population of the Turpentine Run Basin which is not served by water from a desalinization plant. The actual population served by groundwater is probably less than 11,000, as desalinated water and water from wells outside the 3-mile radius is trucked into the area.

Ref. Nos. 9, 13, 15, 18, 19

SURFACE WATER ROUTE

10. **Describe the likelihood of a release of contaminant(s) to surface water as follows: observed, alleged, potential, or none. Identify the contaminant(s) detected or suspected, and provide a rationale for attributing the contaminants to the facility.**

A potential exists for contaminants to be released to surface water. The location of the drums is at the top of a steep hill, and at the base of the hill is a tributary to Turpentine Run -- an intermittent stream which drains the Tutu area and discharges to the Caribbean Sea. The drums have not been sampled, and there is no historical information that indicates what their contents are. The DPNR indicated that the Laga Building was a former textile processing facility which used solvents in its processes.

Ref. Nos. 1, 2

11. **Identify and locate the nearest downslope surface water. If possible, include a description of possible surface drainage patterns from the site.**

The nearest downslope surface water is the Mangrove Lagoon which is hydraulically connected to the Caribbean Sea. Turpentine Run is an intermittent stream that drains the Turpentine Run Basin. The distance from the site to the nearest surface water, along the course of Turpentine Run, is 2.4 miles. It should be noted that because of the steeply sloping nature of the topography on St. Thomas (35-percent slopes are not uncommon), there are no natural perennial streams on the island. On St. Thomas orographic effects produce frequent, brief rainstorms. Runoff from these rainstorms can be significant, and therefore, short-term flow rates of the intermittent streams can be high.

Ref. Nos. 2, 4, 5

12. **What is the facility slope in percent? (Facility slope is measured from the highest point of deposited hazardous waste to the most downhill point of the waste area or to where contamination is detected.)**

The drum area is relatively flat with a slight slope toward the north and east. Near the margin of the drum area there is a steep slope to the northeast. Facility slope is estimated to be between 0 and 3 percent.

Ref. Nos. 1, 2

13. **What is the slope of the intervening terrain in percent? (Intervening terrain slope is measured from the most downhill point of the waste area to the probable point of entry to surface water.)**

The slope of the intervening terrain is as follows:

- Elevation of waste area - 240 ft
- Elevation at point of entry - 0 ft
- Path length - 12,700 ft

240 ft - 0 ft x 100 = 1.9% slope

12,700 ft

Ref. Nos. 1, 2

14. **What is the 1-year 24-hour rainfall?**

One-year 24-hour rainfall data were not available for the U.S. Virgin Islands. However, it is known that rains exceeding 1 inch in 24 hours occur six or seven times a year on St. Thomas. Two-year 48-hour rainfalls range from 4 to 15 inches. It has also been reported that it is not uncommon for 24-hour rainfalls to be 2 to 3 inches.

Ref. Nos. 4, 6

15. **What is the distance to the nearest downslope surface water? Measure the distance along a course that runoff can be expected to follow.**

The nearest downslope surface water is the Mangrove Lagoon, which is hydraulically connected to the Caribbean Sea. The distance from the site to the above surface water is 2.4 miles.

Ref. No. 2

16. **Identify uses of surface waters within 3 miles downstream of the site (i.e., drinking, irrigation, recreation, commercial, industrial, not used).**

Surface water within 3 miles downstream of the site is used for recreation including swimming, fishing, and boating. The DPNR has designated the area of the Mangrove Lagoon for preservation.

Ref. Nos. 2, 14

17. **Describe any wetlands, greater than 5 acres in area, within 2 miles downstream of the site. Include whether it is a freshwater or coastal wetland.**

There are no wetlands greater than 5 acres within 2 miles downstream of the site. However, there is a coastal mangrove wetland approximately 2.4 miles downstream. The Mangrove Swamp is designated as a preservation area in the Coastal Zone Management Program of the DPNR.

Ref. Nos. 2, 14

18. **Describe any critical habitats of federally listed endangered species within 2 miles of the site along the migration path.**

There are no known critical habitats of federally endangered species within 2 miles of the site. The Virgin Islands Tree Boa (epicrates monensis granti) is an endangered species in the U.S. Virgin Islands; however, no critical habitat has been identified for this species.

Ref. No. 7

19. **What is the distance to the nearest sensitive environment along or contiguous to the migration path (if any exist within 2 miles)?**

There are no sensitive environments within 2 miles of the site that lie along or contiguous to the migration pathway.

Ref. Nos. 2, 7, 14

20. **Identify the population served or acres of food crops irrigated by surface water intakes within 3 miles downstream of the site and the distance to the intake(s).**

There is no population served and there are no food crops irrigated by surface water intakes within 3 miles downstream of the site. The nearest surface water is saline. There is a desalinization plant which uses seawater to supply drinking water, but the intake is greater than 3 miles from the site.

Ref. Nos. 2, 13

21. **What is the state water quality classification of the water body of concern?**

No water quality classification is known to exist for the Mangrove Lagoon or the Caribbean Sea, although the mangrove swamp surrounding the lagoon is designated as a preservation area by the DPNR.

Ref. Nos. 14

22. **Describe any apparent biota contamination that is attributable to the site.**

No apparent biota contamiantion was observed during the on-site reconnaissance conducted by NUS Corp. Region 2 FIT on February 15, 1989.

Ref. No. 1

AIR ROUTE

23. **Describe the likelihood of a release of contaminant(s) to the air as follows: observed, alleged, potential, none. Identify the contaminant(s) detected or suspected, and provide a rationale for attributing the contaminant(s) to the facility.**

A slight potential exists for release of contaminants to the air. If corroded and uncontained drums rupture, the potential exists for a release to the atmosphere. The type of wastes in the drums is unknown; however, prior to ownership by the Department of Education, the building housed a textile processing facility that is reported to have used solvents.

No readings above background were detected on the OVA flame ionization detector or the HNu photoionization detector during the on-site reconnaissance of the drum area conducted by NUS Region 2 FIT on February 15, 1989.

Ref. No. 1

24. **What is the population within a 4-mile radius of the site?**

Based on the 1980 census, the population within 4 miles of the site is approximately 36,000.

Ref. No. 17

FIRE AND EXPLOSION

25. **Describe the potential for a fire or explosion to occur with respect to the hazardous substance(s) known or suspected to be present on site. Identify the hazardous substance(s) and the method of storage or containment associated with each.**

A small potential exists for fire or explosion to occur at the site. Solvents were reportedly used in the textile processing that took place in the Laga Building. If these solvents are contained in the drums, there is a potential for fire or explosion. Drums on the site were in poor condition, and there were no containment structures around the drums.

Ref. No. 1

26. **What is the population within a 2-mile radius of the hazardous substance(s) at the facility?**

Based on 1980 census data, the population within 2 miles of the site is approximately 19,000.

Ref. No. 17

DIRECT CONTACT/ON-SITE EXPOSURE

27. **Describe the potential for direct contact with hazardous substance(s) stored in any of the waste units on site or deposited in on-site soils. Identify the hazardous substance(s) and the accessibility of the waste unit.**

The potential exists for direct contact with hazardous substances at the facility. The drums are uncontained and were deposited in an uncontrolled manner. It is not known whether the drums contain hazardous substances; however, solvents have been associated with this site in the past. The waste is not surrounded by a fence, and children were observed near the drum area. There are residences 230 feet east and downhill from the drum area.

Ref. Nos. 1, 2

28. **How many residents live on a property whose boundaries encompass any part of an area contaminated by the site?**

It is not known whether any area has been contaminated by the site.

29. **What is the population within a 1-mile radius of the site?**

Based on 1980 census data, the population within 1 mile of the site is approximately 11,000.

Ref. No. 17

PART IV: SITE SUMMARY AND RECOMMENDATIONS

The Laga Building Site is located in the Tutu area of St. Thomas, U.S. Virgin Islands. The Laga Building was formerly the site of a textile manufacturing facility and is currently occupied by the Virgin Islands Board of Education. The area within approximately 1 mile of the site is densely populated, and includes some commercial properties. There are large housing developments north, northwest, and southeast of the site. The nearest residence is 320 feet east of the site. Beyond 1 mile, there are scattered smaller villages and towns. The densely populated and highly commercial town of Charlotte Amalie, which is the capital of St. Thomas, is located 2.5 miles west of the site.

On February 15, 1988, NUS Corp. Region 2 FIT conducted an on-site reconnaissance of the Laga Building Site. Twenty-two 55-gallon drums were found behind the building. The drums were deposited in an uncontrolled manner, and most of them were in poor condition. Some of the drums were rusted, some were perforated, some were deposited on their sides, some were empty, and at least one was full. Vegetation has grown around most of the drums, and a few were nearly completely overgrown. There were no discernible labels on the drums. No stains were noted near the drums, and no readings above background were detected on the OVA flame ionization detector or the HNu photoionization detector. There are no containment structures surrounding the drums, and the DPNR indicated that solvents were used by the textile processing facility that previously occupied the building.

The above conditions indicate that there is a potential for contaminants to be released to the environment from the drum area behind the Laga Building Site. A tributary of Turpentine Run is located downhill and approximately 250 feet east of the drum area. Turpentine Run is an intermittent stream that drains the Turpentine Run Basin and discharges to the Mangrove Lagoon, which is hydraulically connected to the Caribbean Sea. If hazardous substances are released from the drums, the potential exists for them to be transported to the Mangrove Lagoon via Turpentine Run. The DPNR has designated the mangrove wetlands for preservation.

There is also concern that hazardous substances that may be in the drums will be released to groundwater. The site is atop the Turpentine Run Basin Aquifer, which is the most productive aquifer on St. Thomas. There are numerous wells in the Turpentine Run Basin Aquifer, and collectively they are permitted to draw up to 1 million gallons per day from the aquifer. Some of these wells draw water for drinking purposes. Currently, the water main from a public water supply desalinization plant does not extend to the Tutu area.

There is also a potential for fire and/or explosion, direct contact, and air contamination from the drums. The drums may contain solvents that may be flammable or explosive. Direct contact is

possible if hazardous substances are present in the drums. The nearest residence is 235 feet east of the site, and children have been observed walking near the drums. The potential for air contamination exists if volatile compounds are released from the drums.

The previous owners of the Laga Building have been identified as one of nine potentially responsible parties in the contamination of groundwater in the Tutu area. In July and August of 1987, EPA confirmed by sampling that volatile organic compounds were present in a number of wells in the Tutu area. DPNR has issued orders to close 16 wells in the area. One of the wells was a major source of commercially provided potable water for the eastern end of the island. Removal action activities in the Tutu area included sampling of wells and cisterns, removal of contaminated water from cisterns, cleaning of cisterns, and supplying clean water on a regular basis to affected residents.

The Laga Building Site is given a **MEDIUM PRIORITY** for further action for the following reasons:

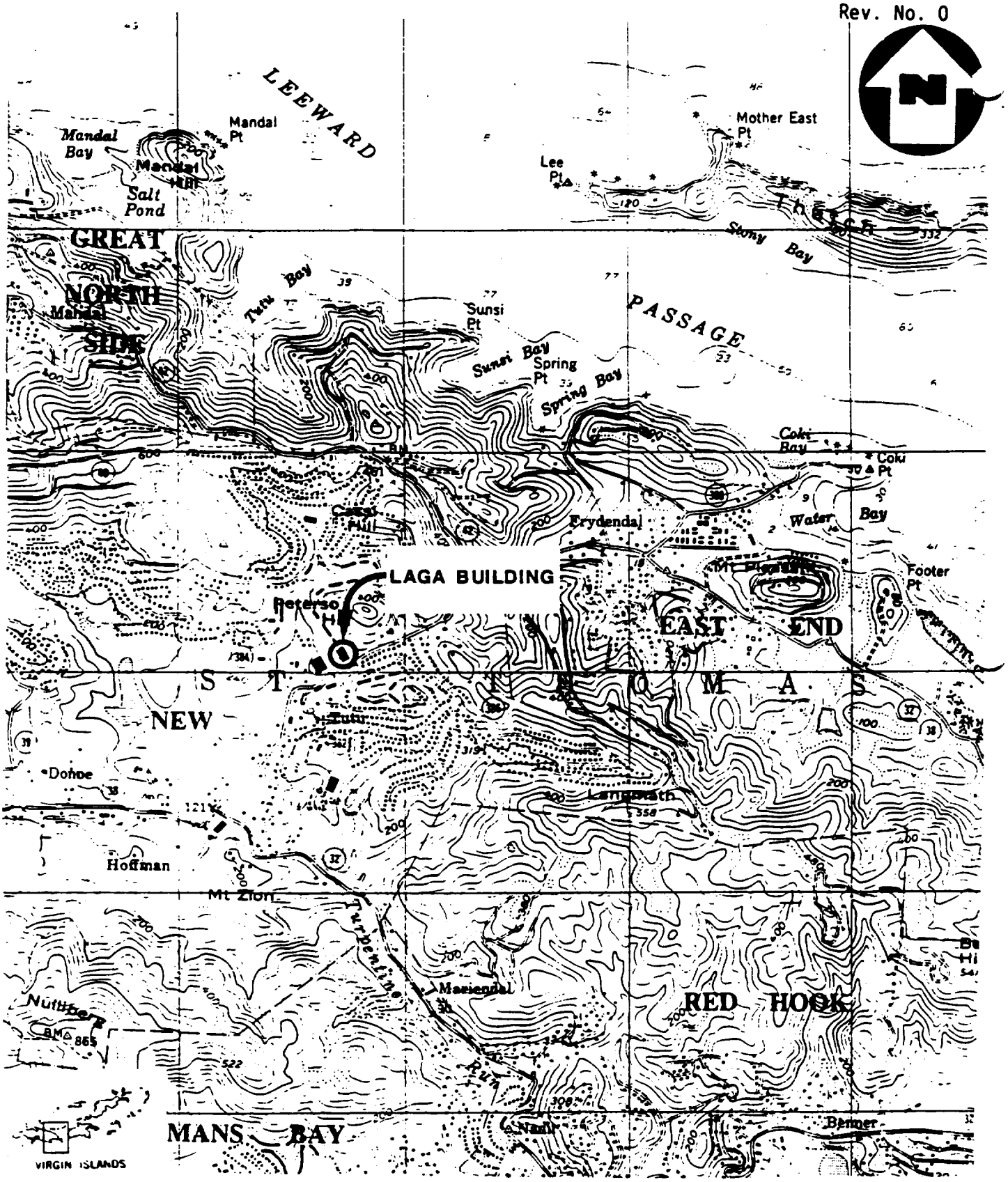
- Waste containment is poor as evidenced by perforated and corroding drums.
- Groundwater in the vicinity of the site is used for domestic purposes, and the water main from the desalinization plant does not currently extend to the Tutu area.
- The potential exists for runoff from the site to reach the Mangrove Lagoon via Turpentine Run.
- The waste area is accessible, and there are homes 230 feet east and downhill of the drum area.

Further efforts should focus on determining whether there are hazardous substances in the drums. Efforts should also be directed toward determining whether any hazardous substances have been released to the environment. Drum sampling and soil sampling in the vicinity of the drums and soil sampling in the drainage pathway to Turpentine Run are recommended. Sampling of wells in the vicinity of the site is also recommended. It should be noted that a number of the wells are contaminated with volatile organic compounds; therefore, judgement should be used to select appropriate wells for sampling.

LAGA BUILDING
ST. THOMAS, U.S. VIRGIN ISLANDS

CONTENTS

Figure 1: Site Location Map
Figure 2: Site Map
Exhibit A: Photograph Log



(QUAD) EASTERN ST. THOMAS, V.I.

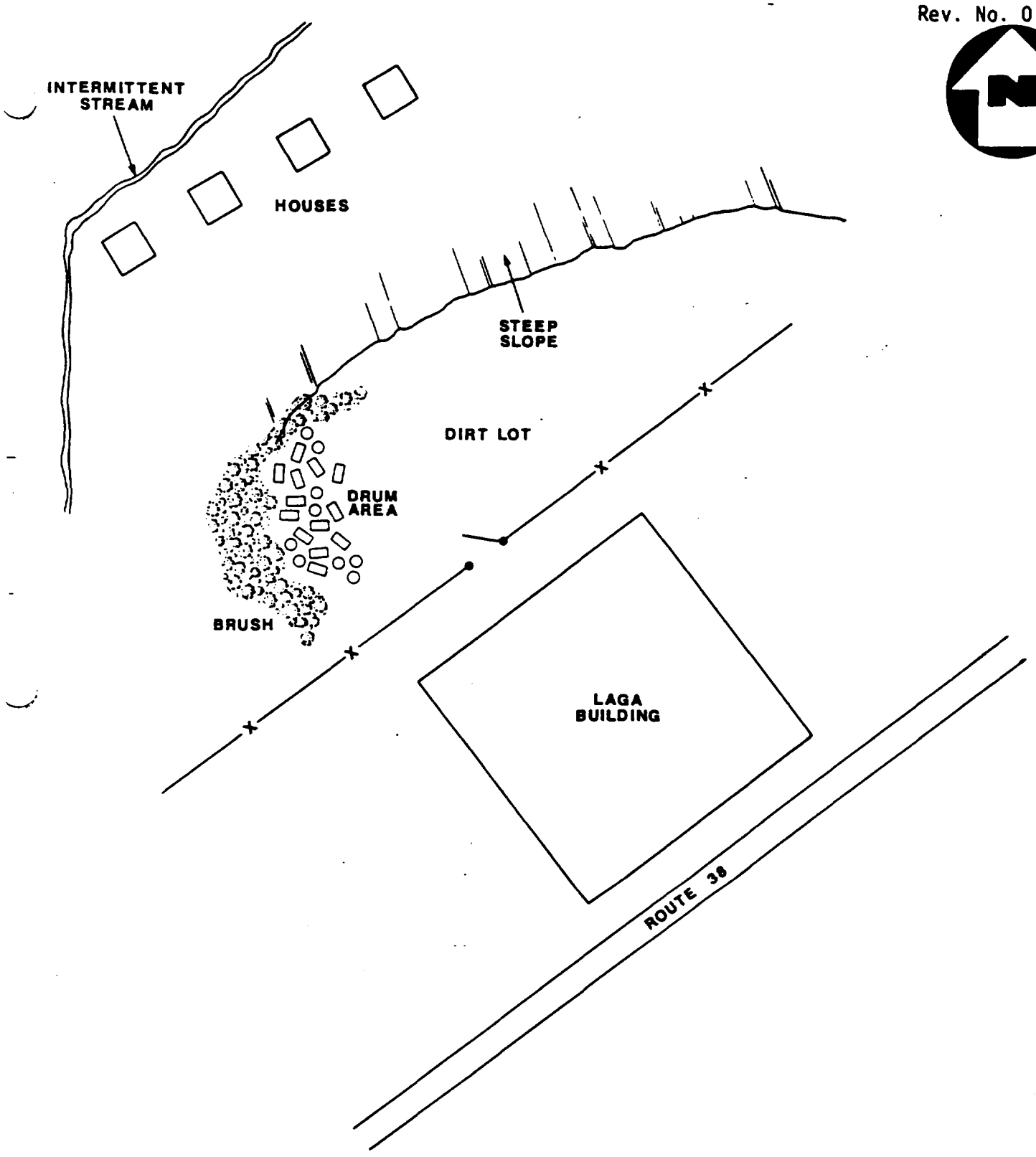
FIGURE 1

SITE LOCATION MAP
LAGA BUILDING
ST. THOMAS, U.S. VIRGIN ISLANDS

SCALE: 1" = 2000'

NUS CORPORATION

TUT 001 1947



SITE MAP
LAGA BUILDING,
ST. THOMAS, U.S. VIRGIN ISLANDS

NOT TO SCALE

FIGURE 2

NUS CORPORATION

TUT 001 1048

LAGA BUILDING
ST. THOMAS, U.S. VIRGIN ISLANDS
FEBRUARY 15, 1989

PHOTOGRAPH INDEX

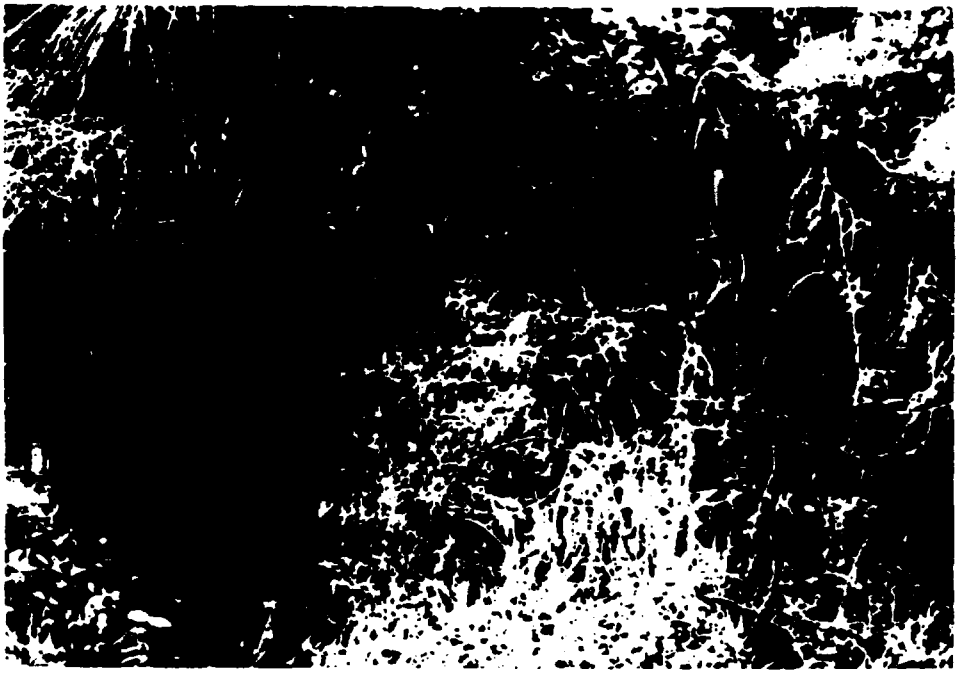
ALL PHOTOGRAPHS TAKEN BY DIANE TRUBE.

Photo Number	Description	Time
R3-P17	Drums behind Laga building.	1525
R3-P18	Drums behind Laga building.	1525
R3-P19	Drums behind Laga building.	1525

LAGA BUILDING
ST. THOMAS, U.S. VIRGIN ISLANDS

R3-P17 February 15, 1989 1525
Drums behind Laga building.

LAGA BUILDING
ST. THOMAS, U.S. VIRGIN ISLANDS



R3-P18 February 15, 1989 1525
Drums behind Laga building.

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02-8902-41-PA
REV. NO. 0

FINAL DRAFT
PRELIMINARY ASSESSMENT
GASSETT MOTORS
ST. THOMAS, U.S. VIRGIN ISLANDS

PREPARED UNDER

TECHNICAL DIRECTIVE DOCUMENT NO. 02-8902-41
CONTRACT NO. 68-01-7346

FOR THE

ENVIRONMENTAL SERVICES DIVISION
U.S. ENVIRONMENTAL PROTECTION AGENCY

MARCH 24, 1989

NUS CORPORATION
SUPERFUND DIVISION

SUBMITTED BY:

Diane Trube

DIANE TRUBE
PROJECT MANAGER

Joseph Mayo

JOSEPH MAYO
SITE MANAGER

REVIEWED/APPROVED BY:

Timothy Minick for

RONALD M. NAMAN
FIT OFFICE MANAGER

POTENTIAL HAZARDOUS WASTE SITE PRELIMINARY ASSESSMENT

PART I: SITE INFORMATION

1. Site Name/Alias Gassett Motors

   Street Route 384, Tutu District

   City St. Thomas State U.S. Virgin Islands Zip 08002

2. County N/A County Code N/A Cong. Dist. N/A

3 EPA ID No. New Site

4. Latitude 18° 20' 38"N Longitude 64° 53' 19" W

   USGS Quad. Eastern St. Thomas, U.S. Virgin Islands

5. Owner Unknown Tel. No. N/A

   Street Unknown

   City Unknown State N/A Zip N/A

6. Operator Tom Gassett Tel. No. (809) 776-4600

   Street Route 384, Tutu District

   City St. Thomas State U.S. Virgin Islands Zip 08002

7. Type of Ownership

   ☒ Private ☐ Federal ☐ State

   ☐ County ☐ Municipal ☐ Unknown ☐ Other

8. Owner/Operator Notification on File

   ☐ RCRA 3001 Date ☐ CERCLA 103c Date

   ☒ None ☐ Unknown

9. Permit Information

Permit	Permit No.	Date Issued	Expiration Date	Comments
None				

10. Site Status

    ☒ Active ☐ Inactive ☐ Unknown

11. Years of Operation Unknown to Present

12. Identify the types of waste units (e.g., landfill, surface impoundment, piles, stained soil, above- or below-ground tanks or containers, land treatment, etc.) on site. Initiate as many waste unit numbers as needed to identify all waste sources on site.

    (a) Waste Management Areas

Waste Unit No.	Waste Unit Type	Facility Name for Unit
1	Drums	Waste Oil Drums

(b) **Other Areas of Concern**

Identify any miscellaneous spills, dumping, etc. on site; describe the materials and identify their locations on site.

Waste oil from a drainage ditch on the Gassett Motors Site is discharging onto the adjacent Ramsey Motors property.

13. Information available from

Contact	Amy Brochu	**Agency**	U.S. EPA	**Tel. No.**	(201) 906-6802
Preparer	Joseph Mayo	**Agency**	NUS Corp. Region 2 FIT	**Date**	3/24/89

PART II: WASTE SOURCE INFORMATION

For each of the waste units identified in Part I, complete the following six items.

Waste Unit 1 - Drums Waste Oil Drums

1. **Identify the RCRA status and permit history, if applicable, and the age of the waste unit.**

   The site does not have a RCRA Permit. The age of the waste unit is unknown, but Mr. Gassett indicated that the drums were present when he leased the property in May of 1988.

   Until June 1986, the Water and Power Authority (WAPA) accepted waste oil and used it for fuel. A batch of waste oil was found to contain PCBs, and WAPA stopped accepting waste oil. Currently, there is no acceptable method for disposal of waste oil on St. Thomas. Waste oil generators must store all their oil.

2. **Describe the location of the waste unit and identify clearly on the site map.**

   The waste unit is located behind the main building adjacent to an overhang garage.

3. **Identify the size or quantity of the waste unit (e.g., area or volume of a landfill or surface impoundment, number and capacity of drums or tanks). Specify the quantity of hazardous substances in the waste unit.**

   There are four 55-gallon drums and three 20-gallon drums located in the northwest corner of the property.

4. **Identify the physical state(s) of the waste type(s) as disposed of in the waste unit. The physical state(s) should be categorized as follows: solid, powder or fines, sludge, slurry, liquid, or gas.**

   The drums contain liquid waste oil from automotive repair and servicing operations.

5. **Identify specific hazardous substance(s) known or suspected to be present in the waste unit.**

   The drums on site contain liquid waste oil from automotive repair and servicing operations. The drums may also contain small quantities of gasoline, kerosene, or degreasing solvents.

6. **Describe the containment of the waste unit as it relates to contaminant migration via groundwater, surface water, and air.**

   The waste is not properly contained. There were numerous spills in the area, and there was a large pool of oil in the northwest corner of the property where the drums are located. A drainage ditch containing waste oil originates along the northern perimeter of the property and proceeds westward to the northwest corner of the property, where it turns southwestward onto the Ramsey Motors property. An oil-stained area was observed on the Ramsey Motors property at the point where the drainage ditch left the Gassett Motors site. A larger ditch on the Ramsey property drains the stained area and discharges to a storm sewer. Given the above conditions, the potential exists for waste migration to surface water and groundwater.

Ref. Nos. 1, 20, 21

PART III: HAZARD ASSESSMENT

GROUNDWATER ROUTE

1. **Describe the likelihood of a release of contaminant(s) to the groundwater as follows: observed, alleged, potential, or none. Identify the contaminant(s) detected or suspected, and provide a rationale for attributing the contaminant(s) to the facility.**

   The potential exists for contaminants to be released to groundwater. Pooled waste oil was observed in the drum storage area, and a small ditch containing waste oil was dug in the soil around the garage area. In addition to the waste oil the drums may contain small quantities of gasoline, kerosene, and degreasing solvents.

   Ref. No. 1

2. **Describe the aquifer of concern; include information such as depth, thickness, geologic composition, permeability, overlying strata, confining layers, interconnections, discontinuities, depth to water table, groundwater flow direction.**

   The rock units of St. Thomas and St. John are divided into three major groups: the Water Island Formation, the Virgin Island Group, and an unnamed group of dioritic plutons. The Water Island Formation, which is late lower Cretaceous in age, consists of keratophyre and spillates. The Virgin Island Group, which is probably early Cretaceous or Albian in age, consists of andesitic-pyroclastic rocks and sedimentary formations. The Virgin Island Group is divided into four formations: the Louisenhoj Formation, which consists of augite-andesite breccia, tuff, and conglomerate; the Outer Brass Limestone, which consists of partially silicified-tuffaceous-radiolarian limestone; the Tutu Formation, which consists of tuffaceous wacke, including megabreccia near the base and limestone near the top; the Hans Lollik Formation, which may be Eocene in age and consists of augite-andesite breccia and tuff. The final group is made up of one or more dioritic plutons. These unnamed dikes and plugs of quartz-andesine-hornblende porphory are Upper Cretaceous and Lower Tertiary in age. Alluvian deposits are quarternary in age.

   The Water Island Formation, which consists of 95 percent volcanic flow breccias was probably extruded on a relatively level ocean floor. The absence of terrigenous sediments from this formation indicates that there were no emergent islands present in the area at the time of extrusion. Emergent islands would have served as a source of weather sediments or detritus, which are not present in this formation. There is evidence that sea floor subsidence occurred during the greater part of the accumulation of this formation. However, the subsidence was not rapid enough to maintain a constant water level, thereby causing explosive eruptions near the top of the formation. Regional uplift occurred near the end of the Water Island time.

   The Louisenhoj Formation of the Virgin Island Group unconformably overlies the Water Island Formation and crops out on about half of the land area on St. Thomas. Pillsbury Sound between St. Thomas and St. John was the origin of this formation. Evidence of this center is based upon the coarseness of volcanic ejecta in the formation in nearby eastern St. Thomas and western St. John. Material is less coarse and tuffs are more predominant as one moves further east and west away from the center or origin. This augite-andesite formation ranges in thickness from 4,000 to 13,000 feet. In certain areas of St. Thomas and St. John conglomerates are interbedded with andesitic rocks at the base of this formation. The depositional environment of this conglomerate varies from location to location throughout this formation.

   The Outer Brass Formation of the Virgin Island Group is mostly siliceous limestone which overlies the Louisenhoj Formation. The limestone formation is an offshore deposit formed by radiolarian and foraminiferal remains including a minor amount of tuff. Thicknesses are known to be at least 600 feet.

   Overlying the Outer Brass Formation is the Tutu Formation. The Tutu Formation is fine- to coarse-grained volcanic wackes, which are termed flysch. This formation is derived from eroding sediments from the Louisenhoj andesites. Exposed thicknesses are known to be as much as 6000 feet. Within this formation is a megabreccia lithofacies with an average thickness of 30 feet and a limestone member with a thickness up to 300 feet.

The Hans Lollik Formation, which consists of at least 10,000 feet of augite-andesite pyroclastic rocks, crops out on Little Hans Lollik Island. Dioritic plutons are located in Pillsbury Sound between St. Thomas and St. John; in the narrows, between St. John and the British Virgin Islands; and south of St. Thomas. The exact delineation of these plutons is uncertain. Throughout the islands isolated dikes of quartz-andesine porphyries, andesine-hornblende porphyries, lamprophyres, breccias, and pegmaties appear.

Folding occurred after the deposition of the Virgin Island Group. Rocks were tilted to form a northward-dipping homocline, which is cut by sets of faults trending N 45°W, N 55°E, and north. Well-defined joint sets parallel each of the major fault trends. Dips range from 15° to 90° with the average being 40°. Strike-slip faults have horizontal offsets of less than 1 mile. Two major strike-slip graben structures or fault systems exist. The first passes through Redhook, St. Thomas, and the eastern tip of Lovango Cay. The second crosses St. John, from Contact Point on the southwest to Brown's Bay on the northeast.

Most recent Pleistocene to Holocene alluvial deposits occurred primarily in coastal embayments. However, a narrow bank of alluvium extends up to Turpentine Run on the east end of the island. Most of these deposits are composed of silt, clay, and thin, discontinuous beds of sand and gravel. Maximum thickness of these is 50 feet.

Groundwater movement is limited to openings and joints along fault zones. Regional geologic information is insufficient to determine whether these fractures and fault zones are present in all of the above-described formations; however, for this report it is assumed that the fractures and fault zones are present in all of these formations. The valleys on the island are the result of weak zones caused by faulting and jointing and are primary recharge areas for groundwater. Alluvial deposits have a high porosity but low permeability, making this aquifer unfavorable for groundwater production. In coastal embankments throughout the island, saltwater intrusion is widespread in alluvial deposits. In most areas, alluvial deposits are interconnected with bedrock and act to recharge precipitation to the underlying bedrock.

The direction of groundwater flow in the Turpentine Run Basin Aquifer is south-southeast which is generally along the direction of flow of Turpentine Run. Depth to groundwater in the aquifer ranges from 5 to 60 feet, and the altitude of the water levels ranges from 1 to 209 feet above mean sea level.

Ref. Nos. 9, 11, 16

3. **Is a designated sole source aquifer within 3 miles of the site?**

There are no sole source aquifers, as designated in the Federal Register, within 3 miles of the site.

Ref. No. 8

4. **What is the depth from the lowest point of waste disposal/storage to the highest seasonal level of the saturated zone of the aquifer of concern?**

Drums in the waste unit were deposited on the ground surface. Depth to groundwater in Virgin Islands Housing Authority VIHA well Nos. 1 and 2 was reported to be 56 and 60 feet, respectively. VIHA well Nos. 1 and 2 are located approximately 630 feet southeast of the Gassett Motors Property.

Ref. Nos. 1, 2, 9

5. **What is the permeability value of the least permeable continuous intervening stratum between the ground surface and the aquifer of concern?**

There are no continuous intervening strata between the ground surface and the bedrock aquifer. Soils are generally thin in the area around the site. The water-bearing formations in the Turpentine Run Basin are composed primarily of fractured and jointed volcanic rocks. The range of hydraulic conductivities associated with these formations is 10^{-3} to 10^{-5} cm/sec.

Ref. Nos. 10, 11, 16

6. **What is the net precipitation for the area?**

Net precipitation is usually calculated by subtracting mean annual lake evaporation (a surrogate measure for evapotranspiration) from normal annual total precipitation. Mean annual lake evaporation information was not available for St. Thomas; however, evapotranspiration data were available. These data indicate that 95.8 percent of the incident precipitation on St. Thomas is lost through evapotranspiration. The normal annual total precipitation for St. Thomas is 43.74 inches, but because of orographic effects on the island, normal annual total precipitation can range from 35 inches to 50 inches over short distances.

In the Turpentine Run Basin, normal annual precipitation is 40 inches. Calculations for net precipitation are provided below:

40 inches precipitation x 95.8 percent lost to evapotranspiration = 38.32 inches lost to evapotranspiration

40 inches precipitation - 38.32 inches lost to evapotranspiration = 1.68 inches net precipitation.

Ref. Nos. 3, 5, 12, 13

7. **Identify uses of groundwater within 3 miles of the site (i.e., private drinking source, municipal source, commercial, industrial, irrigation, unusable).**

Groundwater within 3 miles of the site is used as a source of private and municipal drinking water, and for commercial purposes. There are at least 41 wells within 2 miles of the site. Thirty-four of the wells are within 1 mile of the site. Sixteen of these wells have been closed because they are contaminated with volatile organic compounds.

Ref. Nos. 6, 9

8. **What is the distance to and depth of the nearest well that is currently used for drinking or irrigation purposes?**

Distance 630 feet **Depth** 150 feet

The nearest well is the VIHA well No. 2, which is located approximately 630 feet southeast of Gassett Motors. This well is believed to be used for drinking. A nearby well, VIHA No. 1, was ordered closed because of contamination with volatile organic compounds. VIHA well No. 2 is not listed as being closed for contamination, and its designated use is for domestic purposes.

Ref. Nos. 6, 9

9. **Identify the population served by the aquifer of concern within a 3-mile radius of the site.**

It is difficult to estimate the population served by groundwater on St. Thomas as there are few records available on groundwater withdrawal, sale, and transport. The locations of some wells in St. Thomas are unknown, and there are reports of illegal drilling on the island. It is estimated that there are 500 to 600 private wells on St. Thomas. Most of these are used for nondrinking domestic uses such as washing and flushing, although some may be used for drinking. There are a number of wells that are used for commercial purposes. Water from these wells is trucked to private houses and pumped into cisterns to augment the rainwater collected from roofs. Groundwater is also bottled and sold in supermarkets.

There are at least 41 wells in the Turpentine Run Basin. Recently 16 of these wells have been ordered closed because they were found to be contaminated with volatile organic compounds. One of these wells was a major supplier of water to the eastern end of the island.

Estimates of the population using groundwater as a source of drinking water range from none to approximately 11,000 - the population of the Turpentine Run Basin which is not served by water from the desalinization plant. The actual population served by groundwater is probably less than 11,000, as desalinated water and water from wells outside the 3-mile radius is trucked into the area.

Ref. Nos. 9, 13, 15, 18, 19

SURFACE WATER ROUTE

10. **Describe the likelihood of a release of contaminant(s) to surface water as follows: observed, alleged, potential, or none. Identify the contaminant(s) detected or suspected, and provide a rationale for attributing the contaminants to the facility.**

The potential exists for wastes on the site to be released to surface water. There is a large pool of oil on the ground in the drum storage area, and there is a drainage ditch, which contains waste oil, that runs along the northern border of the property and discharges to a drainage ditch on the adjacent Ramsey Motors property. The ditch discharges to a storm sewer. It is unknown where the storm sewer discharges, but it is likely that it discharges to Turpentine Run as this intermittent stream drains the entire Turpentine Run Basin.

The drums on site contain waste oil from automotive repair and maintenance activities. Small quantitaties of gasoline, kerosene, and degreasing solvents may also be present in the drums.

Ref. Nos. 1, 2

11. **Identify and locate the nearest downslope surface water. If possible, include a description of possible surface drainage patterns from the site.**

The nearest downslope surface water is the Mangrove Lagoon which is hydraulically connected to the Caribbean Sea. The distance from the site to the nearest surface water along the course of Turpentine Run is 2.5 miles. However, the site slope is such that runoff flows south-southwest to storm sewers on the property. It is unknown where the storm sewers discharge, but it is suspected that they discharge to Turpentine Run as it is the only drainage pathway from the Turpentine Run Basin.

Ref. Nos. 2, 4, 5, 14

12. **What is the facility slope in percent? (Facility slope is measured from the highest point of deposited hazardous waste to the most downhill point of the waste area or to where contamination is detected.)**

The facility is relatively flat with an overall slope toward the south-southwest. Facility slope is estimated to be 0-3 percent.

Ref. Nos. 1, 2

13. **What is the slope of the intervening terrain in percent? (Intervening terrain slope is measured from the most downhill point of the waste area to the probable point of entry to surface water.)**

The slope of the intervening terrain can not be calculated as runoff discharges to storm sewers and the path of these sewers is unknown. If runoff were to follow an overland route, the slope of the intervening terrain would be as follows:

- Elevation of waste areas - 240 ft
- Elevation at point of entry - 0 ft
- Path length - 13,200

$$\frac{240 \text{ ft} - 0 \text{ ft} \times 100}{13{,}200 \text{ ft}} = 1.8\%$$

Ref. Nos. 1, 2

14. **What is the 1-year 24-hour rainfall?**

One-year 24-hour rainfall data were not available for the U.S. Virgin Islands. However, it is known that rains exceeding 1 inch in 24 hours occur six or seven times a year on St. Thomas. Two-year 48-hour rainfalls range from 4 to 15 inches. It has also been reported that it is not uncommon for 24-hour rainfalls to be 2 to 3 inches.

Ref. Nos. 4, 6

15. **What is the distance to the nearest downslope surface water? Measure the distance along a course that runoff can be expected to follow.**

The nearest downslope surface water is the Mangrove Lagoon which is hydraulically connected to the Caribbean Sea. The distance from the site to the above surface water is approximately 2.5 miles as measured along Turpentine Run. It appears that most runoff from the site enters the storm drains near the site. Since the point of discharge and the route of these storm drains are not known, the distance to the nearest downslope surface water along this pathway is unknown.

Ref. Nos. 2, 14

16. **Identify uses of surface waters within 3 miles downstream of the site (i.e., drinking, irrigation, recreation, commercial, industrial, not used).**

Surface water within 3 miles downstream of the site is used for recreation including swimming, fishing, and boating. The DPNR has designated the area of the Mangrove Lagoon for preservation.

Ref. Nos. 2, 14

17. **Describe any wetlands, greater than 5 acres in area, within 2 miles downstream of the site. Include whether it is a freshwater or coastal wetland.**

There are no wetlands greater than 5 acres within 2 miles downstream of the site. However, there is a coastal mangrove wetland approximately 2.5 miles downstream. The Mangrove Swamp is designated as a preservation area in the Coastal Zone Management Program of the DPNR.

Ref. Nos. 2, 14

18. **Describe any critical habitats of federally listed endangered species within 2 miles of the site along the migration path.**

There are no known critical habitats of federally endangered species within 2 miles of the site. The Virgin Islands Tree Boa (epicrates monensis granti) is an endangered species in the U.S. Virgin Islands; however, no critical habitat has been identified for this species.

Ref. No. 7

19. **What is the distance to the nearest sensitive environment along or contiguous to the migration path (if any exist within 2 miles)?**

There are no sensitive environments within 2 miles of the site that lie along or contiguous to the migration pathway.

Ref. Nos. 2, 7, 14

20. **Identify the population served or acres of food crops irrigated by surface water intakes within 3 miles downstream of the site and the distance to the intake(s).**

There is no population served and there are no food crops irrigated by surface water intakes within 3 miles downstream of the site. The nearest surface water is saline. There is a desalinization plant that uses seawater to supply drinking water, but the intake is greater than 3 miles from the site.

Ref. Nos. 2, 13

21. **What is the state water quality classification of the water body of concern?**

No water quality classification is known to exist for the Mangrove Lagoon or the Caribbean Sea, although the mangrove swamp surrounding the lagoon is designed as a preservation area by the DPNR.

Ref. No. 14

22. Describe any apparent biota contamination that is attributable to the site.

A patch of oil stained vegetation was observed during the on-site reconnaissance conducted by NUS Corp Region 2 FIT on February 15, 1989

Ref No 1

AIR ROUTE

23. **Describe the likelihood of a release of contaminant(s) to the air as follows: observed, alleged, potential, none. Identify the contaminant(s) detected or suspected, and provide a rationale for attributing the contaminant(s) to the facility.**

No potential exists for the release of any significant quantities of contaminants to the air. No readings above background were detected on the OVA flame ionization detector or the HNu photoionization detector during the on-site reconnaissance of the drum area conducted by NUS Corp. Region 2 FIT on February 15, 1989.

Ref. No. 1

24. **What is the population within a 4-mile radius of the site?**

Based on the 1980 census, the population within 4 miles of the site is approximately 36,000.

Ref. No. 17

FIRE AND EXPLOSION

25. **Describe the potential for a fire or explosion to occur with respect to the hazardous substance(s) known or suspected to be present on site. Identify the hazardous substance(s) and the method of storage or containment associated with each.**

Although the waste oil was not properly contained, the site does not pose a significant fire and explosion threat. No readings above background were detected on the OVA flame ionization detector or the HNu photoionization detector during the on-site reconnaissance of the drum area conducted by NUS Corp., Region 2 FIT on February 15, 1989.

Ref. No. 1

26. **What is the population within a 2-mile radius of the hazardous substance(s) at the facility?**

Based on 1980 census data, the population within 2 miles of the site is approximately 19,000.

Ref. No. 17

DIRECT CONTACT/ON-SITE EXPOSURE

27. **Describe the potential for direct contact with hazardous substance(s) stored in any of the waste units on site or deposited in on-site soils. Identify the hazardous substance(s) and the accessibility of the waste unit.**

The potential exists for direct contact with waste oil at the facility. The oil was not properly contained, and there was a pool of oil on the ground near the drums. The area is not accessible to the public as a fence surrounds the facility. There is a potential for workers to come in contact with waste oil on the site.

Ref. No. 1

28. **How many residents live on a property whose boundaries encompass any part of an area contaminated by the site?**

There is no evidence that any residential areas have been contaminated by the site.

Ref. No. 1

29. **What is the population within a 1-mile radius of the site?**

Based on 1980 census data, the population within 1 mile of the site is approximately 11,000.

Ref. No. 17

PART IV: SITE SUMMARY AND RECOMMENDATIONS

The Gassett Motors Site is located in the Tutu area of St. Thomas, U.S. Virgin Islands. Gassett Motors is in automobile sales establishment. The site was formerly occupied by consolidated auto parts. Mr. Gassett leased the property in May of 1988 and has occupied the facility since that time. The owner of the property is unknown.

The area within approximately 1 mile of the site is densely populated and contains some commercial properties. The site is bordered on the northeast by Ramsey Motors and on the southeast by Tutu Texaco. There are large housing developments north, southeast, and west of the site. The nearest residence is located approximately 200 feet west of the site. Beyond a 1-mile radius of the site there are scattered smaller villages and towns. The densely populated and highly commercial town of Charlotte Amalie is located 2.5 miles west of the site.

On February 15, 1989, NUS Corp. Region 2 FIT conducted an on-site reconnaissance of the Gassett Motors Site. There are four 55-gallon drums and three 20-gallon drums located in the northwest corner of the property. There is a pool of oil around the drums, and a drainage ditch containing waste oil originates along the northern perimeter of the property and drains toward the northwest corner of the property, where it turns onto the Ramsey Motors property. Once on the Ramsey Motors property, the oil enters a large drainage ditch which drains toward a storm sewer. Mr. Gassett indicated that the site was in the condition described above when he leased it in May of 1988. No readings above background were detected on the OVA flame ionization detector or on the HNu photoionization detector in the drum area.

Until June 1986, the Virgin Islands Water and Power Authority (WAPA) accepted waste oil generated by marinas, airports, and auto maintenance facilities. The waste oil was blended with fuel and burned as a source of power. WAPA stopped accepting waste oil when a batch of oil was found to contain PCBs. The source of the PCBs is unknown. Currently there is no permitted method of waste oil disposal on St. Thomas. Generators must store all their waste oil, but the facilities are not inspected or issued storage permits. These conditions, combined with drum shortages and poor housekeeping, have resulted in generally poor waste containment at many facilities.

There is concern that contaminants possibly present in the waste oil will enter groundwater and surface water. There is a pool of oil that may percolate through the soil and enter groundwater. Oil is draining from the Gassett Motors Site toward a storm sewer on the Ramsey Motors Property. Groundwater in the vicinity of the site is used for domestic purposes. The nearest surface water, the Mangrove Lagoon, is surrounded by mangrove swamps that are designated for preservation by DPNR.

Based on the above considerations, the Gassett Motors Site is given a **MEDIUM PRIORITY** for further action. Sampling activities should focus on determining whether the oil contains hazardous substances and whether those substances are migrating to the storm sewer on the Ramsey Motors property. Nearby wells should also be sampled. It sould be noted that a number of these wells were found to be contaminated with volatile organic compounds; therefore, judgement should be used in selecting appropriate wells for sampling. Further efforts should also be directed towards better definition of the population using groundwater for drinking.

No enforcement actions have been taken against Gassett Motors in the past. The owners of the property have been identified as one of nine potentially responsible parties in the contamination of groundwater in the Tutu area. In July and August of 1987, EPA confirmed by sampling that volatile organic compounds were present in a number of wells in the Tutu area. DPNR issued orders to close 16 of the wells. EPA removal action activities in the Tutu area included sampling of wells and cisterns, removal of contaminated water from cisterns, and supplying of clean water on a regular basis to affected residents.

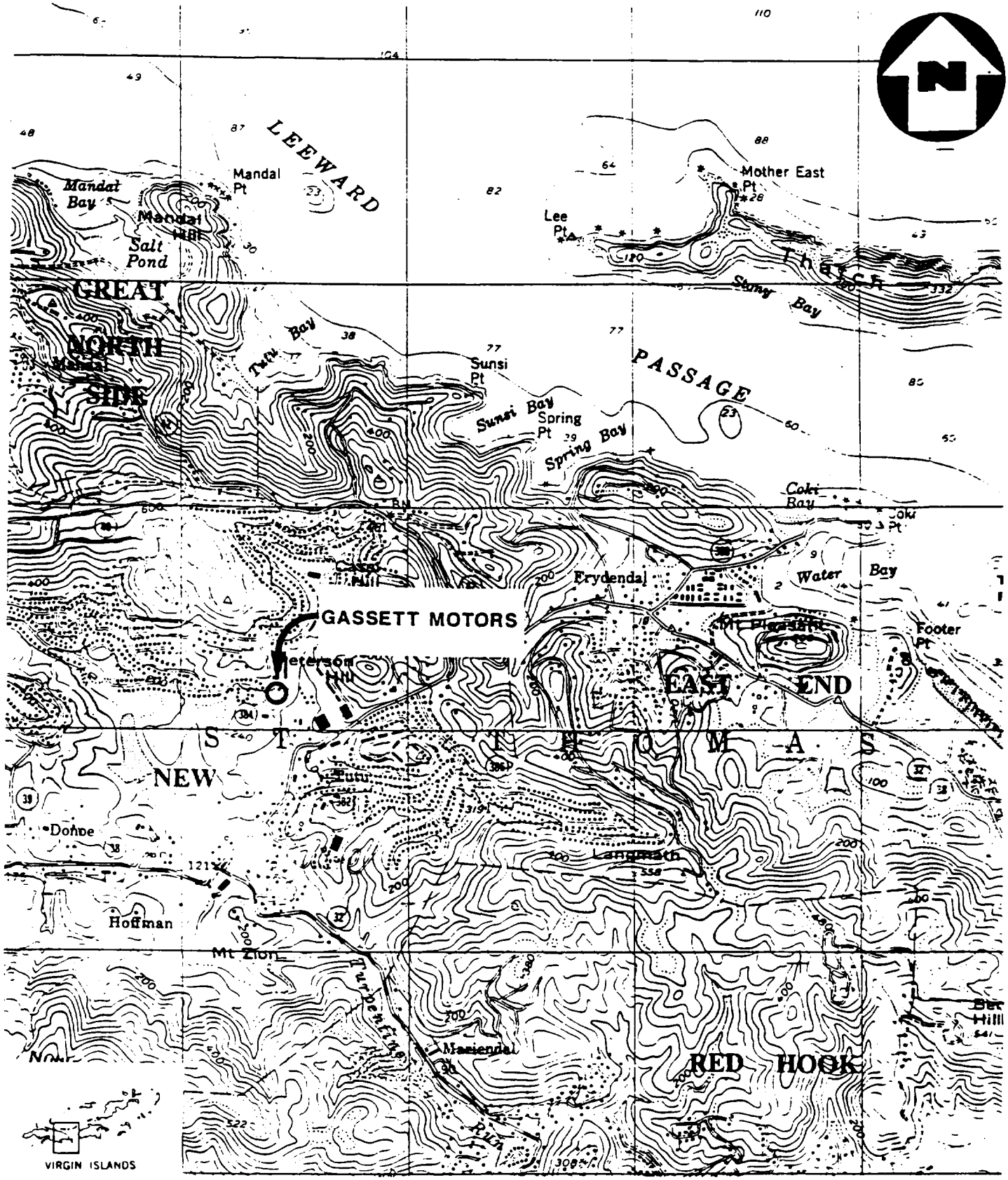
GASSETT MOTORS

ST. THOMAS, U.S.VIRGIN ISLANDS

CONTENTS

Figure 1: Site Location Map
Figure 2: Site Map
Exhibit A: Photograph Log

Rev. No. 0



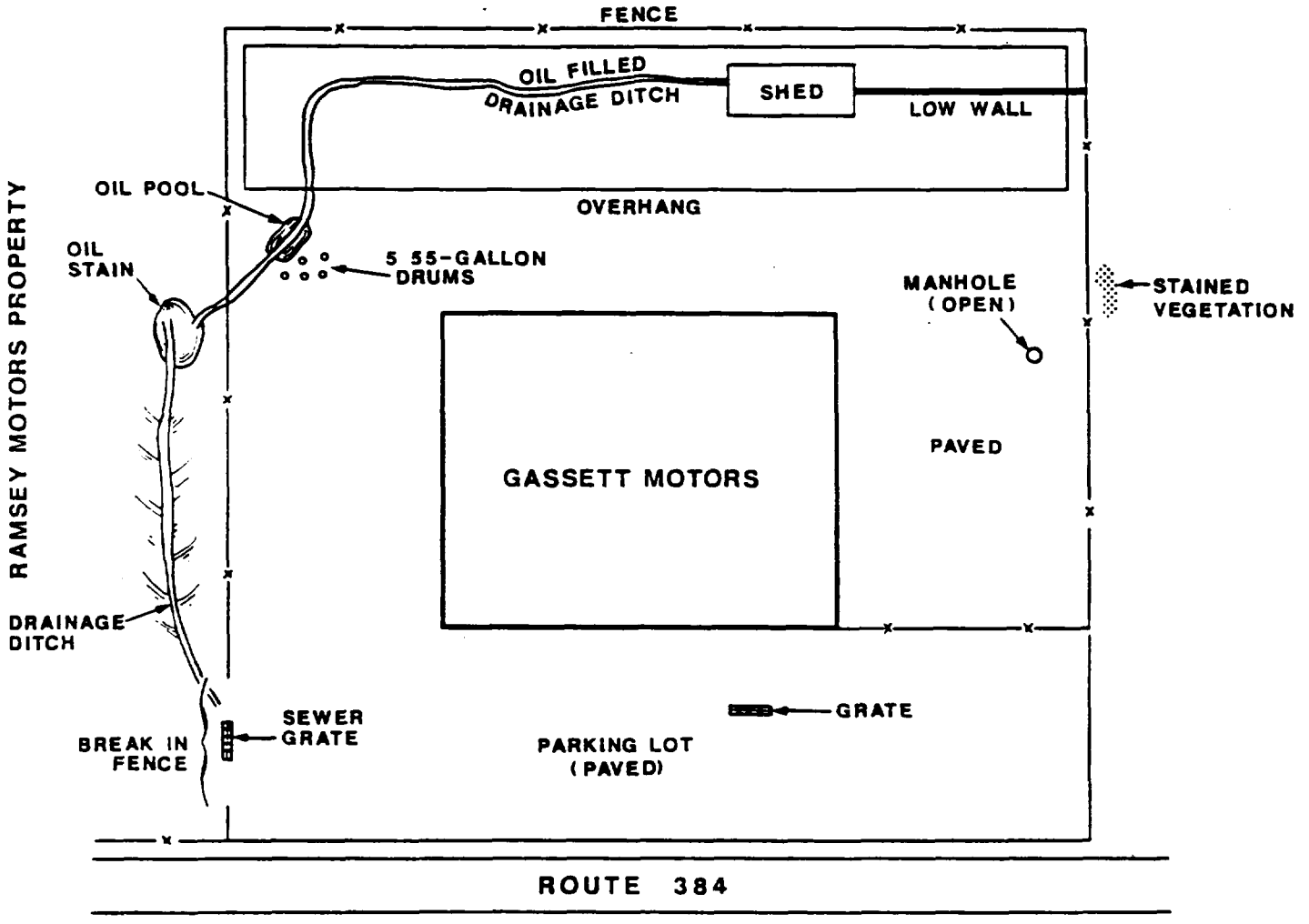
(QUAD) EASTERN ST. THOMAS, V.I.

FIGURE 1

SITE LOCATION MAP
GASSETT MOTORS
ST. THOMAS, U.S. VIRGIN ISLANDS

NUS CORPORATION

SCALE: 1" = 2000' TUT 001 1067



TUT 001 1068

SITE MAP

GASSETT MOTORS

ST. THOMAS, U.S. VIRGIN ISLANDS

NOT TO SCALE

FIGURE 2

NUS CORPORATION

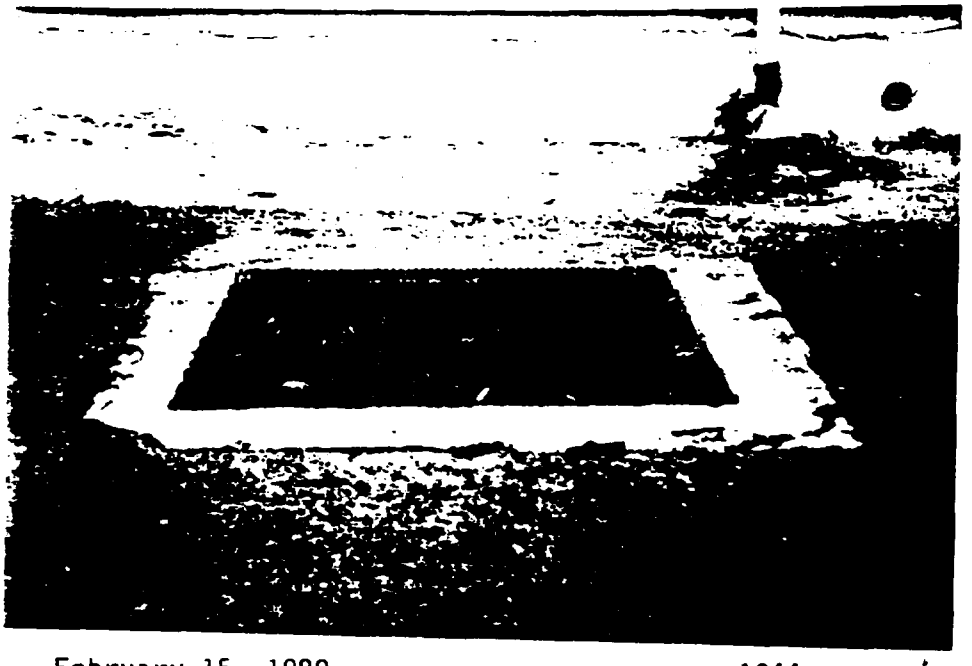
GASSETT MOTORS
ST. THOMAS, U.S. VIRGIN ISLANDS
FEBRUARY 15, 1989

PHOTOGRAPH INDEX

ALL PHOTOGRAPHS TAKEN BY DIANE TRUBE.

Photo Number	Description	Time
R3-P5	Grate in front of building.	1344
R3-P6	Grate under fence.	1346
R3-P7	Drum and oil pool in corner.	1349
R3-P8	Northwest corner of property, showing oil pool near drums.	1351
R3-P9	Origin of oil-filled drainage ditch at north end of property.	1352
R3-P11	Oil-stained vegetation.	1356
R3-P12	Sewer manhole. Tutu Texaco in background.	1400

GASSETT MOTORS
ST. THOMAS, U.S. VIRGIN ISLANDS



R3-P5 February 15, 1989 1344
Grate in front of building.

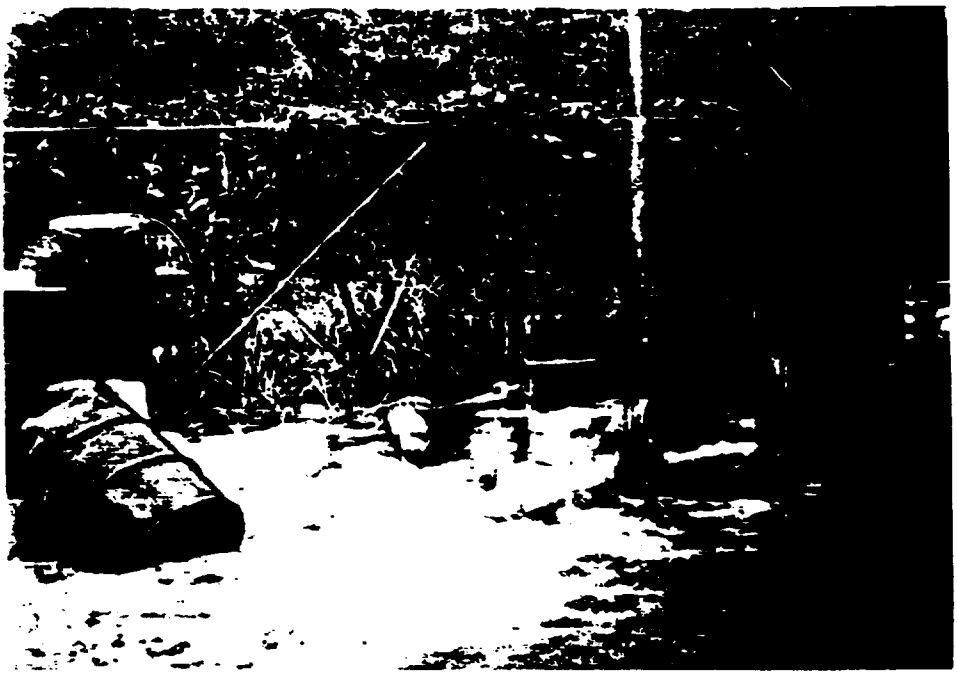
GASSETT MOTORS
ST. THOMAS, U.S. VIRGIN ISLANDS

R3-P6

February 15, 1989
Grate under fence.

1346

GASSETT MOTORS
ST. THOMAS, U.S. VIRGIN ISLANDS



R3-P7 February 15, 1989 1349
Drum and oil pool in corner.

GASSETT MOTORS
ST. THOMAS, U.S. VIRGIN ISLANDS

R3-P8 February 15, 1989 1351
Northwest corner of property, showing oil pool near drums.

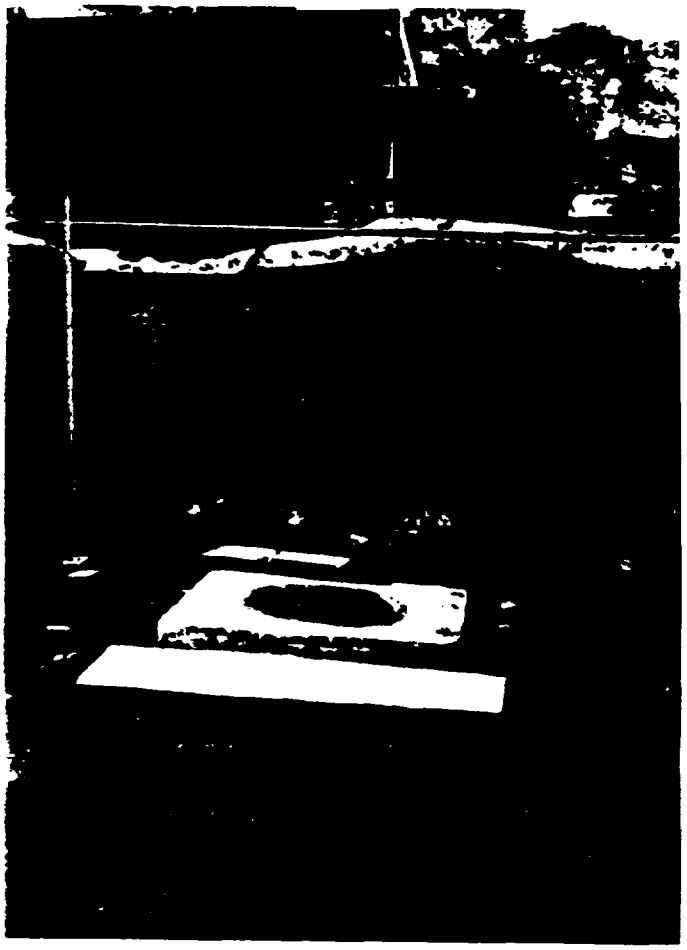
GASSETT MOTORS
ST. THOMAS, U.S. VIRGIN ISLANDS

R3-P9 February 15, 1989 1352
Origin of oil-filled drainage ditch at north end of property.

GASSETT MOTORS
ST. THOMAS, U.S. VIRGIN ISLANDS

R3-P11 February 15, 1989 1356
Oil-stained vegetation.

GASSETT MOTORS
ST. THOMAS, U.S. VIRGIN ISLANDS



R3-P12 February 15, 1989 1400
Sewer manhole. Tutu Texaco in background.

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19. Telecon Note: Conversation between D. Goetz of Polycaribe and D. Trube, NUS Corp., on 3/14/89 at 1430 hours. RE: Wells and water use on St. Thomas.

20. Telecon Note: Conversation between L. Reed, DPNR, and D. Trube, NUS Corp., on 3/3/89 at 1640 hours. RE: Permits for site on St. Thomas.

21. Record of communication, telephone conversation between L. Reid, DPNR, and A. Brochu, U.S. EPA Region 2, on 01/30/89 at 1400 hours.

REFERENCE NO. 25

PEDRO PANZARDI & ASSOCIATES

PROCESS & ENVIRONMENTAL ENGINEERS
1250 PONCE DE LEON AVE. • BANCO DE PONCE BLDG., FIFTH FLOOR • SANTURCE, P.R.
P.O. BOX 2291 • HATO REY, P.R. 00919-2291 • (809) 722-3671 / 722-3664 / FAX: 725-9085

PRELIMINARY SITE ASSESSMENT REPORT L' HENRY, INC. ST. THOMAS, U. S. V. I.

PP&A PROJECT 8998

OCTOBER 1989

TUT 001 1080

Project 8998
L'Henry Site Assessment
October 31, 1989

EXECUTIVE SUMMARY

Pedro Panzardi and Associates (PP&A) performed a preliminary site assessment of L'Henry, Inc. , in the Tutu Area of Eastern St. Thomas to determine potential soil and ground water contamination with tetrachloroethylene, (Perchloroethylene or PCE).

The total amount of PCE disposed of by L'Henry does not exceed 22 gallons per year. They started operation in 1982. Based on the the small quantity of tetrachloethylene (PCE) waste generated and the nature of their operations, we believe that L,Henry, Inc., has not contributed to the contamination of the Turpentine Run Basin aquifer.

This report supports the above statement and provides guidance to the Environmental Protection Agency (EPA) in dealing with this site. It also recommends additional work to be performed by L'Henry, Inc. to assess the contamination of the soil at their site and take remedial action for this, if necessary.

Project 8998
L'Henry Site Assessment
October 31, 1989

L'HENRY, INC.

Preliminary Site Assessment Report

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Appendix II: Chain of Custody and Laboratory Results.

Appendix III: Material Safety Data Sheet for tetrachloroethylene (PCE).

Project 8998
L'Henry Site Assessment
October 31, 1989

1.0 Introduction

1.1 Authorization of this Report

This report was requested from Pedro Panzardi & Associates (PP&A) by Mr. Leo T. Barbel, President of L'Henry, Inc., in telephone conversation of August 8, 1989, and documented in letter dated August 21, 1989.

1.2 Objectives

The objectives of this report is to establish the following:

- Present a clear view of the overall operations of a dry cleaning business; and, of the small quantity of hazardous waste generated by it.
- A preliminary site assessment concerning potential contamination of the soil and the turpentine Run Basin aquifer by L'Henry, Inc.
- The degree of PCE contamination, if any, contributed by L'Henry, Inc.
- Present a preliminary action plan to investigate further the findings discussed in this report.

TUT 001 1083

Project 8998
L'Henry Site Assessment
October 31, 1989

2.0 Protocols Used During Operation

L'Henry, Inc., cleaners owns and operates one (1) dry cleaning unit (Marvel CP-45 Model), and one (1) industrial size washing machine and dryer. The only hazardous waste generating activity is the filter-changing operation of the dry-cleaning unit. The following subsections describe both the overall dry cleaning process and filter-changing operation.

2.1 Dry Cleaning Operation

The dry-cleaning unit operates as follows (see Figure #1):

2.1.1 The reservoir of machine #1 was originally filled to the operations level with virgin PCE from drums.

2.1.2 The dry cleaning operation is a relatively closed circuit. A make-up of virgin solvent (PCE) is only added to the machine to maintain the required operating levels; thus compensating for the evaporation losses, the residue left on clothes, and the PCE residue lost during the filter changing operation (see section 2.2).

2.1.3 The clothes are put into machine #1 (see Figure #1). Here, they are impregnated with PCE.

2.1.4 When machine #1 is in operation, the PCE is continuously being cleaned. It is recycled through two (2) cylinders containing twelve (12) filters in series (six (6) each) and then returned to machine #1's reservoir.

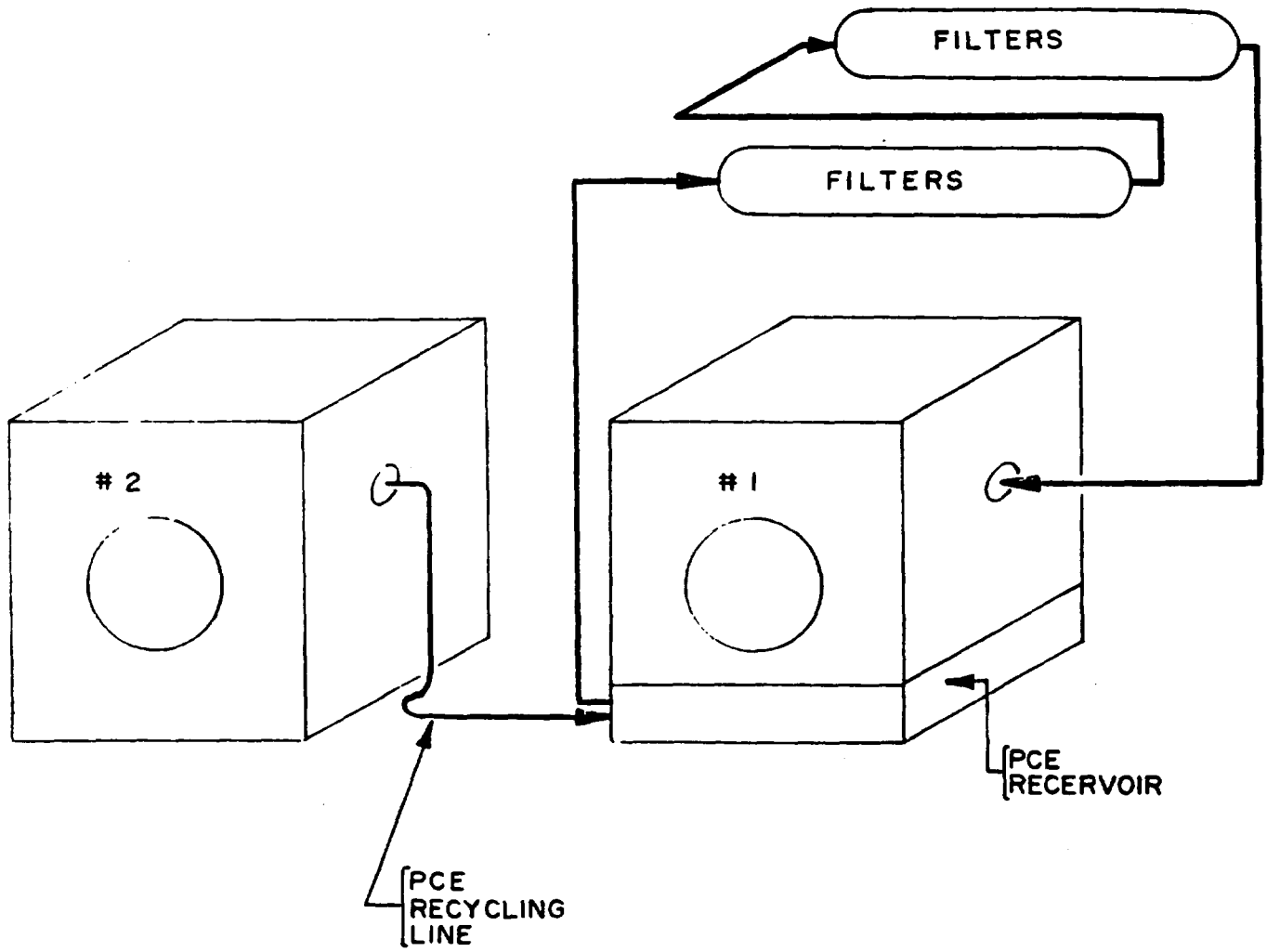
2.1.5 Once the clothes are impregnated with PCE, they are transferred to machine #2, the dryer.

2.1.6 In the dryer, most of the PCE is evaporated from the clothes and returned to machine #1's

TUT 001 1084

FIGURE #1

DRY-CLEANING UNIT OPERATION



TUT 001 1085

reservoir.

2.1.7 Once most of the PCE is evaporated from the clothes, these are removed from the dryer. They are pressed, wrapped, and given to the client.

2.2 Filter Changing Operation

The twelve (12) filters are contained in two (2) cylinders. Each cylinder contains six (6) filters (see Figure #1). These are changed every 6-8 weeks. The time span depends on the volume of operations.

The following steps are taken when the filters are changed:

2.2.1 A five (5) gallon empty container is placed under the cylinders.

2.2.2 The bottom cylinder cover is unscrewed.

2.2.3 The PCE that is contained inside the cylinder at this time is displaced into the five(5) gallon container as the filters and filter separators are removed. The PCE, as well as the filter contain a lot of lint.

2.2.4 The dirty filters and filter separators are drained to the 5 gallon container. Once they are free of free liquid, they are put in drums or on a concrete pad outside.

2.2.5 The cylinder is scraped to remove the remaining lint and the PCE residue or sludge. This is put into the 5 gallon container together with the waste PCE.

2.2.6 The above procedure is repeated with the top cylinder.

2.2.7 Approximately 1-1.5 gallons of PCE residue, lint and waste PCE is collected in the

TUT 001 1086

container, of which less than half are free liquids.

2.2.8 The five (5) gallon container and the filters are put outside to dry. Most of the PCE is evaporated. The filters and the PCE sludge and lint have been traditionally disposed of at a local dump site.

2.2.9 Presently, arrangements are being made with Safety-Kleen Envirosystems of PR to dispose of the above wastes.

Project 8998
L'Henry Site Assessment
October 31, 1989

3.0 Historical PCE Purchases

L'Henry, Inc., began operations in January 2, 1982. One of the co-owners of this cleaners is also co-owner of another cleaners located St. Thomas. PCE is purchased jointly by both cleaners. The virgin PCE was divided equally among the two (2) cleaners until six (6) months ago, when, the other cleaners bought a new, extremely efficient dry to dry machine, which reduces the use of PCE.

Table 1 lists the record of PCE purchases for both cleaners from 1983 through 1989. Previous records are not available. Refer to Appendix I for purchase invoices.

Approximately 35-40 drums of PCE are purchased per year or 3-3.5 drums per month. Therefore, L'Henry, uses approximately 1.5 to 1.75 gallons per month. As stated in section 2.0, this is used as make-up to replenish that lost through evaporation, residue left on clothes, and the filter changing operation.

IUT 001 1088

Project 8998
L'Henry Site Assessment
October 31, 1989

TABLE 1

SUMMARY OF PCE PURCHASES FROM 1983-1989

Invoice Date	Invoice Number	No. Of Drums Purchased
7-11-83	47896	15
1-11-84	54106	20
7-18-84	61717	20
2-08-85	69112	15
6-06-85	73587	20
1-16-86	80995	15
6-04-86	86520	20
1-08-87	94736	20
7-09-87	102907	20
12-01-87	109307	20
4-25-88	115372	20
10-18-88	122414	20
4-12-89	128865	20

TUT 001 1089

4.0 Historical Background and Actions Taken by L'Henry, Inc.

L'Henry, Inc., has historically disposed of the dried filters and PCE residue in the local landfill. At one time, an operator improperly disposed of the PCE residue, and possibly the waste PCE, on site. Figure #2 shows the location of this area, which is approximately thirty six square feet (36ft2) and was clearly demarcated since it had a lot of black lint residues (from the filters when they were changed).

In June, 1989, an inspector visited the facility and took soil samples in the area where the lint residues where located. This inspection prompted the following actions to be taken by L'Henry, Inc.

- The top soil of the above mentioned area was removed and placed in two (2) containers.
- PP&A personnel took two (2) composite soil samples, one (1) of each container.
- These samples were transported by PP&A personnel to a laboratory in Puerto Rico to be analyzed for PCE. Appendix II shows the chain of custody of these samples.
- Laboratory results indicate that the tetrachloroethylene (PCE) concentration in both soil samples is less than 0.03 mg/kg. (see Appendix II).

UT 001 1090

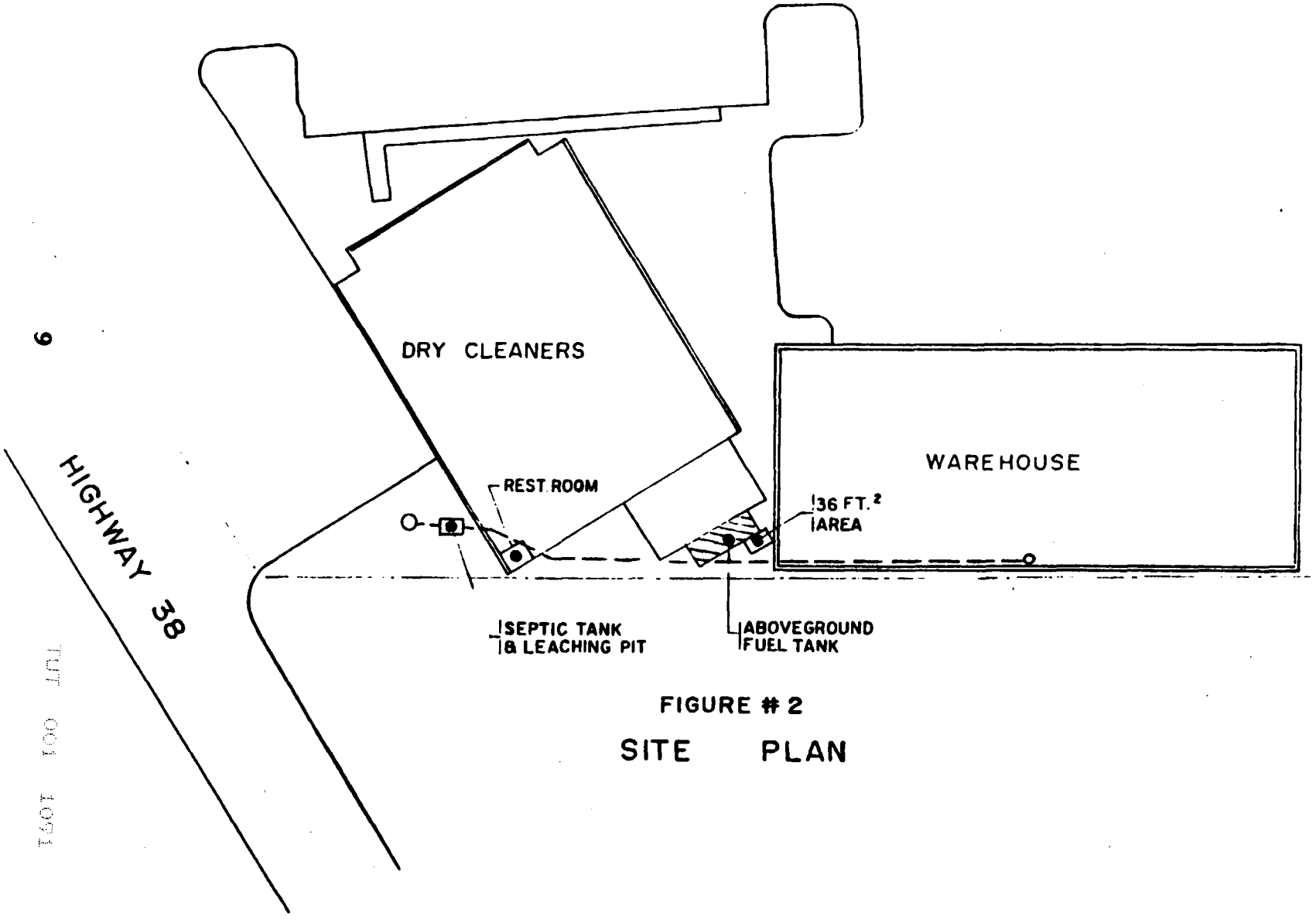


FIGURE # 2

SITE PLAN

5.0 Discussion and Action to be Taken

Due to the following facts PP&A believe that the site's contamination, if any, is very limited and definitely did not cause the concentration of PCE found in the aquifer.

- Assuming a worse-case scenario, the quantity of waste PCE (including PCE sludge and clothes lint) derived from both cylinders and the preliminary dripping of the twelve (12) filters is 2.5 gallons every six (6) weeks about 22 gallons per year.

- The result of the analyzed soil samples show that the concentration in the top soil (where PCE residuals were found) is less than 0.03mg/kg.

- Even though, some of the wells around the facility are contaminated with PCE. They are also contaminated with other solvents such as Trichloroethylene (TCE) and Methylene Chloride. L'Henry Inc., only uses PCE.

Based on the data presented above, the following investigative actions will be taken:

- Soil borings will be drilled to a depth of ten (10) feet or above sea level (whichever comes first). This will be done in various locations of L'Henry's facilities. Split spoon samples will be taken. These will be analyzed for PCE.

- Results for the above work will be submitted to the Environmental Protection Agency (EPA) once the work is completed.

TUT 001 1092

Project 8998
L'Henry Site Assessment
October 31, 1989

6.0 APPENDIX SECTION

TLST 001 1093

Project 8998
L'Henry Site Assessment
October 31, 1989

Appendix I

Invoices of PCE Purchases from 1983-1989.

TUT 001 1044

AUG 05 '83 10:42 BARREL ENTERPRISES P.3

MANUEL DEL VALLE, INC.

P.O. BOX 3806
CAROLINA, PUERTO RICO 00630
TELS (809) 769-6085 • 6065 • 6069

CALLE 272 550 220
LRB INDUSTRIAL COUNTRY CLUB
CAROLINA, PUERTO RICO
CABLE ADDRESS: MAVALLE

INVOICE

STOMER NO.	SOLD TO	SHIPPED TO	INVOICE NO
000337	L HENRI, INC BOX 232 ST. THOMAS VIRGIN ISLANDS 00801		004789 S/O : 104005

CONDUCE NO.	SLMN.	CUSTOMER P.O. NO.	ORDER DATE	SHIPPED VIA	INVOICE DATE	TERMS
0010920	92	LEVINE	07/07/83	OCEAN	07/11/83	NET 30 DAYS

QUANTITY SHIPPED	QUANTITY BACK ORDERED	UNIT	CODE	DESCRIPTION	UNIT PRICE	AMOUNT
15	0	DR	046-0003	PERCHLOROETHYLENE -700 LBS VIA ISLAND EXPRESS FREIGHT C O L L E C T	220.00	3300.00

MERCHANDISE	FREIGHT	OTHER	TOTAL
3300.00			3300.00

EA — EACH
LB — POUNDS
BX — BOXES
DZ — DOZENS
GL — GALLONS
BG — BAGS
DR — DRUMS
T — TONS

UNIT CODE EXPLANATION

IMPORTANTE

IMPORTANT

CUSTOMER COPY

TJT 301 1095

MANUEL DEL VALLE, INC.

P.O. BOX 3606
CAROLINA, PUERTO RICO 00630
TELS. 1809, 756-6085 • 6065 • 6069

CALLE 272 EDIF. 220
URB. INDUSTRIAL COUNTRY CLUB
CAROLINA, PUERTO RICO
CABLE ADDRESS: MAVALLE

INVOICE

CUSTOMER NO	SOLD TO	SHIPPED TO	INVOIC
001337	[illegible] INC BOX [illegible] ST. THOMAS VIRGIN ISLANDS 00801	774-2028	0084 S/O 1049

CONDUCE NO	SLMN	CUSTOMER P.O. NO.	ORDER DATE	SHIPPED VIA	INVOICE DATE	TERMS
2016806	02		01/10/84	I EXPRESS	01/11/84	NET 30 D

QUANTITY SHIPPED	QUANTITY BACK ORDERED	UNIT	CODE	DESCRIPTION	UNIT PRICE	AMOUNT
20	0	DR	046-0006	PERCHLOROETHYLENE -700 LBS	235.00	4700.

#2826
2/24/84

EA = EACH
LB = POUNDS
BX = BOXES
DZ = DOZENS
GL = GALLONS
BG = BAGS
DR = DRUMS
T = TONS

UNIT CODE EXPLANATION

MERCHANDISE	FREIGHT	OTHER	TOTAL
4700.00			4700.0

IMPORTANTE

[illegible]

IMPORTANT

[illegible]

INVOICE

ORIGINAL

MANUEL DEL VALLE, INC.

P.O. BOX 3806
CAROLINA, PUERTO RICO 00630
TELS (809) 769-0096 • 6065 • 6069

CALLE 272 ESQ. 220
URB. INDUSTRIAL COUNTRY CLUB
CAROLINA, PUERTO RICO
CABLE ADDRESS: MAVALLE

INVOICE

CUSTOMER NO.	SOLD TO	SHIPPED TO	INVOICE #
0000337	L HENRI, INC BOX 232 ST. THOMAS VIRGIN ISLANDS 00801	VIRGIN ISLANDS	0061
			S/O : 1052

CONDUCE NO.	SLMN	CUSTOMER P.O. NO.	ORDER DATE	SHIPPED VIA	INVOICE DATE	TERMS
0023800	92	VERBAL	07/17/84	OUR TRUCK	07/18/84	NET 30 D/

QUANTITY SHIPPED	QUANTITY BACK ORDERED	UNIT	CODE	DESCRIPTION	UNIT PRICE	AMOUNT
20	0	DR	046-0003	PERCHLOROETHYLENE -700 LBS	235.00	4700.0
				ISLAND EXPRESS FRIEGHT COLLECT		
				LW		

7/14
7/18/84

MERCHANDISE		FREIGHT	OTHER	
4700.00				4700.0

EA — EACH
LB — POUNDS
BX — BOXES
BZ — BOZENS
GL — GALLONS
BG — BAGS
DR — DRUMS
T — TONS

UNIT CODE EXPLANATION

TOTAL

INVOICE

IMPORTANTE

1. FACTURA VENCE A LOS 30 DIAS DE SU FECHA Y DEVENGARA INTERESES AL 9 MAXIMO ANUAL PERMITIDO POR LA PARTIR DE DICHO VENCIMIENTO
2. SI ES HECHA UN PAGO Y NO ESPECIFICAR EL CONCEPTO DEL MISMO NOS RESERVAMOS EL DERECHO A DARLE DICHO PAGO A ADECUADAS FACTURAS O PARTE DE LAS MISMAS QUE ESTIMEMOS CONVENIENTE

IMPORTANT

1. THIS INVOICE IS DUE IN DAYS FROM DATE OF INVOICE AND WILL BE SUBJECT TO INTEREST AT THE MAXIMUM ANNUAL RATE PERMITTED BY LAW STARTING FROM DUE DATE
2. WHEN A PAYMENT IS MADE WITHOUT SPECIFYING WHAT INVOICE IT COVERS, WE RESERVE THE RIGHT TO APPLY SAID PAYMENT TO ANY INVOICE OR PART OF IT AT OUR DISCRETION

CUSTOMER COPY

TUT ONE 109

MANUEL DEL VALLE, INC.

P.O. BOX 3806
CAROLINA, PUERTO RICO 00630
TELS. (809) 769-6085 • 8065 • 6069

CALLE 272 ESQ. 220
URB. INDUSTRIAL COUNTRY CLUB
CAROLINA, PUERTO RICO
CABLE ADDRESS: MAVALLE

INVOICE

CUSTOMER NO. | SOLD TO | SHIPPED TO | INVOICE

0000337 L HENRI, INC
BOX 232
ST. THOMAS
VIRGIN ISLANDS 00801

0069

S/O : 10587

CONDUCE NO.	SALESMAN	CUSTOMER P.O. NO.	ORDER DATE	SHIPPED VIA	INVOICE DATE	TERMS
0030473	92	LEVINE	02/07/85	OCEAN	02/08/85	NET 30 DA

QUANTITY ORDERED	QUANTITY SHIPPED	UNIT	CODE	DESCRIPTION	UNIT PRICE	AMOUNT
15	0	DR	046-0003	PERCHLOROETHYLENE -700 LBS ORM-A UN#1897	250.00	3750.0

$888
3/11/85

MERCHANDISE	FREIGHT	OTHER	
3750.00			3750.00

EA — EACH, GL — GALLONS, LB — POUNDS, BG — BAGS, BX — BOXES, DR — DRUMS, DZ — DOZENS, T — TONS

UNIT CODE EXPLANATION

IMPORTANTE

IMPORTANT

1. THIS INVOICE IS DUE 30 DAYS FROM DATE OF INVOICE AND WILL BE SUBJECT TO INTEREST AT THE MAXIMUM ANNUAL RATE PERMITTED BY LAW STARTING FROM DUE DATE.
2. WHEN A PAYMENT IS MADE WITHOUT SPECIFYING WHAT INVOICE IT COVERS, WE RESERVE THE RIGHT TO APPLY SAID PAYMENT TO ANY INVOICE OR PART OF IT AT OUR DISCRETION.

TOTAL

INVOICE

ORIGINAL

TOT 001 1078

MANUEL DEL VALLE, INC.

P.O. BOX 3606
CAROLINA, PUERTO RICO 00630
TELS. (809) 769-6065 • 6065 • 6069

CALLE 272 ESQ. 230
URB. INDUSTRIAL COUNTRY CLUB
CAROLINA, PUERTO RICO
CABLE ADDRESS: MAVALLE

INVOICE

CUSTOMER NO.	SOLD TO	SHIPPED TO	INVOICE N
0000337	L HENRI, INC BOX 232 ST. THOMAS VIRGIN ISLANDS 00801		0073
			S/O : 10527

CONDUCE NO.	SLMN	CUSTOMER P.O. NO.	ORDER DATE	SHIPPED VIA	INVOICE DATE	TERMS
0034475	92	MR LEVINE	06/05/85	OCEAN	06/06/85	NET 30 D/

QUANTITY ORDERED	QUANTITY SHIPPED	UNIT	CODE	DESCRIPTION	UNIT PRICE	AMOUNT
20	0	DR	046-0003	PERCHLOROETHYLENE -700 LBS DRM--A UN#1897	250.00	5000.0

#983
6-7-85

MERCHANDISE	JOINT CODE EXPLANATION	FREIGHT	OTHER	
5000.00		--		5000.0

EA—EACH, GL—GALLONS, LB—POUNDS, BG—BAGS, BX—BOXES, DR—DRUMS, DZ—DOZENS, TN—TONS

IMPORTANTE

IMPORTANT

TOTAL

INVOICE

ORIGINAL

MANUEL DEL VALLE, INC.

P. O. BOX 3806
CAROLINA, PUERTO RICO 00630
TELS: (809) 769-6085 • 6065 • 6069

CALLE 20 ESQ. 22G
URB. INDUSTRIAL COUNTRY CLUB
CAROLINA, PUERTO RICO
CABLE ADDRESS: MAVALLE

INVOICE

CUSTOMER NO.	SOLD TO	SHIPPED TO	INVO.
0000337	L HENRI, INC BOX 232 ST. THOMAS VIRGIN ISLANDS 00801		00
			S/O : 10

CONDUCE NO.	SLMN.	CUSTOMER P. O. NO.	ORDER DATE	SHIPPED VIA	INVOICE DATE	TERMS
0041137	92	LEVINE	01/13/86	OCEAN	01/16/86	NET 30

QUANTITY ORDERED	QUANTITY SHIPPED	UNIT	CODE	DESCRIPTION	UNIT PRICE	AMOU
15	5	DR	046-0003	PERCHLORDETHYLENE -700 LBS ORM-A UN#1897	250.00	3750

Check #3419 2/11/86

Rec'd 1/27

MERCHANDISE	UNIT CODE EXPLANATION	FREIGHT	OTHER	
3750.00	EA-EACH, LB-POUNDS, BX-BOXES, DZ-DOZENS, GL-GALLONS, BG-BAGS, DR-DRUMS, T-TONS			3750.

IMPORTANTE

IMPORTANT

TOTAL

INVOIC

ORIGINAL

Laquer 7/187 - Thinner

Thynner
$225.00

MANUEL DEL VALLE, INC.

P. O. BOX 3606
CAROLINA, PUERTO RICO 00630
TELS (809) 769-6065 • 6065 • 6089

CALLE 27C ESQ 220
URB INDUSTRIAL COUNTRY CLUB
CAROLINA PUERTO RICO
CABLE ADDRESS MAVALLE

INVOICE

CUSTOMER NO.	SOLD TO	SHIPPED TO	INVOIC
0000337	L HENRI, INC BOX 232 ST. THOMAS VIRGIN ISLANDS 00801	950-3111	008 S/O : 107

CONDUCE NO.	SLMN	CUSTOMER P. O. NO.	ORDER DATE	SHIPPED VIA	INVOICE DATE	TERMS
0046184	92	LEVINE	06/02/86	OCEAN	06/04/86	NET 30 I

QUANTITY SHIPPED	QUANTITY BACK ORDERED	UNIT	CODE	DESCRIPTION	UNIT PRICE	AMOU
20	0	DR	046-0003	PERCHLOROETHYLENE -700 LBS ORM-A UN#1897	230.00	4600.

#3598
6/26/86

MERCHANDISE	UNIT CODE EXPLANATION	FREIGHT	OTHER
4600.00	EA-EACH, LB-POUNDS, BX-BOXES, DZ-DOZENS, GL-GALLONS, BG-BAGS, DR-DRUMS, T-TONS	Ck# 3592 - 6/26/86	4600.

IMPORTANTE

ESTA FACTURA VENCE A LOS 30 DIAS DE SU FECHA Y DEVENGARA INTERESES AL % MAXIMO ANUAL PERMITIDO POR LEY A PARTIR DE DICHO VENCIMIENTO

SE USTED HACER UN PAGO Y NO ESPECIFICAR EL CONCEPTO DEL MISMO, NOS RESERVAMOS EL DERECHO A APLICAR DICHO PAGO A AQUELLAS FACTURAS O PARTES DE LAS MISMAS QUE ESTIMEMOS CONVENIENTE

IMPORTANT

1 THIS INVOICE IS DUE 30 DAYS FROM DATE OF INVOICE AND SHALL BE SUBJECT TO INTEREST AT THE MAXIMUM ANNUAL % PERMITTED BY LAW START ING FROM DUE DATE.

2 WHEN A PAYMENT IS MADE WITHOUT SPECIFYING WHAT INVOICE IT COVERS WE RESERVE THE RIGHT TO APPLY SAID PAYMENT TO ANY INVOICE OR PART OF IT AT OUR DISCRETION.

TOTAL

INVOIC

ORIGINAL

TLT 001 1101

MANUEL DEL VALLE, INC.

P. O. BOX 3206
CAROLINA PUERTO RICO 00630
TELS (809) 767-6065 • 6065 • 6069

CALLE 272 ESQ 330
U.P.R. INDUSTRIAL COUNTRY CLUB
CAROLINA PUERTO RICO
CABLE ADDRESS MAVALLE

INVOICE

CUSTOMER NO. | SOLD TO | SHIPPED TO | INVOI

0000337 L HENRI, INC
BOX 232
ST. THOMAS
VIRGIN ISLANDS 00801

00

S/O : 10

EXEMPTION # :

CONDUCE NO.	SLMN.	CUSTOMER P. O. NO.	ORDER DATE	SHIPPED VIA	INVOICE DATE	TERM
0053692	92	LEAH	01/05/87	OCEAN	01/08/87	NET 30

QUANTITY ORDERED	QUANTITY SHIPPED	UNIT	CODE	DESCRIPTION	UNIT PRICE	AMOU
20	0	DR	046-0003	PERCHLOROETHYLENE -700 LBS ORM-A UN#1897 VIA ISLAND EXPRESS FREIGHT C O L L E CT	225.00	4500

L'H. 1st Loan
OR # 1558
1/23/87

EA-EACH, LB-POUNDS, BX-BOXES, DZ-DOZENS, GL-GALLONS, BG-BAGS, DR-DRUMS, T-TONS

MERCHANDISE	FREIGHT	OTHER	
4500.00			4500.

UNIT CODE EXPLAMATION

IMPORTANTE

ESTA FACTURA VENCE A LOS 30 DIAS DE SU FECHA Y DEVENGARA INTERESES AL % MAXIMO ANUAL PERMITIDO POR LA LEY EN CASO DE DEMORA VOLUNTARIA

SI USTED HACE UN PAGO Y NO ESPECIFICA EL CONCEPTO DEL MISMO NOS RESERVAMOS EL DERECHO A APLICAR DICHO PAGO A AQUELLAS FACTURAS O PARTES DE LAS MISMAS QUE ESTIMEMOS CONVENIENTE.

IMPORTANT

THIS INVOICE IS DUE 30 DAYS FROM DATE OF INVOICE AND WILL BE SUBJECT TO INTEREST AT THE MAXIMUM ANNUAL % PERMITTED BY LAW STARTING FROM DUE DATE

WHEN A PAYMENT IS MADE WITHOUT SPECIFYING WHAT INVOICE IT COVERS, WE RESERVE THE RIGHT TO APPLY SAID PAYMENT TO ANY INVOICE OR PART OF IT AT OUR DISCRETION

TOTAL

INVOIC

ORIGINAL

MANUEL DEL VALLE, INC.

P O BOX 3806
CAROLINA, P.R. 00628-3806
TEL. (809) 750-6065

OFICINA Y ALMACEN
CALLE 272 ESQ. 220 URB. IND. COUNTRY CLUB
CAROLINA, PUERTO RICO 00630
CABLE ADDRESS: MAVALLE

INVOICE

CUSTOMER NO. | SOLD TO | SHIPPED TO | INVOIC

0000337 L. HENRY, INC
BOX 2332
ST. THOMAS
VIRGIN ISLANDS 00801

010270

S/O 1068

CONDUCE NO. | SLMN | CUSTOMER P.O. NO. | ORDER DATE | SHIPPED VIA | INVOICE DATE | TERMS

C0508844 | SS | PHONE | 07/01/97 | OUR TRUCK | 07/07/97 | NET 30 D

QUANTITY SHIPPED	QUANTITY BACK ORDERED	UNIT	CODE	DESCRIPTION	UNIT PRICE	AMOUNT
20	0	DR	046-0003	PERCHLOROETHYLENE -700 LBS ORM-A UN#1897 FREIGHT COLLECT ONLY. VIA: ISLAND EXPRESS 1ST Freight 1758- $ 1600.00 Order #319 - 2940.00 $ 4500.00 Ok 7/15	225.00	4500.00

EA-EACH, LB-POUNDS, BX-BOXES, DZ-DOZENS, GL-GALLONS, BG-BAGS, DR-DRUMS, T-TONS

MERCHANDISE	UNIT CODE EXPLANATION	FREIGHT	OTHER	
4500.00				4500.0

IMPORTANTE

CARGOS ADICIONALES SOBRE ESTA FACTURA SE PAGARAN CONTRA ENTREGA DE LA MERCANCIA. NO SE ACEPTARAN DEVOLUCIONES DESPUES DE 15 DIAS DE LA FECHA DE LA FACTURA. NO SE ACEPTARAN DEVOLUCIONES SIN AUTORIZACION PREVIA.

IMPORTANT

1. THIS INVOICE IS DUE 30 DAYS FROM DATE OF INVOICE AND WILL BE SUBJECT TO INTEREST AT THE MAXIMUM ANNUAL % PERMITTED BY LAW STARTING FROM DUE DATE.
2. WHEN A PAYMENT IS MADE WITHOUT SPECIFYING WHAT INVOICE IT COVERS WE RESERVE THE RIGHT TO APPLY SAID PAYMENT TO ANY INVOICE OR PART OF IT AT OUR DISCRETION.

TOTAL

INVOICE

ORIGINAL

FUT 001 1103

MANUEL DEL VALLE, INC.

P.O. BOX 3806
CAROLINA, P.R. 00628-3806
TEL. (809) 750-6085

OFICINA Y ALMACEN
CALLE 222 ESQ. 220 URB. IND COUNTRY CLUB
CAROLINA, PUERTO RICO 00630
CABLE ADDRESS MAVALLE

INVOICE

CUSTOMER NO.	SOLD TO	SHIPPED TO	INVOICE
0000337	L HENRI, INC BOX 232 ST. THOMAS VIRGIN ISLANDS 00801		010730

EXEMPTION # 840 - 1094

CONDUCE NO.	SUMN.	CUSTOMER P.O NO.	ORDER DATE	SHIPPED VIA	INVOICE DATE	TERMS
0066934	43	232	12/01/87	OCEAN	12/02/87	NET 30 D.

QUANTITY SHIPPED	QUANTITY BACK ORDERED	UNIT	ITEM CODE	DESCRIPTION	UNIT PRICE	AMOUNT
20	0	DR	046-0003	PERCHLOROETHYLENE 700 LBS	220.00	4400.

1ST Pcia #1913 - 12/11/87 $ 220.00
CMB # 1054 - 12/11/87 220.00
4400.00

MERCHANDISE	FREIGHT	OTHER	
4400.00			4400.0

UNIT CODE EXPLANATION: EA-EACH, LB-POUNDS, BX-BOXES, DZ-DOZENS, GL-GALLONS, BG-BAGS, DR-DRUMS, T-TONS

IMPORTANTE

[illegible]

IMPORTANT

1 THIS INVOICE IS DUE 30 DAYS FROM DATE OF INVOICE AND WILL BE SUBJECT TO INTEREST AT THE MAXIMUM ANNUAL % PERMITTED BY LAW STARTING FROM DUE DATE

2 WHEN A PAYMENT IS MADE WITHOUT SPECIFYING WHAT INVOICE IT COVERS, WE RESERVE THE RIGHT TO APPLY SAID PAYMENT TO ANY INVOICE OR PART OF IT AT OUR DISCRETION

TOTAL

INVOICE

CUSTOMER COPY

MANUEL DEL VALLE, INC.

P O BOX 3806
CAROLINA, P R. 00628-3806
TEL (809) 750-6085

OFICINA Y ALMACEN
CALLE 272 ESQ. 220-URB. IND COUNTRY CLUB
CAROLINA, PUERTO RICO 00630
CABLE ADDRESS MANVALLE

INVOICE

CUSTOMER NO.	SOLD TO	SHIPPED TO	INVOICE
0000337	L HENRI, INC BOX 202 ST. THOMAS VIRGIN ISLANDS 00801		011537

710 - 5410

S/O : 1100

EXEMPTION # :

CONDUCE NO.	SLMN	CUSTOMER P.O.NO.	ORDER DATE	SHIPPED VIA	INVOICE DATE	TERMS
0072441	43	LEAH	04/20/88	DIAMOND	04/25/88	NET 30 D

QUANTITY SHIPPED	QUANTITY BACK ORDERED	UNIT	CODE	DESCRIPTION	UNIT PRICE	AMOUNT
20	0	DR	046--0003	PERCHLORETHYLENE 700 LBS FREIGHT C O L L E C T	245.00	4900.

$245.00 Kgal

10/3

Ref. CK#2092 - $2450.00
PCMS CK# 4205 - 2450.00
4900.00

EA-EACH, GL-GALLONS, LB-POUNDS, BG-BAGS, BX-BOXES, DR-DRUMS, DZ-DOZENS, T-TONS

MERCHANDISE	UNIT CODE EXPLANATION	FREIGHT	OTHER	TOTAL
4900.00		--		4900.00

IMPORTANTE

1.- FACTURA VENCE A LOS 30 DIAS DE SU FECHA Y DEVENGARA INTERESES AL % MAXIMO ANUAL PERMITIDO POR LEY A PARTIR DE DICHO VENCIMIENTO.

2.- SI AL HACER UN PAGO Y NO ESPECIFICAR EL CONCEPTO DEL MISMO, NOS RESERVAMOS EL DERECHO A APLICAR DICHO PAGO A CUALESQUIERA FACTURAS O PARTES DE LAS MISMAS QUE ESTIMEMOS CONVENIENTE.

IMPORTANT

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ORIGINAL

TUT 001 1105

MANUEL DEL VALLE, INC.

P.O. BOX 2527—TOA BAJA, PUERTO RICO 00759-2663
KM.20 HM.5—BO. CANDELARIA, TOA BAJA, P.R. 00759
TEL. (809)740-5410

INVOICE

CUSTOMER NO. | SOLD TO | SHIPPED TO | INVOICE

0000337 L HENRI, INC
25A DRONNINGENS GADE .
ST. THOMAS
VIRGIN ISLANDS 00804

ST. THOMAS

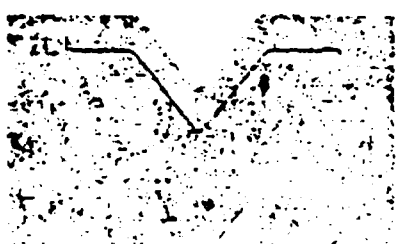
012241

S/O : 1106

EXEMPTION # :

CONDUCE NO.	SLSMN	CUSTOMER P.O. NO.	ORDER DATE	SHIPPED VIA	INVOICE DATE	TERMS
0078804	43	VERBAL	10/13/88	OUR TRUCK	10/18/88	NET 30 D.

QUANTITY SHIPPED	QUANTITY BACK ORDERED	UNIT	CODE	DESCRIPTION	UNIT PRICE	AMOUNT
20	0	DR	046-0003	PERCHLORETHYLENE 700 LBS VIA ISLAND EXPRESS FREIGHT COLLECT	245.00	4900.



Amb # 4416 - $2450.00
1st f # 2308 - 2450.00
11/4/88 4900.00

MERCHANDISE	UNIT CODE EXPLANATION	FREIGHT	OTHER	
4900.00	EA-EACH, LB-POUNDS, BX-BOXES, DZ-DOZEN, BG-BAGS, DR-DRUMS			4900.0

IMPORTANTE

* FACTURA VENCE A LOS 30 DIAS DE SU FECHA * DEVENGARA INTERESES AL % MAXIMO ANUAL PERMITIDO POR LA PARTIR DE DICHO VENCIMIENTO

* SI SE HACE UN PAGO Y NO ESPECIFICA EL CONCEPTO DEL MISMO NOS RESERVAMOS EL DERECHO A APLICAR DICHO PAGO A AQUELLAS FACTURAS O PARTES DE LAS MISMAS QUE ESTIMEMOS CONVENIENTE

IMPORTANT

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TOTAL

INVOICE

ORIGINAL

TOT 001 1106

MANUEL DEL VALLE, INC.

P O BOX 2527—TOA BAJA PUERTO RICO 00759-2663
K.M.20 HM 5—BO CANDELARIA, TOA BAJA, P R. 00759
TEL. (809)740-5410

INVOICE

CUSTOMER NO.	SOLD TO	SHIPPED TO	INVOICE
0000337	L HENRI, INC 25A DRONNINGENS GADE ST. THOMAS VIRGIN ISLANDS 00804		01288

S/O : 111

EXEMPTION # :

CONDUCE NO.	SLMN	CUSTOMER P.O. NO.	ORDER DATE	SHIPPED VIA	INVOICE DATE	TERMS
0084523	43	LEAH	04/04/89	OCEAN	04/12/89	NET 30 D

QUANTITY SHIPPED	QUANTITY BACK ORDERED	UNIT	CODE	DESCRIPTION	UNIT PRICE	AMOUNT
20	0	DR	046-0003	PERCHLORETHYLENE 700 LBS OCEAN FREIGHT C O L L E C T	245.00	4900.

4/20/89 1st Pmt #2481 - $2450.00
Cm.D # 422 - $2450.00
$4900.00

MERCHANDISE	FREIGHT	OTHER	TOTAL
4900.00			4900.

EA-EACH GL-GALLONS
LB-POUNDS BG-BAGS
BX-BOXES DR-DRUMS
DZ-DOZENS TONS

UNIT CODE EXPLANATION

IMPORTANTE

LA FACTURA VENCE A LOS 30 DIAS DE SU FECHA Y DEVENGARA INTERESES AL % MAXIMO ANUAL PERMITIDO POR LEY A PARTIR DE DICHO VENCIMIENTO

USTED NO HACE NINGUN PAGO Y NO ESPECIFICA EL CONCEPTO DEL MISMO NOS RESERVAMOS EL DERECHO A APLICAR DICHO PAGO A AQUELLAS FACTURAS O PARTES DE LAS MISMAS QUE ESTIMEMOS CONVENIENTE

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ORIGINAL

Project 8998
L'Henry Site Assessment
October 31, 1989

Appendix II

Chain of Custody and Laboratory Results

TUT 001 1103

CHAIN OF CUSTODY RECORD

SURVEY: L' Henry Inc

SAMPLERS: (Signature) Tom Bowman

STATION NUMBER	STATION LOCATION	DATE	TIME	SAMPLE TYPE: Water / Comp. / Grab / Air	SEQ. NO	NO. OF CONTAINERS	ANALYSIS REQUIRED
#1	Area #1	8/23/89				1	Tetrachloroethylene
#2	" #1	8/23/89				1	Tetrachloroethylene

Relinquished by: (Signature) Tom Bowman	Received by: (Signature) Fernando Colon	Date/Time 8/25/89 3:25 pm
Relinquished by: (Signature)	Received by: (Signature)	Date/Time 8/25/89
Relinquished by: (Signature)	Received by: (Signature)	Date/Time
Relinquished by: (Signature)	Received by Mobile Laboratory for field analysis: (Signature)	Date/Time
Dispatched by: (Signature) Date/Time 8/23/89 7:40	Received for Laboratory by: (Signature)	Date/Time 8-25-89 3:40PM

Method of Shipment:

TUI 001 1109

LABORATORY TEST REPORT

- L'HENRY, INC.
  P.O. BOX 232
- ST. THOMAS, VI 00804

- ATTN: MR. LEO T. BARBEL

eqlab
ENVIRONMENTAL QUALITY LABORATORIES, INC.

- Date: October 5, 1989
- Page 1 of 1

EQ LAB	CLIENT
W.O.#: 635-01-01 D.S.#: 893874 Date Sample Collected/Received: 8/25/89	Facility: St. Thomas, VI P.O.# Date Sample Collected:
Sample #: See Below	Source: Station
	Description: Soil Grab

EQL SAMPLE NO.	SOURCE	TETRACHLOROETHYLENE (mg/kg)
44801	Station # 1	<0.03
44802	Station # 2	<0.03

ISMAEL MARTINEZ JIMENEZ
Químico Licenciado
Estado Libre Asociado de Puerto Rico
M. 1488

TUT 001 1110

Reported by: Ismael [illegible]
Title: Laboratory Manager

adp

A133137

Released by: William Sarriera
Title: General Manager

OCT 12 1989

eqlab
ENVIRONMENTAL QUALITY LABORATORIES, INC.

*****TELECOPY COVER PAGE*****

TOTAL NUMBER OF PAGES: 2
(including cover page)

PLEASE DELIVER THE FOLLOWING INFORMATION TO:

NAME: Sra. Diana Bolivar

LOCATION: Pedro Ponzoni y Asoc.

COMPANY: 725-9085

TELECOPY SENT FROM:

NAME Elba Luz Martinez Cosme

TELECOPIER NUMBER 724-3110

NOTE: IF YOU DO NOT RECEIVE ALL THE PAGES, PLEASE CALL US AT 725-5
AS SOON AS POSSIBLE.

TUT 001 1111

Appendix III

Material Safety Data Sheet for Perchloroethylene (PCE)

TUT 001 1112

U.S. DEPARTMENT OF LABOR
Occupational Safety and Health Administration

Form Approved
OMB No. 44-R1387

MATERIAL SAFETY DATA SHEET

Required under USDL Safety and Health Regulations for Ship Repairing, Shipbuilding, and Shipbreaking (29 CFR 1915, 1916, 1917)

SECTION I

MANUFACTURER'S NAME	EMERGENCY TELEPHONE NO.
Vulcan Materials Company, Chemicals Division	316-524-5751

ADDRESS (Number, Street, City, State, and ZIP Code)
P. O. Box 7689, Birmingham, Alabama 35223

CHEMICAL NAME AND SYNONYMS	TRADE NAME AND SYNONYMS
Tetrachloroethylene	Perchloroethylene
CHEMICAL FAMILY: Chlorinated hydrocarbon	FORMULA: $CCl_2 = CCl_2$

SECTION II - HAZARDOUS INGREDIENTS

PAINTS, PRESERVATIVES, & SOLVENTS	%	TLV (Units)	ALLOYS AND METALLIC COATINGS	%	TLV (Units)
PIGMENTS			BASE METAL		
CATALYST			ALLOYS		
VEHICLE			METALLIC COATINGS		
SOLVENTS			FILLER METAL PLUS COATING OR CORE FLUX		
ADDITIVES			OTHERS		
OTHERS					

HAZARDOUS MIXTURES OF OTHER LIQUIDS, SOLIDS, OR GASES	%	TLV (Units)

SECTION III - PHYSICAL DATA

BOILING POINT (°F.)	250	SPECIFIC GRAVITY (H_2O=1)	1.6
VAPOR PRESSURE (mm Hg.) @20°C	13	PERCENT, VOLATILE BY VOLUME (%)	100
VAPOR DENSITY (AIR=1)	5.8	EVAPORATION RATE (ether =1)	0.09
SOLUBILITY IN WATER	Negligible		
APPEARANCE AND ODOR	Colorless clear liquid, mildly sweet		

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (Method used)	FLAMMABLE LIMITS	Lel	Uel
None (tag closed cup)			

EXTINGUISHING MEDIA
Not applicable

SPECIAL FIRE FIGHTING PROCEDURES
Self-contained breathing equipment should be used by firemen in building where perchloroethylene is stored. Keep container cool.

UNUSUAL FIRE AND EXPLOSION HAZARDS
Vapors can be ignited by high energy ignition source. Decomposes with fire or hot surfaces to acidic gases and other highly toxic substance.

TUT 001 1113

SECTION V - HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE
100 ppm (As listed in Part 1910.1000 of CFR, Title 29)

EFFECTS OF OVEREXPOSURE
Overexposure can cause vomiting, nausea, drowsiness, unconsciousness and even death in extreme cases.

EMERGENCY AND FIRST AID PROCEDURES
Move to fresh air. Remove contaminated clothing. If breathing has stopped, administer artificial respiration. Keep warm and quiet. Call physician.

Eye contact--wash with copious amounts of water. Never administer adrenaline.

SECTION VI - REACTIVITY DATA

STABILITY			CONDITIONS TO AVOID
	UNSTABLE		Contact with open flame, hot surfaces or
	STABLE	XX	emissions from welding arc.

INCOMPATABILITY *(Materials to avoid)*

HAZARDOUS DECOMPOSITION PRODUCTS
Hydrogen chloride, phosgene and other highly toxic substance.

HAZARDOUS POLYMERIZATION			CONDITIONS TO AVOID
	MAY OCCUR		
	WILL NOT OCCUR	XX	

SECTION VII - SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED
Evacuate the area, ventilate, avoid breathing vapor or coming in contact with liquid. Clean up area (wear protective clothing) contain spill, transfer by mopping or with absorbent material to storage container.

WASTE DISPOSAL METHOD
Consult manufacturer or local pollution control agency.

SECTION VIII - SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION *(Specify type)*
None required when used with adequate ventilation.

VENTILATION		
	LOCAL EXHAUST: Sufficient to maintain below TLV	SPECIAL
	MECHANICAL *(General)*	OTHER

PROTECTIVE GLOVES	EYE PROTECTION
Neoprene, viton, P.V.C. coated	Chemical safety goggles

OTHER PROTECTIVE EQUIPMENT
Protective headgear and apron when splashing is a problem

SECTION IX - SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING
Avoid contact with skin and avoid vapors. Pipe vents outdoors. Store in cool, dry ventilated area.

OTHER PRECAUTIONS
Prevent moist air from entering storage. No smoking in presence of vapors.

Vulcan Materials Company

CHEMICALS DIVISION, P. O. BOX 7097, BIRMINGHAM, ALABAMA 35223

PERCHLOR

PHYSICAL PROPERTIES

Chemical Formula	C_2Cl_4
Molecular Weight	165.85
Freezing Point	22.22°C; −8°F
Boiling Point (At 1 ATM.)	121.2°C; 250°F
Steam Distillation Point (At 1 ATM.)	87.7°C; 190°F
Ratio of Solvent/Water, by wt.	5.32/1
Latent Heat of Vaporization at b. pt.	50.8 cal./g; 91.4 Btu/lb.
Specific Heat, Liquid @ 20°C Vapor (1 atm., 100°C)	0.205 cal./g/°C 0.146 cal./g/°C
Critical Temperature	348.6°C; 659.5°F
Thermal Conductivity, Liquid @ 20°C Vapor @ b. pt.	0.0732 Btu/hr./ft²/°F/ft. 0.00505 Btu/hr./ft²/°F/ft.
Specific Gravity of Liquid 25/25°C	1.620
Pounds/Gallon @ 25°C	13.47 lb./gal.
Ave. Coeff. of Cubical Expansion, Liquid, 1/°C,	0.00102, (0 to −25°C)
Vapor Density @ b. pt. & 1 atm.	5.13 g/l.; 0.320 lb./cu. ft.
Sp. Gr. of Vapor @ 1 atm. & b. pt. (Air = 1)	5.72
Viscosity, Liquid @ 20°C Vapor @ 60°C	0.88 cp 0.0099 cp.
Solubility @ 25°C Perchlor in Water Water in Perchlor	 0.015 g/100 g water 0.0105 g/100 g perchlor
Diffusivity in Air @ 25°C, 1 atm.	0.067 sq. cm./sec
Refractive Index n_D Liquid @ 20°C Vapor @ 0°C	1.5044 1.00201

TUT 001 1115

Vulcan Materials Company

DENSITY OF [illegible]

I Temperature °F.	II Density lbs./Gal.	III Gallons to Make 700 lb.
0	14.03	49.89
2	14.02	49.93
4	14.01	50.00
6	13.99	50.04
8	13.98	50.07
10	13.96	50.14
12	13.95	50.18
14	13.94	50.22
16	13.92	50.29
18	13.91	50.33
20	13.89	50.40
22	13.88	50.44
24	13.86	50.50
26	13.85	50.55
28	13.83	50.61
30	13.81	50.68
32	13.80	50.72
34	13.79	50.77
36	13.77	50.83
38	13.76	50.87
40	13.74	50.95
42	13.73	50.99
44	13.71	51.06
46	13.70	51.10
48	13.68	51.17
50	13.66	51.24

I Temperature °F.	II Density lbs./Gal.	III Gallons to Make 700 lb.
52	13.65	51.29
54	13.63	51.36
56	13.62	51.40
58	13.61	51.44
60	13.59	51.50
62	13.58	51.55
64	13.57	51.58
66	13.56	51.62
68	13.55	51.66
70	13.53	51.73
72	13.52	51.78
74	13.50	51.85
76	13.48	51.93
78	13.47	51.97
80	13.45	52.04
82	13.44	52.08
84	13.42	52.15
86	13.41	52.20
88	13.39	52.27
90	13.37	52.36
92	13.36	52.40
94	13.34	52.47
96	13.32	52.55
98	13.31	52.59
100	13.30	52.63
102	13.29	52.67

17-71

TUT 001 1116

ETHYLENE

Surface Tension in Air @ 20°C	32.32 dynes/cm.
Power Factor (1000 cycles)	0.02%
Dielectric Constant, Liquid @ 25°C	2.365
Specific Resistance	1.8×10^{13} ohms/cm. cube
Heat of Formation, Liquid Vapor	+ 3 kg cal./mol. — 6 kg. cal./mol.
Vapor Pressure	See Fig. 1
Density of Liquid	See Fig. 2
Flash Point	None
Explosion Point	None
Evaporation Rate (Ether = 100)	9

Azeotropic Mixtures

Component	B. P. @ 760 mm °C	Wt. % Perchlor
Water	87.7	84.2
Methanol	63.7	36.5
Ethanol	76.7	37
Propanol	94.0	52
Isopropanol	81.7	30
Butanol	108.9	71
Isobutyl Carbinol	116.1	80
Allyl Alcohol	93.4	54
Glycol	119.1	94
Formic Acid	88.1	50
Acetic Acid	107.4	61.5
Propionic Acid	119.2	91.5
Isobutyric Acid	120.5	97
Triethyl Borate	117.5	48
Acetamide	120.4	97.4
Isobutyl Acetate	115.5	47
Nitromethane	95.0	80

TUT 001 1117

REFERENCE NO. 27

NUS CORPORATION

II

0398

TUT 001 1119

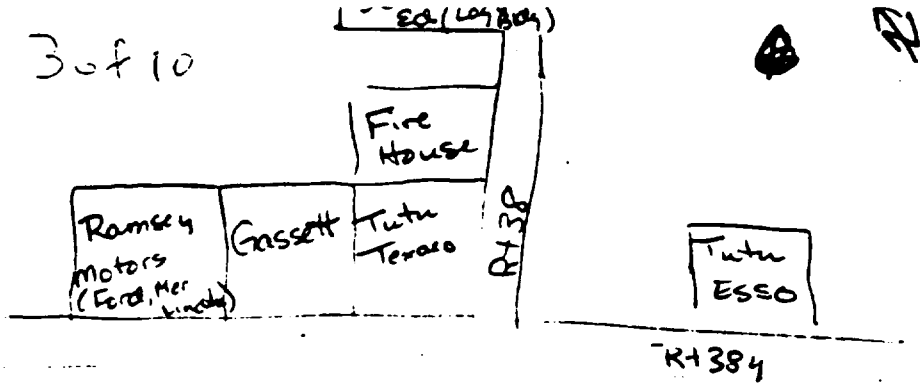
2 of 10

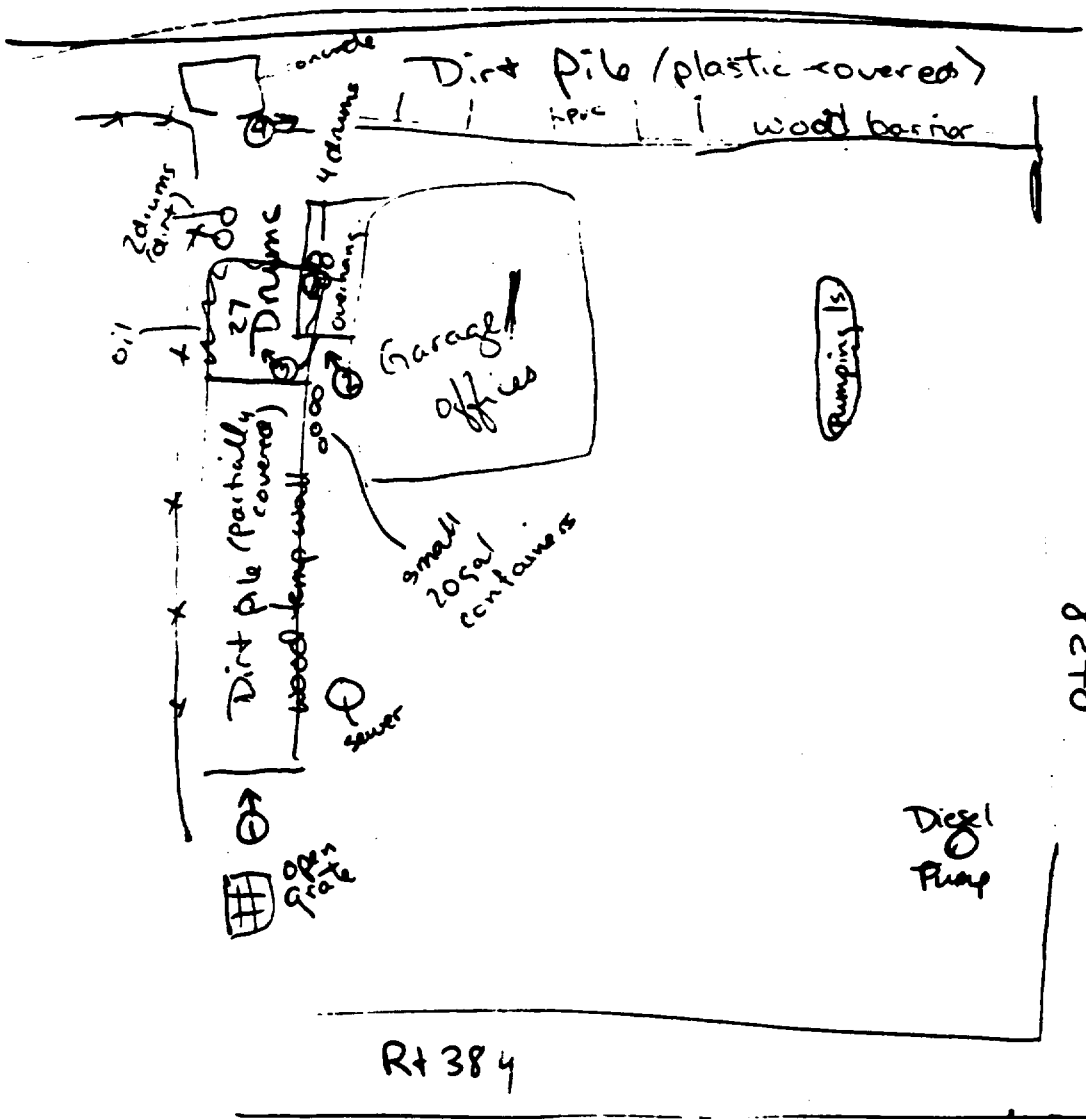
VIRGIN ISLANDS DRUM RECON.
02-8901-29
TDD MGR.- D. TRUBE
LOGBOOK #0398
FEBRUARY 2, 1989

TUT 001 1120

3 of 10

139





Tutu Texaco

J. Moyer 2/1/89
D Stube 2.1.5/89

TUT 001 1121

4 of 10

1255 Arrived at Tutu Texaco station. Owner said no one from DNR has been here yet, + OK'd our recon.

Open grate - Water @ 4' ~~deep~~ from surface DT — 4ppm on OVA
H_2S odor — 1-2 ppm on HNu

Sewer manhole >1000ppm in hole (OVA)
225ppm in hole (HNu)
nothing in breathing zone.
Dirt pile on west side ~6' high - bushes growing in pile - trash

3 20 gal containers
Oily sheen near garage area.
27 55 gal drums in NW corner
incl 2 plastic drums
20 ppm in drum (OVA) w/open bung. 0 on HNu
2-3 20 gal. drums, several 5 gal plastic pails
4 55 gal drums under overhang ~~Tank~~ Pit water
Drum PW-2
also Drum PW-1"
" water from S. Premium Tank
Tutu S/S 9/8/88)"
4th drum: label not visible

~~DT~~
~~1-2 ppm (HNu) near Case~~

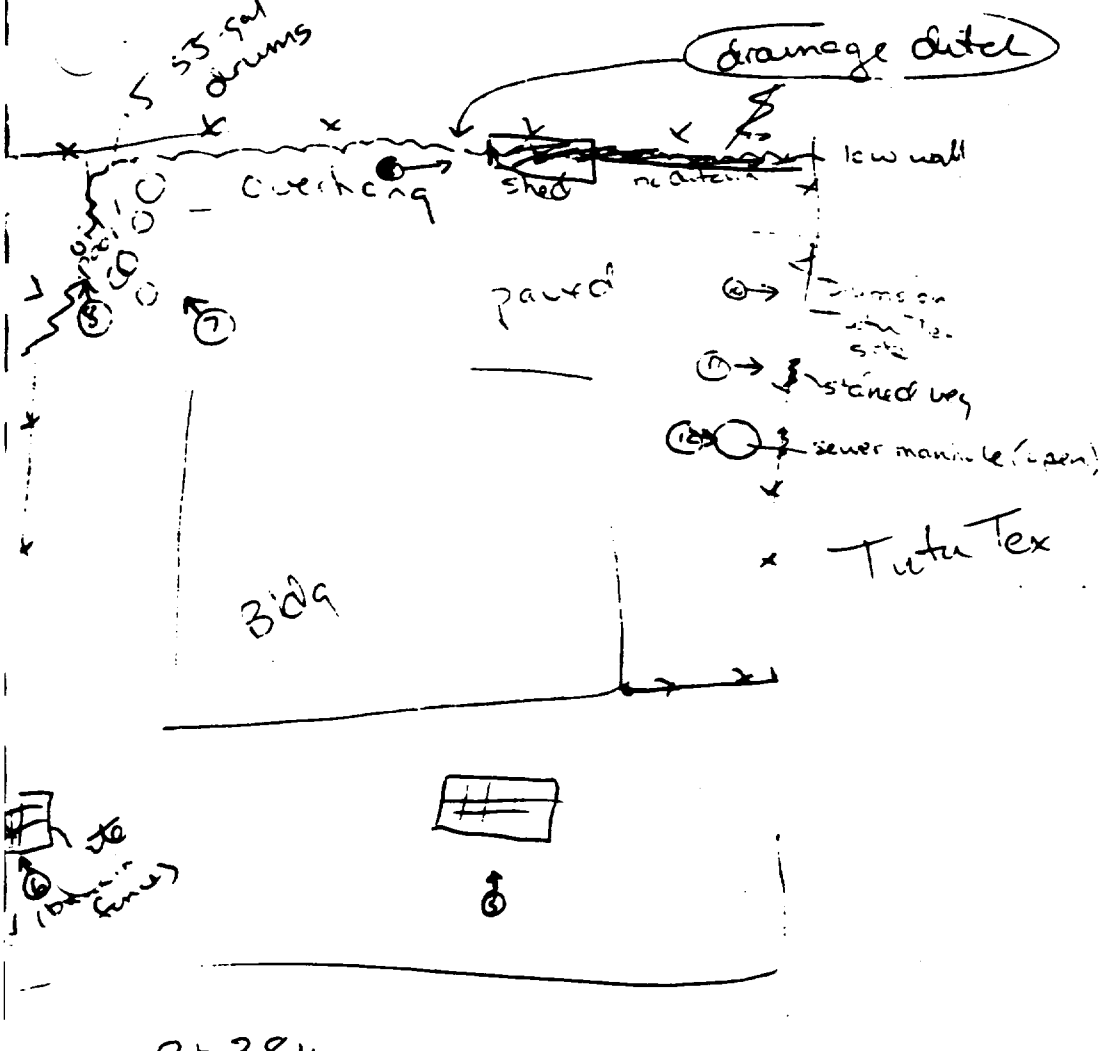
Drum in NW corner says "Used for UST"
4 20-gal drums of new grease in garage

Call 43139/1931 Texaco Mr. Friday - Tex Indgrs for info

1.5/89

Diane Lurie 2/15/89 — Jim Mayo 2/23/89

TUT 001 1122



Gassett Motors

J. Mapp 1/23/89
D'Jude 2/5/89

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Gassett
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to Ramsey
observed
were obser
A sewer m
heard flow

Diane Fu

TUT 001 1123

6 of 10

Manager said 25 drums contain oil, 2 contain dirt, 4 inside contain water pumped from tank excavation

PVC pipe system at North end (back of site) installed by tank excavation contractors. Mgr said this is to "clean dirt of hydrocarbons", but he doesn't know how.

1337 Tom Gassett of Gassett motors ~~Foodarama~~ stopped by. (leases property)
He said Gassett has no oil tanks or drums, above or below ground. He OK'd our recon.

He suggested we check out Nissan at Airport

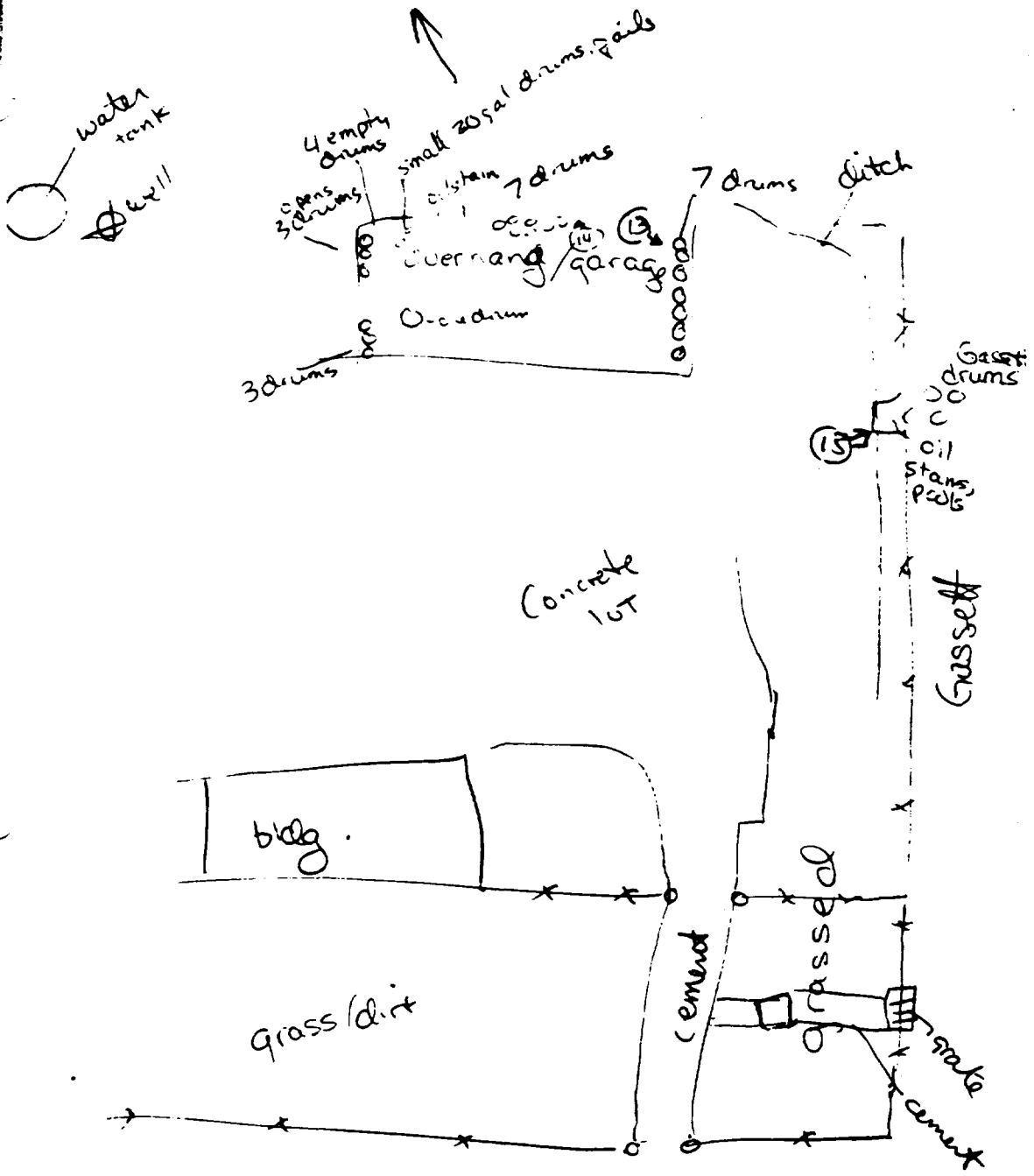
Gassett leased this prop. since May '88.
4 - 55 gal, ~~three~~ 20 gal drums in N corner of property. Mr Gassett said these were here when he leased it.

Grate in front of property. Mr. G said it was part of drainage system. 2nd grate under fence.

A drainage ditch originates in the back of the property and extends northward around the drums, pools near the drums and continues under the fence offsite to Ramsey Motors. No elevated air readings observed from oil in ditch. Stained soil + vegetation were observed along the border of Gassett + Tuten Texaco. A sewer manhole (in concrete) was open. Water could be heard flowing. No elev. readings

Diane Lemke 4/5/89 J. O'Mara 4/23/89

TUT 001 1124



Ramsey

J. Mayo 2/23/89

O Lube 2/15/89

TUT 001 1125

1407 Went to Ramsey Motors
Spoke w/ Rita Ramsey (owner of property + business)
OK'd our recon. ~~PB~~ Pictures. Said all drums are waste oil

7 drums in eastern corner - ~~2~~ 5 red + white Exxon, 2 blue
~~95~~ 90 ppm OVA } in open drum
10-30 ppm HNu }
One label - Exxon Tro-Mar SD 30
Stains under drums
60-90 ppm (OVA) inside open drums along back of garage
20-60 ppm (HNu) "
Nothing in breathing zone
7 drums along back of garage
labels - Exxon Tro-Mar SD 30
BCC Odor Control 752
others unlabelled

300 ppm (OVA) - drums ~~order~~ in garage (open bungs)
10-90 ppm (HNu).
Info from Nancy Berry:
10-year old well (approx) on site used for sanitary, car washing not used for drinking. Tested monthly by DPNR.
approx 100' deep.
Well permit dated Aug. 1978 Max 500 gpd use
Permit # WDL 003 78
Well never used for drinking
Gates secured at night.
Well pumped to vertical tank - gravity feed to outlet.
Accessible for sampling.
1500 At Esso Station - called Leonard Reed DNR.
3 mums, Saga Haven + Fish Hawk will not be done because they said their oils are taken offsite. He would like us to do the airport tomorrow morning. I requested we go first thing tomorrow.
Diane Imbe 2/15/89 JMP 2/22/89

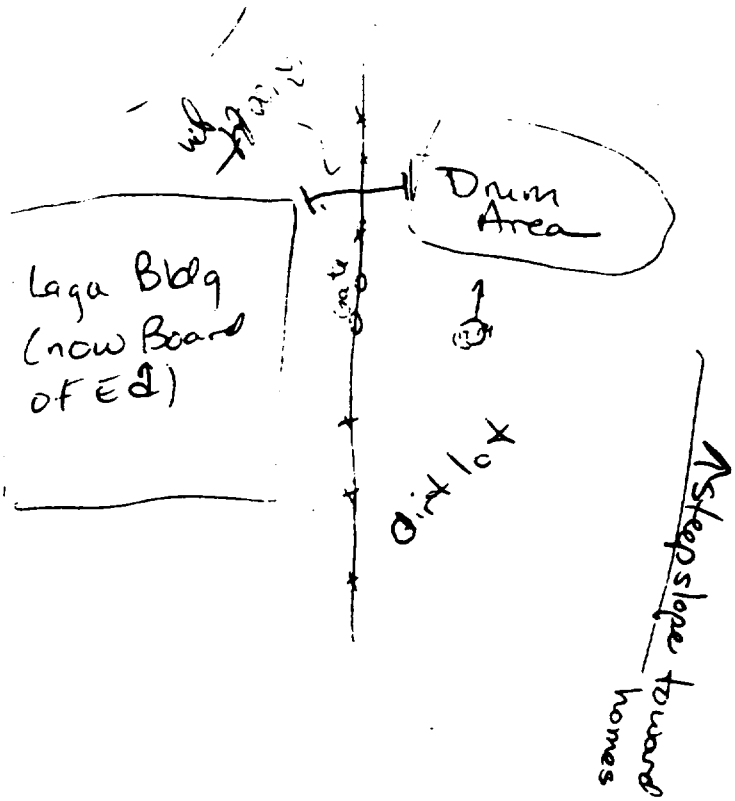
TUT 001 1126

9 of 10

16A

02-8901

Laga Bldg



1505 Spoke C
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1519 S
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Drums
Drums
1530 left

1700 Ca
them
were
proper

2200
Ms
0730
airpor

Diane

2/15/89
Lube
Map 2/23/89

TUT 001 1127

1505 Spoke with Operations Mgr. Thomas Gutshall. All waste oils put into underground tank, then pumped & removed by ESSO Corp They do not accept waste oils from others. No solvents, cleansers, etc are put into tank.

Underground Tank is under garage (under lifts) last tested by EPA 6 mo ago.

1519 Stopped by Loca Bldg. No solvent, oils etc currently stored on site. Allowed to go behind building. 22 drums visible, some overgrown many in poor repair Some appear empty, others full. No elevated air readings. One drum contains liquid jm 3/20

28 cpm on minirad
No stained soil visible, No labels visible.
Children were observed crossing area on foot.
Drums are rusted, some broken or perforated.
Drums are 55 gal metal (except 1 is plastic)

1530 left site

1700 Called Ron + Tim at NUS office + informed them of progress, & that TAT team from Edison were also here, working on some of the same properties.

2200 I received a message from Leonard Reed that Ms Monsanto will meet us at DNR office at 0730-0800 hr. tomorrow to show us where airport sites are.

Diane Lube 2/15/89 Jeff Mayo 2/23/89

TUT 001 1128

REFERENCE NO. 28

WESTON • SPER
Suite 201, 1090 King Georges Post Road,
Edison, NJ 08837 • (201) 225-6116

TECHNICAL ASSISTANCE TEAM FOR EMERGENCY RESPONSE REMOVAL AND PREVENTION
EPA CONTRACT 68-01-7367

TO: Carlos C'Neill, EPA CFO

FROM: Iván García, TAT-21

SUBJECT: Documentation of Transmittal

SITE: Tutu wells, St. Thomas

TDD#: 8908-07A (Task 2792)

DATE: 17 April 1990

The purpose of this memo is to document the transmittal of the following:

_____ Letter Report DCN#_____

_____ OSC Report Draft/Final DCN#_____

_____ Photographs

_____ Analytical Data

_____ POLREP

_____ Safety Plan DCN#_____

_____ Community Relations Plan DCN#_____

__X__ Sampling Plan DCN#_____

_____ Sampling Report DCN#_____

_____ Action Memorandum DCN#_____

_____ SPCC Report

__X__ Site Maps

__X__ Other Photovac results 1987-90

cc: TAT PM
TDD File

TUT 001 1130

TABLE 1. LIST OF WELLS SAMPLED AND THEIF LOCATION

NO.	WELL NAME	LOCATION
1	Bryans	Dorroe lot C
2	Rodriguez	Charlotte Amalie Estate #7
3.1	Hartmann Barney	Charlotte Amalie Estate #3
3.2	Hartmann Brusher	Charlotte Amalie Estate #3
3.3	Hartmann estate	Charlotte Amalie Estate #3
4.1	Gene Eglin 1	Anna's Retreat #2
4.2	Gene Eglin 2	Anna's Retreat #2
4.3	Gene Eglin 3	Anna's Retreat #2
5	Harvey's	Anna's Retreat #5c
6	Steele's	Anna's Retreat #5a
7	Mathia's	Charlotte Amalie Estate #12
8	Smith's	Charlotte Amalie Estate #110
9	Francois	Anna's Retreat #385
10	Tillet's	Anna's Retreat #126
11	Ramsey's	Anna's Retreat #405
12	4 winds 1	Anna's retreat #392
13.1	VIHA 3	Anna's Retreat #387
13.2	VIHA 1	Anna's retreat #387
14	Alpha Leonard	Anna's Retreat #129-45
15	Demitri	Anna's Retreat #215
16	Dench	Mariendahl #10
17.1	Devcon 1	Mariendahl #11
17.2	Devcon 3	Mariendahl #11
18	Dede's	Mariendahl

TABLE 2. PHOTOVAC SAMPLING RESULTS, 1987. ALL CONCENTRATIONS IN UG L

	1987					
BENCH#	JUL	AUG	SEP	OCT	NOV	DEC
BEN		0.0	0.0	0.0	0.0	0.0
TOL		0.0	0.0	0.0	0.0	0.0
PCE		0.0	0.0	0.0	0.0	0.0
TCE		0.0	0.0	0.0	0.0	0.0
DCE		0.0	0.0	1.0	0.0	0.0
RAMSEY	JUL	AUG	SEP	OCT	NOV	DEC
BEN		0.0	0.0	4.5	0.0	0.0
TOL		0.0	0.0	0.0	0.0	0.0
PCE		7.0	7.5	50	16.0	4.0
TCE		0.0	<1	0.0	<1	0.0
DCE		1.0	0.0	2.7	0.0	0.0
H.CRUSHER	JUL	AUG	SEP	OCT	NOV	DEC
BEN	0.0	0.0	0.0	5.0	0.0	0.0
TOL	5.7	0.0	0.0	0.0	0.0	0.0
PCE	102.0	26.0	14.0	29.5	5.0	0.0
TCE	7.0	3.0	1.0	0.0	7.0	0.0
DCE	0.0	12.0	1	4.0	0.0	0.0
H.BAILEY#	JUL	AUG	SEP	OCT	NOV	DEC
BEN	0.0	0.0	0.0	1	0.0	0.0
TOL	6.3	0.0	0.0	0.0	0.0	0.0
PCE	2.9	3.0	1.0	0.0	0.0	0.0
TCE	0.0	0.0	1	1	1	0.0
DCE	0.0	1.0	0.0	1	0.0	0.0
H.ESTATE#	JUL	AUG	SEP	OCT	NOV	DEC
BEN		0.0	0.0	0.0	NA	0.0
TOL		0.0	0.0	1.0	NA	0.0
PCE		1.0	0.0	2.5	NA	0.0
TCE		0.0	0.0	0.0	NA	0.0
DCE		0.0	0.0	0.0	NA	0.0
LEONARD	JUL	AUG	SEP	OCT	NOV	DEC
BEN		0.0	0.0	0.0	0.0	0.0
TOL		0.0	0.0	0.0	0.0	0.0
PCE		1.0	0.0	0.0	0.0	0.0
TCE		0.0	0.0	0.0	0.0	0.0
DCE		0.0	0.0	0.0	0.0	0.0

TUT 001 1132

TABLE 2 (CONTINUED). PHOTOVAC SAMPLING RESULTS, 1987.

FRANCIS	JUL	AUG	SEP	OCT	NOV	DEC
BEN		0.0	0.0	0.0	0.0	0.0
TOL		0.0	1.0	0.0	0.0	0.0
PCE		130.0	180.0	50	30.0	25.0
TCE		28.0	15.0	70.0	20.0	7.0
DCE		140.0	5.0	3.6	2.0	1.0

DEMITRIS	JUL	AUG	SEP	OCT	NOV	DEC
BEN		0.0	0.0	<1	0.0	0.0
TOL		0.0	0.0	0.0	0.0	0.0
PCE		2.0	0.0	<1	0.0	0.0
TCE		0.0	0.0	<1	0.0	0.0
DCE		0.0	0.0	<1	0.0	0.0

DEDC	JUL	AUG	SEP	OCT	NOV	DEC
BEN		0.0	0.0	<1	0.0	0.0
TOL		0.0	0.0	0.0	0.0	0.0
PCE		0.0	0.0	0.0	0.0	0.0
TCE		0.0	0.0	<1	0.0	0.0
DCE		0.0	0.0	1.0	0.0	0.0

DEVCON #1	JUL	AUG	SEP	OCT	NOV	DEC
BEN		0.0	0.0	0.0	0.0	0.0
TOL		0.0	0.0	0.0	0.0	0.0
PCE		0.0	0.0	0.0	0.0	0.0
TCE		0.0	0.0	0.0	<1	0.0
DCE		0.0	0.0	<1	1	0.0

DEVCON #2	JUL	AUG	SEP	OCT	NOV	DEC
BEN		0.0	0.0	0.0	0.0	0.0
TOL		0.0	0.0	0.0	0.0	0.0
PCE		0.0	0.0	0.0	0.0	0.0
TCE		0.0	0.0	0.0	0.0	0.0
DCE		0.0	0.0	<1	0.0	0.0

VIHA #1	JUL	AUG	SEP	OCT	NOV	DEC
BEN	15.3	0.0	0.0	0.0	0.0	0.0
TOL	6.0	1.0	0.0	0.0	0.0	0.0
PCE	35.7	10.0	14.0	8.0	2.0	1.0
TCE	9.4	3.0	<1	0.0	<1	0.0
DCE	0.0	12.0	0.0	2.3	0.0	0.0

TABLE 2 (CONTINUED). PHOTOVAC SAMPLING RESULTS, 1987.

VIHA #2	JUL	AUG	SEP	OCT	NOV	DEC
BEN		0.0	0.0	<1	0.0	0.0
TOL		0.0	0.0	0.0	0.0	2.5
PCE		0.0	0.0	1.0	0.0	0.0
TCE		0.0	1	1.0	1	0.0
DCE		7.0	<5	1	0.0	0.0

EGLIN #1	JUL	AUG	SEP	OCT	NOV	DEC
BEN		0.0	0.0	0.0	0.0	1.0
TOL		0.0	1.0	0.0	0.0	5.0
PCE		38.0	60.0	104.0	25.0	14.0
TCE		11.0	10	26.0	10.0	8.0
DCE		63.0	<5	4.5	2.0	1.3

EGLIN #2	JUL	AUG	SEP	OCT	NOV	DEC
BEN	3.1	0.0	0.0	0.0	0.0	0.0
TOL	5.9	0.0	<5	0.0	0.0	0.0
PCE	57.6	43.0	40.0	62.0	22.0	8.6
TCE	16.5	13.0	10.0	21.8	12.0	5.8
DCE	0.0	74.0	<5	4.5	2.0	1.4

EGLIN #3	JUL	AUG	SEP	OCT	NOV	DEC
BEN		0.0	0.0	0.0	0.0	0.0
TOL		0.0	1.0	0.0	0.0	0.0
PCE		57.0	105.0	104.0	55.0	24.0
TCE		16.0	20	30.5	20.0	9.2
DCE		66.0	5	7.5	1.0	1.7

SMITH	JUL	AUG	SEP	OCT	NOV	DEC
BEN		0.0	0.0	0.0	0.0	0.0
TOL		1.0	0.0	0.0	0.0	0.0
PCE		130.0	135.0	>500	50.0	9.6
TCE		17.0	10.0	70.0	3.0	1.4
DCE		81.0	<5	3.6	<1	ND

TILLET	JUL	AUG	SEP	OCT	NOV	DEC
BEN	6950.0	1400.0	250.0	46.0	>1000	>500
TOL	492.0	33.0	0.0	0.0	30.0	180.0
PCE	2040.0	120.0	475.0	>500	350.0	85.0
TCE	711.0	36.0	75.0	110.0	200.0	0.0
DCE	327.0	620.0	<10	19.0	45.0	0.0

TABLE 2 (CONTINUED). PHOTOVAC SAMPLING RESULTS, 1987.

'4 WINDS	JUL	AUG	SEP	OCT	NOV	DEC
BEN	6.7	1.0	0.0	0.0	0.0	1.0
TOL	5.3	1.0	2.0	0.0	0.0	0.0
PCE	6...	...	15...	...	134.0	5...
TCE	19.3	21.0	15	75.0	34.0	22.2
DCE	.1	110.	5.0	13.1	4.0	1.0

STEELE	JUL	AUG	SEP	OCT	NOV	DEC
BEN		0.0	0.0	0.0	0.0	0.0
TOL		0.0	0.0	0.0	0.0	0.0
PCE		270.0	575.0	500	300.0	130.0
TCE		20.0	9.0	27.0	12.0	14.6
DCE		61.0	5	1.8	1	0.8

HARVEY	JUL	AUG	SEP	OCT	NOV	DEC
BEN		0.0	0.0	0.0	0.0	0.0
TOL		1.0	0.0	0.0	0.0	0.0
PCE		7600.0	1000	500	1000	500
TCE		61.0	25.0	20.0	40.0	50.0
DCE		56.0	5.0	14.0	1	0.0

RODRIGUEZ	JUL	AUG	SEP	OCT	NOV	DEC
BEN		0.0	0.0	0.0	0.0	0.0
TOL		0.0	0.0	0.0	0.0	0.0
PCE		1.0	0.0	0.0	0.0	0.0
TCE		0.0	0.0	0.0	1	0.0
DCE		0.0	0.0	1	0.0	0.0

BRYAN	JUL	AUG	SEP	OCT	NOV	DEC
BEN		0.0	0.0	0.0	0.0	NA
TOL		0.0	0.0	0.0	0.0	NA
PCE		0.0	0.0	0.0	0.0	NA
TCE		0.0	0.0	0.0	1	NA
DCE		0.0	0.0	0.0	0.0	NA

MATHIAS	JUL	AUG	SEP	OCT	NOV	DEC
BEN		0.0	0.0	0.0	0.0	0.0
TOL		1.0	0.0	0.0	0.0	0.0
PCE		66.0	118.0	17.8	88.0	35.0
TCE		4.0	3.0	0.0	14.0	2.8
DCE		9.0	1	1	2.0	0.0

TABLE 3. PHOTOVAC SAMPLING RESULTS, 1988. ALL CONCENTRATIONS IN UG/L

BENCH#	JAN	FEB	1988 MAY	AUG	NOV
BEN	0.0	0.0	0.0	1	0.0
TOL	0.0	0.0	0.0	1	1
PCE	1.0	0.0	0.0	1	0.0
TCE	0.0	0.0	0.0	0.0	10.0
DCE	NF	1	NF	NF	NF
RAMSEY	JAN	FEB	MAY	AUG	NOV
BEN	0.0	0.0	0	0.0	NA
TOL	0.0	0.0	30.0	0.0	NA
PCE	6.0	4.0	154.0	17.0	NA
TCE	1.0	<1	46.0	1.0	NA
DCE	NF	0.0	NF	NF	NF
H.CRUSHER	JAN	FEB	MAY	AUG	NOV
BEN	0.0	0.0	0.0	0.0	NA
TOL	0.0	0.0	38.0	0.0	NA
PCE	4.0	3.0	130.0	10.0	NA
TCE	1.0	2.0	46.0	1.0	NA
DCE	NF	<1	NF	NF	NF
H.BAILEY#	JAN	FEB	MAY	AUG	NOV
BEN	0.0	0.0	1	0.0	0.0
TOL	0.0	0.0	33.0	4.0	0.0
PCE	0.0	0.0	0.0	1	0.0
TCE	0.0	1	5.0	1	1
DCE	NF	0.0	NF	NF	NF
H.ESTATE#	JAN	FEB	MAY	AUG	NOV
BEN	0.0	0.0	1	0.0	NA
TOL	0.0	0.0	0.0	0.0	NA
PCE	0.0	0.0	2.0	0.0	NA
TCE	0.0	0.0	0.0	0.0	NA
DCE	NF	0.0	NF	NF	NF
LEONARD	JAN	FEB	MAY	AUG	NOV
BEN	0.0	0.0	0.0	0.0	0.0
TOL	0.0	0.0	1.0	0.0	0.0
PCE	0.0	0.0	3.0	0.0	0.0
TCE	0.0	0.0	0.0	<1	0.0
DCE	NF	0.0	NF	NF	NF

TABLE 2 (CONTINUED). PHOTOVAC SAMPLING RESULTS, 1988.

SAMPLE	JAN	FEB	MAY	AUG	NOV
BEN	0.0	0.0	0.0	0.0	0.0
TOL	[illegible]	0.0	0.0	1.0	0.0
PCE	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
TCE	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
DCE	NF	4.0	NF	NF	NF

DEMITRIS	JAN	FEB	MAY	AUG	NOV
BEN	0.0	0.0	0.0	0.0	0.0
TOL	0.0	0.0	0.0	0.0	0.0
PCE	0.0	0.0	4.0	0.0	0.0
TCE	0.0	0.0	2.0	0.0	0.0
DCE	NF	0.0	NF	NF	NF

DEDE	JAN	FEB	MAY	AUG	NOV
BEN	0.0	0.0	0.0	1	0.0
TOL	0.0	0.0	0.0	1	0.0
PCE	0.0	0.0	0.0	1	0.0
TCE	0.0	0.0	0.0	1	1
DCE	NF	0.0	NF	NF	NF

DEVCON #1	JAN	FEB	MAY	AUG	NOV
BEN	0.0	0.0	0.0	1	0.0
TOL	0.0	0.0	0.0	0.0	0.0
PCE	0.0	0.0	0.0	0.0	0.0
TCE	0.0	0.0	0.0	1	1
DCE	NF	0.0	NF	NF	NF

DEVCON #3	JAN	FEB	MAY	AUG	NOV
BEN	0.0	0.0	0.0	1	1
TOL	0.0	0.0	0.0	1	1
PCE	0.0	0.0	0.0	1	0.0
TCE	0.0	0.0	0.0	1	1
DCE	NF	0.0	NF	NF	NF

VIHA #1	JAN	FEB	MAY	AUG	NOV
BEN	0.0	0.0	0.0	<1	0.0
TOL	0.0	0.0	0.0	<1	0.0
PCE	3.0	1.0	10.0	20.0	8.0
TCE	0.0	0.0	<1	3.0	7.0
DCE	NF	0.0	NF	NF	NF

VIHA #3	JAN	FEB	MAY	AUG	NOV
BEN	0.0	0.0	0.0	0.0	0.0
TOL	0.0	0.0	0.0	0.0	0.0
PCE	0.0	0.0	2.0	0.0	0.0
TCE	0.0	0.0	<1	0.0	0.0
DCE	NF	0.0	NF	NF	NF

TABLE 3 (CONTINUED). PHOTOVAC SAMPLING RESULTS, 1988.

HARVEY	JAN	FEB	MAY	AUG	NOV
BEN	0.0	0.0	0.0	0.0	NA
TOL	0.0	0.0	0.0	0.0	NA
PCE	[illegible]	[illegible]	[illegible]	1000	NA
TCE	[illegible]	8.0	250.0	17.0	NA
DCE	NF	3.0	NF	NF	NF

PORTUGUES	JAN	FEB	MAY	AUG	NOV
BEN	0.0	0.0	0.0	0.0	0.0
TOL	0.0	0.0	0.0	0.0	0.0
PCE	0.0	0.0	0.0	0.0	0.0
TCE	0.0	0.0	0.0	0.0	0.0
DCE	NF	0.0	NF	NF	NF

BRYAN	JAN*	FEB	MAY	AUG	NOV
BEN	0.0	0.0	0.0	0.0	0.0
TOL	0.0	0.0	0.0	0.0	0.0
PCE	0.0	0.0	0.0	0.0	0.0
TCE	0.0	0.0	0.0	<1	<1
DCE	NF	0.0	NF	NF	NF

MATHIAS	JAN	FEB	MAY	AUG	NOV
BEN	0.0	0.0	0.0	0.0	NA
TOL	0.0	0.0	0.0	0.0	NA
PCE	100.0	49.0	348.0	25.0	NA
TCE	55	4.0	16.0	2.0	NA
DCE	NF	1	NF	NF	NF

TABLE 2 (CONTINUED). PHOTOVAC SAMPLING RESULTS, 1988.

EGLIN #1	JAN	FEB	MAY	AUG	NOV
BEN	NA	0.0	0.0	0.0	1
TOL	NA	0.0	0.0	0.0	0.0
PCE	NA	22.0	450.0	39.0	6.0
TCE	NA	11.0	300.0	22.0	58.0
DCE	NA	3.0	NR	NR	NR

EGLIN #2	JAN	FEB	MAY	AUG	NOV
BEN	NA	0.0	0.0	NA	NA
TOL	NA	0.0	0.0	NA	NA
PCE	NA	25.0	760.0	NA	NA
TCE	NA	14.0	404.0	NA	NA
DCE	NA	3.0	NR	NA	NR

EGLIN #3	JAN	FEB	MAY	AUG	NOV
BEN	NA	0.0	0.0	0.0	0.0
TOL	NA	0.0	0.0	0.0	0.0
PCE	NA	41.0	500.0	12.0	9.0
TCE	NA	20.0	268.0	4.0	36.0
DCE	NA	2.0	NR	NR	NR

SMITH	JAN	FEB	MAY	AUG	NOV
BEN	0.0	0.0	1.0	0.0	0.0
TOL	0.0	0.0	0.0	0.0	0.0
PCE	50	28.0	1000	35.0	17.0
TCE	5.0	5.0	130.0	3.0	6.0
DCE	NR	1	NR	NR	NR

TILLET	JAN	FEB	MAY	AUG*	NOV
BEN	NA	49.0	1000	1000	NA
TOL	NA	0.0	0.0	110.0	NA
PCE	NA	254.0	1000	10.0	NA
TCE	NA	12.0	420.0	30.0	NA
DCE	NA	3.0	NR	NR	NR

'4 WINDS	JAN	FEB	MAY	AUG	NOV
BEN	0.0	0.0	NA	NA	0.0
TOL	0.0	0.0	NA	NA	0.0
PCE	450.0	159.0	NA	NA	30.0
TCE	100.0	56.0	NA	NA	100.0
DCE	NR	3.0	NA	NA	NR

STEELE	JAN	FEB	MAY	AUG	NOV
BEN	0.0	0.0	0.0	0.0	0.0
TOL	0.0	0.0	0.0	0.0	0.0
PCE	500.0	49.0	1000	41.0	105.0
TCE	100.0	11.0	160.0	5.0	42.0
DCE	NR	1.0	NR	NR	NR

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TABLE 4. PHOTOVAC SAMPLING RESULTS, 1989. ALL CONCENTRATIONS IN UG/L

BENCH#	FEB	1989 MAY	AUG	DEC
BEN	0.0	0.0	15.0	1.0
TOL	.	1	1	1
PCE	1	0.0	0.0	0.0
TCE	1.0	3.0	1.0	0.0
DCE	.0	0.0	1.0	0.0

RAMSEY	FEB	MAY	AUG	DEC
BEN	0.0	0.0	0.0	0.0
TOL	0.0	0.0	0.0	0.0
PCE	27.0	7.0	30.0	2.0
TCE	2.0	6.0	1.4	1.0
DCE	0.0	0.0	0.0	0.0

H.CRUSHER	FEB	MAY	AUG	DEC
BEN	NA	NA	NA	NA
TOL	NA	NA	NA	NA
PCE	NA	NA	NA	NA
TCE	NA	NA	NA	NA
DCE	NA	NA	NA	NA

4.BAKERY#	FEB	MAY	AUG	DEC
BEN	NA	NA	NA	0.0
TOL	NA	NA	NA	1
PCE	NA	NA	NA	0.0
TCE	NA	NA	NA	0.0
DCE	NA	NA	NA	0.0

H.ESTATE#	FEB	MAY	AUG	DEC
BEN	NA	NA	NA	NA
TOL	NA	NA	NA	NA
PCE	NA	NA	NA	NA
TCE	NA	NA	NA	NA
DCE	NA	NA	NA	NA

LEONARD	FEB	MAY	AUG	DEC
BEN	0.0	0.0	0.0	0.0
TOL	0.0	0.0	0.0	0.0
PCE	0.0	0.0	0.0	0.0
TCE	<1	0.0	<1	0.0
DCE	0.0	0.0	1.0	0.0

TABLE 4 (CONTINUED). PHOTOVAC SAMPLING RESULTS, 1989.

[illegible]	FEB	MAY	AUG	DEC
BEN	NA	NA	NA	NA
TOL	NA	NA	NA	NA
PCE	NA	NA	NA	NA
TCE	NA	NA	NA	NA
DCE	NA	NA	NA	NA

DEMITRIS	FEB	MAY	AUG	DEC
BEN	0.0	NA	NA	NA
TOL	0.0	NA	NA	NA
PCE	1	NA	NA	NA
TCE	1	NA	NA	NA
DCE	0.0	NA	NA	NA

DEDE	FEB	MAY	AUG	DEC
BEN	0.0	0.0	0.0	0.0
TOL	0.0	0.0	0.0	0.0
PCE	0.0	0.0	0.0	0.0
TCE	1	0.0	1	0.0
DCE	0.0	0.0	1.4	0.0

DEVCON #1	FEB	MAY	AUG	DEC
BEN	0.0	0.0	3.0	0.0
TOL	0.0	0.0	0.0	0.0
PCE	0.0	0.0	0.0	0.0
TCE	1	0.0	1.3	0.0
DCE	0.0	0.0	1	0.0

DEVCON #2	FEB	MAY	AUG	DEC
BEN	0.0	0.0	NA	0.0
TOL	0.0	0.0	NA	0.0
PCE	0.0	0.0	NA	0.0
TCE	0.0	0.0	NA	0.0
DCE	0.0	0.0	NA	0.0

VIHA #1	FEB	MAY	AUG	DEC
BEN	0.0	0.0	0.0	0.0
TOL	0.0	0.0	0.0	0.0
PCE	39.0	[illegible]	316.0	11.0
TCE	7.0	9.0	80.0	5.0
DCE	1	0.0	0.0	0.0

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TABLE 4 (CONTINUED . PHOTOVAC SAMPLING RESULTS, 1988.

VIHA #3	FEB	MAY	AUG	DEC
BEN	0.0	0.0	0.0	0.0
TOL	0.0	0.0	0.0	0.0
PCE	1.	0.	0.	0.0
TCE	1	0.	1.0	0.0
DCE	1	0.0	1.0	0.0

EGLIN #1	FEB	MAY	AUG	DEC
BEN	0.0	0.0	NA	NA
TOL	0.0	0.0	NA	NA
PCE	78.0	90.0	NA	NA
TCE	86.0	34.0	NA	NA
DCE	9.0	0.0	NA	NA

EGLIN #2	FEB	MAY	AUG	DEC
BEN	0.0	0.0	NA	NA
TOL	0.0	0.0	NA	NA
PCE	27.0	23.0	NA	NA
TCE	34.0	14.0	NA	NA
DCE	2.0	2.0	NA	NA

EGLIN #3	FEB	MAY	AUG	DEC
BEN	0.0	0.0	NA	NA
TOL	0.0	0.0	NA	NA
PCE	96.0	109.0	NA	NA
TCE	45.0	28.0	NA	NA
DCE	1.0	3.0	NA	NA

SMITH	FEB	MAY	AUG	DEC
BEN	0.0	0.0	0.0	0.0
TOL	0.0	0.0	0.0	0.0
PCE	120.0	337.0	181.0	119.0
TCE	15.0	21.0	73.0	17.0
DCE	1	2.0	0.0	1

TILLET	FEB	MAY	AUG	DEC
BEN	NA	680.0	>1000	NA
TOL	NA	24.0	0.0	NA
PCE	NA	88.0	13.0	NA
TCE	NA	62.0	135.0	NA
DCE	NA	87.0	0.0	NA

TUT 001 1142

TABLE 4 CONTINUED . PHOTOVAC SAMPLING RESULTS, 1989.

[illegible]	FEB	MAY	AUG	DEC
BEN	[illegible]	[illegible]	NA	0.0
TOL	[illegible]	0.0	NA	0.0
PCE	[illegible]	[illegible]	NA	[illegible]
TCE	[illegible]	[illegible]	NA	21.0
DCE	[illegible]	[illegible]	NA	4.0

STEELE	FEB	MAY	AUG	DEC
BEN	[illegible]	0.0	0.0	0.0
TOL	0.0	0.0	0.0	0.0
PCE	217.0	367.0	1000	61.0
TCE	66.0	93.0	280.0	50.0
DCE	2.0	6.0	0.0	2.0

HARVEY	FEB	MAY	AUG	DEC
BEN	NA	NA	NA	NA
TOL	NA	NA	NA	NA
PCE	NA	NA	NA	NA
TCE	NA	NA	NA	NA
DCE	NA	NA	NA	NA

RODRIGUEZ	FEB	MAY	AUG	DEC
BEN	0.0	0.0	0.0	0.0
TOL	0.0	0.0	0.0	0.0
PCE	0.0	0.0	0.0	0.0
TCE	1	0.0	1	0.0
DCE	0.0	0.0	1.1	0.0

BRYAN	FEB	MAY	AUG	DEC
BEN	0.0	0.0	0.0	NA
TOL	0.0	0.0	0.0	NA
PCE	0.0	0.0	0.0	NA
TCE	0.0	5.0	1	NA
DCE	0.0	0.0	2.0	NA

MATHIAS	FEB	MAY	AUG	DEC
BEN	0.0	0.0	0.0	0.0
TOL	0.0	0.0	0.0	0.0
PCE	76.0	66.0	720.0	9.0
TCE	5.0	7.0	48.0	6.0
DCE	<1	0.0	0.0	<1

TABLE 5. PHOTIAL SAMPLING RESULTS, 1990. ALL CONCENTRATIONS IN UG/L

BENCH#	FEB	1990 MAY
BEN	.	
TOL	.	
PCE	.	
TCE	.	
DCE	.	

RAMSEY	FEB	MAY
BEN	0.0	
TOL	0.0	
PCE	8.0	
TCE	1	
DCE	1	

H.CRUSHER	FEB	MAY
BEN	NA	
TOL	NA	
PCE	NA	
TCE	NA	
DCE	NA	

H.BAKERY#	FEB	MAY
BEN	NA	
TOL	NA	
PCE	NA	
TCE	NA	
DCE	NA	

H.ESTATE#	FEB	MAY
BEN	NA	
TOL	NA	
PCE	NA	
TCE	NA	
DCE	NA	

LEONARD	FEB	MAY
BEN	0.0	
TOL	0.0	
PCE	0.0	
TCE	0.0	
DCE	0.0	

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TABLE 5 (CONTINUED). PHOTOVAC SAMPLING RESULTS, 1990.

FRANCIS	FEB	MAY
BEN	NA	
TOL	NA	
PCE	NA	
TCE	NA	
DCE	NA	

DEMITRIS	FEB	MAY
BEN	NA	
TOL	NA	
PCE	NA	
TCE	NA	
DCE	NA	

DEDE	FEB	MAY
BEN	0.0	
TOL	0.0	
PCE	0.0	
TCE	0.0	
DCE	0.0	

DEVCON #1	FEB	MAY
BEN	1	
TOL	0.0	
PCE	0.0	
TCE	0.0	
DCE	0.0	

DEVCON #3	FEB	MAY
BEN	NA	
TOL	NA	
PCE	NA	
TCE	NA	
DCE	NA	

VIHA #1	FEB	MAY
BEN	NA	
TOL	NA	
PCE	NA	
TCE	NA	
DCE	NA	

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TABLE 5 (CONTINUED). PHOTOVAC SAMPLING RESULTS, 1990.

VIHA #3	FEB	MAY
BEN	0.0	
TOL	0.0	
PCE	.	
TCE	1	
DCE	0.0	

EGLIN #1	FEB	MAY
BEN	0.0	
TOL	0.0	
PCE	46.0	
TCE	13.0	
DCE	3.0	

EGLIN #2	FEB	MAY
BEN	0.0	
TOL	0.0	
PCE	58.0	
TCE	15.0	
DCE	1	

EGLIN #3	FEB	MAY
BEN	0.0	
TOL	0.0	
PCE	83.0	
TCE	17.0	
DCE	1	

SMITH	FEB	MAY
BEN	1	
TOL	0.0	
PCE	300.0	
TCE	18.0	
DCE	1	

TILLET	FEB	MAY
BEN	37.0	
TOL	0.0	
PCE	89.0	
TCE	21.0	
DCE	8.0	

TABLE 1 GROUNDWATER PHOTOLAB SAMPLING RESULTS, 1994.

[illegible]	FEB	MAY
BEN	NA	
TOL	NA	
[illegible]	NA	
[illegible]	NA	
DCE	NA	

[illegible]	FEB	MAY
BEN	0.0	
TOL	0.0	
[illegible]	35.0	
TCE	5.0	
DCE	2.0	

HARVEY	FEB	MAY
BEN	NA	
TOL	NA	
PCE	NA	
TCE	NA	
DCE	NA	

RODRIGUEZ	FEB	MAY
BEN	0.0	
TOL	0.0	
PCE	0.0	
TCE	0.0	
DCE	0.0	

BRYAN	FEB	MAY
BEN	0.0	
TOL	1	
PCE	0.0	
TCE	0.0	
DCE	0.0	

MATHIAS	FEB	MAY
BEN	2.0	
TOL	0.0	
PCE	58.0	
TCE	4.0	
DCE	1	

REFERENCE NO. 29

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TECHNICAL ASSISTANCE TEAM FOR EMERGENCY RESPONSE REMOVAL AND PREVENTION
EPA CONTRACT 68-01-7367

MEMORANDUM

TO: Luis E. Santos, OSC
EPA, Caribbean Field Office

FROM: Ivan Garcia, TAT 21, PM
Arnaldo Martinez, TAT 21, QC

SUBJECT: Results of the February 1990 quarterly sampling of Tutu wells site, St. Thomas, USVI.

DATE: April 12, 1990

Attached are the Photovac analyses results of the 15 water samples collected on February 20-22, 1990.

All concentrations for the detected parameters were within their historical ranges. However, a notable finding of this sampling was the detection of an unknown contaminant at concentrations ranging from 3 to 38 ug/L relative to benzene. This contaminant was detected in the following six wells: Steele, Smith, Eglin #1, Eglin #2, Eglin #3 and Dench.

These results only show potential exposure and do not necessarily represent the concentrations in the aquifer itself. This is due to the type of well used for sampling (regular production wells) and to the sampling technique used.

TUT 001 1149

Data Summary:
Samples from Turpentine Run Acquifer, VI
Collected: Feburary 21, 1990
Analyzed: Approved:

Concentration (ppb) of

SN	Name	DCE	Benzene	TCE	Toluene	PCE
P-1000	Travel Blank	<1 J	N.D.	<1	5	N.D.
P-1001	Bryans *	N.D.	N.D.	N.D.	<1	N.D.
P-1013	Steeles *	2 J	N.D.	54	N.D.	95
P-1014	Smith *	<1 J	<1	16	N.D.	300
	Francois	Not	Available	for	Analysis.	
P-1015	Mathias	<1 J	2	4	N.D.	58
P-1010	Eglin #1 *	3 J	N.D.	13	N.D.	46
P-1011	Eglin #2 **	<1 J	N.D.	15	N.D.	58
P-1012	Eglin #3 *	<1 J	N.D.	17	N.D.	83
	Harthman Bakery	Not	Available	for	Analysis.	
	Harthman Estate	Not	Available	for	Analysis.	

J: Estimated due to interference

*: Unknown contaminant also detected at contamination between 3 and 38 ppb relative to benzene.

* evident air bubble entrapment in sample

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(continued)

SN	Name	DCE	Benzene	TCE	Toluene	PCE
P-1008	Ramsey *	<1 J	N.D.	<1	N.D.	8
	4 Winds #1					
P-1009	Tillet	8 J	37 J	21	N.D.	89
P-1018	Devcon #1*	N.D.	<1	N.D.	N.D.	N.D.
	Devcon #3	Not	Available	for	Analysis.	
P-1002	Rodriguez	N.D.	N.D.	N.D.	N.D.	N.D.
	Harthman Crusher	Not	Available	for	Analysis.	
P-1017	Dede *	N.D.	N.D.	N.D.	N.D.	N.D.
P-1004	A. Leonard	N.D.	N.D.	N.D.	N.D.	N.D.
P-1016	Dench **	N.D.	N.D.	N.D.	N.D.	N.D.
	VIHA #1	Not	Available	for	Analysis.	
P-1006	VIHA #3	N.D.	N.D.	< 1	N.D.	N.D.
	Demitris	Not	Available	for	Analysis.	
	Harveys	Not	Available	for	Analysis.	

* evidant Air bubble entrapment in sample

CHAIN OF CUSTODY RECORD

ENVIRONMENTAL PROTECTION AGENCY - REGION II
ENVIRONMENTAL SERVICES DIVISION
EDISON, NEW JERSEY 08817

T2 [illegible]

Name of Unit and Address
Roy F. Weston, Inc
1090 King Georges Post Rd
Edison, NJ 08837

Tutu Well Site
2962-31-02-2479

Sample Number	Number of Containers	Description of Samples
T-1001	3	40-mL VOA vial with aqueous sample from Bryan's well **
T-1006	3	40-mL VOA vials with aqueous sample from Vitta #3 well
T-1008	3	40-mL VOA vials with aqueous sample from Ramsay well *
T-1018	3	40-mL VOA vials with aqueous sample from Deacon #1 well *

Person Assuming Responsibility for Sample: Iván García — Iván García

Time: 1400 Date: 2/22/90

Sample Number	Relinquished By	Received By	Time	Date	Reason for Change of Custody
ALL	Iván García / Iván García	James Fong	1030	2/23/90	
Sample Number	Relinquished By	Received By	Time	Date	Reason for Change of Custody
Sample Number	Relinquished By	Received By	Time	Date	Reason for Change of Custody
Sample Number	Relinquished By	Received By	Time	Date	Reason for Change of Custody

Page No.

ENVIRONMENTAL PROTECTION AGENCY - REGION II
ENVIRONMENTAL SERVICES DIVISION
EDISON, NEW JERSEY 08817

T2

Name of Visit and Address: Roy F. Weston Inc, 1090 King Georges Post Rd. Edison NJ 08837

Tutu Well Site
2962-31-02-2479

Sample Number	Number of Containers	Description of Samples
P-1008	3	40-mL VOA vials with field blank
P-1009	3	40-mL VOA vials with aqueous sample from Alpha Leonard well
P-1010	3	40-mL VOA vials with aqueous sample from Tillets well (H)
P-1011	3	40-mL VOA vials with aqueous sample from Eglin #1 well
P-1012	3	40-mL VOA vials with aqueous sample from Eglin #2 well *
P-1013	3	40-mL VOA vials with aqueous sample from Eglin #3 well
		40-mL VOA vials with aqueous sample from Steele well (H)

Person Assuming Responsibility for Samples: Iván García

Time: 1800 Date: 4/21/10

Sample Number	Relinquished By	Received By	Time	Date	Reason for Change of Custody
ALL	Iván García	James TSENG	1030	4/21/10	

Page No.

CHAIN OF CUSTODY RECORD

ENVIRONMENTAL PROTECTION AGENCY - REGION II
ENVIRONMENTAL SERVICES DIVISION
EDISON, NEW JERSEY 08817

T2

Name of Lab and Address
Roy F. Weston Inc
1090 King George Post Rd
Edison, NJ 08837

Tutu well Site
2962-31-02-2479

Sample Number	Number of Containers	Description of Sample
F-1002	3	40-mL VOA vials containing aqueous sample from Rodrigues well
F-1014	3	40-mL VOA vials containing aqueous sample from Smith well (D)
F-1015	3	40-mL VOA vials containing aqueous sample from Matthias well
F-1016	3	40-mL VOA vials containing aqueous sample from Deneb well **
F-1017	3	40-mL VOA vials containing aqueous sample from Dale's well *

Person Assuming Responsibility for Samples: Javier Pedroza — Time: 1800 — Date: 2/6/90

Sample Number	Relinquished By	Received By	Time	Date	Reason for Change of Custody
ALL	Javier Pedroza	Iljia García	1400	2/2/90	Transportation to shipping company
ALL	Iljia García	Jaime Farrar	1030	2/3/90	Laboratory Analysis

TUT 001 1154

REFERENCE NO. 30

COMPLETED ANALYSIS REPORT

REPORT DATE: 87/12/22

PROJECT NO: 242 PROJECT NAME: TURKENTINE RUN

EXPLANATIONS OF REMARK CODES

REMARK CODE	EXPLANATION
B	RESULTS BASED UPON COLONY COUNTS OUTSIDE ACCEPTABLE RANGE
J	ESTIMATED VALUE
K	ACTUAL VALUE KNOWN TO BE LESS THAN VALUE GIVEN
L	ACTUAL VALUE KNOWN TO BE GREATER THAN VALUE GIVEN
Q	PRESENCE OF MATERIAL VERIFIED BUT NOT QUANTIFIED
T	SAMPLED BUT NOT ANALYZED DUE TO LAB ACCIDENT
U	REPORTED VALUE LESS THAN CRITERIA OF DETECTION

MATERIAL ANALYZED FOR, BUT NOT DETECTED

LOCATION CODES FOR IDENTIFICATION OF SAMPLING POINTS AT INDUSTRIAL / SANITARY FACILITIES, LANDFILLS, HAZARDOUS WASTE SITES.

CODE NUMBERS	SAMPLING POINTS
1001 - 1050	EFFLUENT PIPE NUMBER 001 TO 050
1051 - 1099	OTHER EFFLUENTS SUCH AS COOLING TOWER DISCHARGE, DISCHARGE FROM HOLDING PONDS, ETC...
1100 - 1249	IN PLANT SAMPLES - DURING PROCESS
1250 - 1274	IN PLANT SAMPLES AFTER PROCESS AND BEFORE TREATMENT OR DISCHARGE
1275 - 1424	IN PLANT SAMPLES - DURING TREATMENT
1425 - 1434	SEPARATE INFLUENT POINTS/WATER SOURCES
15XX	INFLUENT ASSOCIATED WITH EFFLUENT 10XX
2000	BLANK FOR VOLATILE ORGANICS
2XXX	AUTO SAMPLER BLANK AT SAMPLE POSITION 1XXX
3000 - 3099	GROUND WATER FROM WELL 01 TO 99
3100 - 3199	SEDIMENT SAMPLE (WATER BOTTOM)
3200 - 3299	SOIL SAMPLE
3300 - 3399	STREAM WATER SAMPLE
3400 - 3499	LAGOON SAMPLE
3500 - 3599	STORAGE TANK SAMPLE
3600 - 3699	LEACHATE SAMPLE
3700 - 3799	OTHER TYPE SAMPLE

TUT 001 1156

COMPLETED ANALYSIS REPORT — REPORT DATE: 87/12/22

PROJECT NO: 262 — PROJECT NAME: TURPENTINE RUN

STATION NO	DATE FROM TO	TIME OF DAY	LABNO	PARNO	PARAMETER NAME	UNITS	CHEMISTRY	VALUE & REMARK
TURP.RUN	87/10/09	1200						
DEPTH: 0000 SUBSTRATE: AQUEOUS								
DESCRIPTION: LAB BLANK FIRST BATCH								
	EXTRACTION DATE 10/9/87							
			000312	34586	2-CHLOROPHENOL	UG/L	TOTAL	U
				34591	2-NITROPHENOL	UG/L	TOTAL	U
				34696	PHENOL	UG/L	TOTAL	U
				34606	2,4-DIMETHYLPHENOL	UG/L	TOTAL	U
				34601	2,4-DICHLOROPHENOL	UG/L	TOTAL	U
				34621	2,4,6-TRICHLOROPHENOL	UG/L	TOTAL	U
				34652	P-CHLORO-M-CRESOL	UG/L	TOTAL	U
				34616	2,4-DINITROPHENOL	UG/L	TOTAL	U
				34657	4,6-DINITRO-O-CRESOL	UG/L	TOTAL	U
				39032	PENTACHLOROPHENOL	UG/L	TOTAL	U
				34646	4-NITROPHENOL	UG/L	TOTAL	U
				34566	1,3-DICHLOROBENZENE	UG/L	TOTAL	U
				34571	1,4-DICHLOROBENZENE	UG/L	TOTAL	U
				34536	1,2-DICHLOROBENZENE	UG/L	TOTAL	U
				34396	HEXACHLOROETHANE	UG/L	TOTAL	U
				39702	HEXACHLOROBUTADIENE	UG/L	TOTAL	U
				34551	1,2,4-TRICHLOROBENZENE	UG/L	TOTAL	U
				34696	NAPHTHALENE	UG/L	TOTAL	U
				34273	BIS(2-CHLOROETHYL) ET.	UG/L	TOTAL	U
				34278	BIS(2-CHLOROETHOXY) METH.	UG/L	TOTAL	U
				34408	ISOPHORONE	UG/L	TOTAL	U
				34447	NITROBENZENE	UG/L	TOTAL	U
				34428	N-NITROSODI-N-PROPYLAMINE	UG/L	TOTAL	U
				34433	N-NITROSODIPHENYLAMINE	UG/L	TOTAL	U
				34284	BIS(2-CHLOROISOPROPYL) ET.	UG/L	TOTAL	U
				34396	HEXACHLOROCYCLOPENTADIENE	UG/L	TOTAL	U
				34581	2-CHLORONAPHTHALENE	UG/L	TOTAL	U
				34200	ACENAPHTHYLENE	UG/L	TOTAL	U
				34205	ACENAPHTHENE	UG/L	TOTAL	U
				34381	FLOURENE	UG/L	TOTAL	U
				39700	HEXACHLOROBENZENE	UG/L	TOTAL	U
				34696	4-BROMOPHENYL PHENYL ET.	UG/L	TOTAL	U
				34461	PHENANTHRENE	UG/L	TOTAL	U
				34220	ANTHRACENE	UG/L	TOTAL	U
				34341	DIMETHYL PHTHALATE	UG/L	TOTAL	U
				34336	DIETHYL PHTHALATE	UG/L	TOTAL	U
				39110	DI-N-BUTYLPHTHALATE	UG/L	TOTAL	0.6
				34292	BUTYL BENZYL PHTHALATE	UG/L	TOTAL	0.1
				34596	DI-N-OCTYL PHTHALATE	UG/L	TOTAL	U
				39100	BIS(2-ETHYLHEXYL) PHTHAL.	UG/L	TOTAL	4.1
				34376	FLUORANTHENE	UG/L	TOTAL	U

TUT 001 1157

COMPLETED ANALYSIS REPORT — REPORT DATE: 87/12/22

PROJECT NO: 262 — PROJECT NAME: TURPENTINE RUN

STATION NO	DATE FROM TO	TIME OF DAY	LABNO	PARNO	PARAMETER NAME	UNITS	CHEMISTRY	VALUE & REMARK
			000012	34469	PYRENE	UG/L	TOTAL	U
				34320	CHRYSENE	UG/L	TOTAL	U
				34526	1,2-BENZANTHRACENE	UG/L	TOTAL	U
				34641	4-CHLOROPHENYL PHENYL ET.	UG/L	TOTAL	U
				34403	INDENO(1,2,3-C,D) PYRENE	UG/L	TOTAL	U
				34247	BENZO(A)PYRENE	UG/L	TOTAL	U
				34521	1,12-BENZOPERYLENE	UG/L	TOTAL	U
				34556	1,2:5,6-DIBENZANTHRACENE	UG/L	TOTAL	U
				34631	3,3'-DICHLOROBENZIDENE	UG/L	TOTAL	U
				34626	2,6-DINITROTOLUENE	UG/L	TOTAL	U
				34611	2,4-DINITROTOLUENE	UG/L	TOTAL	U
				34346	1,2-DIPHENYLHYDRAZINE	UG/L	TOTAL	U
				34230	3,4-BENZOFLUORANTHENE	UG/L	TOTAL	U
				34242	11,12-BENZOFLUORANTHENE	UG/L	TOTAL	U
TURP.RUN	87/10/09	1200						
DEPTH: 0000 SUBSTRATE: AQUEOUS								
DESCRIPTION: LAB BLANK SECOND BATCH EXTRACTION DATE 10/9/87								
			000022	34586	2-CHLOROPHENOL	UG/L	TOTAL	U
				34591	2-NITROPHENOL	UG/L	TOTAL	U
				34694	PHENOL	UG/L	TOTAL	U
				34606	2,4-DIMETHYLPHENOL	UG/L	TOTAL	U
				34601	2,4-DICHLOROPHENOL	UG/L	TOTAL	U
				34621	2,4,6-TRICHLOROPHENOL	UG/L	TOTAL	U
				34452	P-CHLORO-M-CRESOL	UG/L	TOTAL	U
				34616	2,4-DINITROPHENOL	UG/L	TOTAL	U
				34657	4,6-DINITRO-O-CRESOL	UG/L	TOTAL	U
				39032	PENTACHLOROPHENOL	UG/L	TOTAL	U
				34646	4-NITROPHENOL	UG/L	TOTAL	U
				34566	1,3-DICHLOROBENZENE	UG/L	TOTAL	U
				34571	1,4-DICHLOROBENZENE	UG/L	TOTAL	U
				34536	1,2-DICHLOROBENZENE	UG/L	TOTAL	U
				34396	HEXACHLOROETHANE	UG/L	TOTAL	U
				39702	HEXACHLOROBUTADIENE	UG/L	TOTAL	U
				34551	1,2,4-TRICHLOROBENZENE	UG/L	TOTAL	U
				34696	NAPHTHALENE	UG/L	TOTAL	U
				34273	BIS(2-CHLOROETHYL) ET.	UG/L	TOTAL	U
				34278	BIS(2-CHLOROETHOXY) METH.	UG/L	TOTAL	U
				34408	ISOPHORONE	UG/L	TOTAL	U
				34447	NITROBENZENE	UG/L	TOTAL	U

TUT 001 1158

COMPLETED ANALYSIS REPORT — REPORT DATE: 07/12/22

PROJECT NO: 262 — PROJECT NAME: TURPENTINE RUN

STATION NO	DATE FROM TO	TIME OF DAY	LABNO	PARNO	PARAMETER NAME	UNITS	CHEMISTRY	VALUE & REMARK
			000022	34428	N-NITROSODI-N-PROPYLAMINE	UG/L	TOTAL	U
				34433	N-NITROSODIPHENYLAMINE	UG/L	TOTAL	U
				34283	BIS(2-CHLOROISOPROPYL) ET.	UG/L	TOTAL	U
				34386	HEXACHLOROCYCLOPENTADIENE	UG/L	TOTAL	U
				34581	2-CHLORONAPHTHALENE	UG/L	TOTAL	U
				34200	ACENAPHTHYLENE	UG/L	TOTAL	U
				34205	ACENAPHTHENE	UG/L	TOTAL	U
				34381	FLUORENE	UG/L	TOTAL	U
				39700	HEXACHLOROBENZENE	UG/L	TOTAL	U
				34636	4-BROMOPHENYL PHENYL ET.	UG/L	TOTAL	U
				34461	PHENANTHRENE	UG/L	TOTAL	0.1 M
				34220	ANTHRACENE	UG/L	TOTAL	U
				34341	DIMETHYL PHTHALATE	UG/L	TOTAL	U
				34336	DIETHYL PHTHALATE	UG/L	TOTAL	0.1 M
				39110	DI-N-BUTYLPHTHALATE	UG/L	TOTAL	0.5 M
				34292	BUTYL BENZYL PHTHALATE	UG/L	TOTAL	0.1 M
				34596	DI-N-OCTYL PHTHALATE	UG/L	TOTAL	U
				39100	BIS(2-ETHYLHEXYL) PHTHAL.	UG/L	TOTAL	0.6 M
				34376	FLUORANTHENE	UG/L	TOTAL	U
				34469	PYRENE	UG/L	TOTAL	U
				34320	CHRYSENE	UG/L	TOTAL	U
				34526	1,2-BENZANTHRACENE	UG/L	TOTAL	U
				34641	4-CHLOROPHENYL PHENYL ET.	UG/L	TOTAL	U
				34403	INDENO(1,2,3-C,D) PYRENE	UG/L	TOTAL	U
				34247	BENZO(A)PYRENE	UG/L	TOTAL	U
				34521	1,12-BENZOPERYLENE	UG/L	TOTAL	U
				34556	1,2:5,6-DIBENZANTHRACENE	UG/L	TOTAL	U
				34631	3,3'-DICHLOROBENZIDENE	UG/L	TOTAL	U
				34626	2,6-DINITROTOLUENE	UG/L	TOTAL	U
				34611	2,4-DINITROTOLUENE	UG/L	TOTAL	U
				34346	1,2-DIPHENYLHYDRAZINE	UG/L	TOTAL	U
				34230	3,4-BENZOFLUORANTHENE	UG/L	TOTAL	U
				34242	11,12-BENZOFLUORANTHENE	UG/L	TOTAL	U

TURP_RUN -- 87/10/19 1200
DEPTH: 0000 SUBSTRATE: AQUEOUS
DESCRIPTION: LAB BLANK
EXTRACTION DATE 10/10/87

			000032	34586	2-CHLOROPHENOL	UG/L	TOTAL	U
				34591	2-NITROPHENOL	UG/L	TOTAL	U
				34694	PHENOL	UG/L	TOTAL	U

001 100 1159

COMPLETED ANALYSIS REPORT

REPORT DATE: 87/12/22

PROJECT NO: 262 PROJECT NAME: TURPENTINE RUN

STATION NO	DATE FROM TO	TIME OF DAY	LABNO	PARNO	PARAMETER NAME	UNITS	CHEMISTRY	VALUE	C	REMARK
			000032	34606	2,4-DIMETHYLPHENOL	UG/L	TOTAL			U
				34601	2,4-DICHLOROPHENOL	UG/L	TOTAL			U
				34621	2,4,6-TRICHLOROPHENOL	UG/L	TOTAL			U
				34452	P-CHLORO-M-CRESOL	UG/L	TOTAL			U
				34616	2,4-DINITROPHENOL	UG/L	TOTAL			U
				34657	4,6-DINITRO-O-CRESOL	UG/L	TOTAL			U
				39032	PENTACHLOROPHENOL	UG/L	TOTAL			U
				34646	4-NITROPHENOL	UG/L	TOTAL			U
				34566	1,3-DICHLOROBENZENE	UG/L	TOTAL			U
				34571	1,4-DICHLOROBENZENE	UG/L	TOTAL			U
				34536	1,2-DICHLOROBENZENE	UG/L	TOTAL			U
				34396	HEXACHLOROETHANE	UG/L	TOTAL			U
				39702	HEXACHLOROBUTADIENE	UG/L	TOTAL			U
				34551	1,2,4-TRICHLOROBENZENE	UG/L	TOTAL			U
				34585	NAPHTHALENE	UG/L	TOTAL			U
				34273	BIS(2-CHLOROETHYL) ET.	UG/L	TOTAL			U
				34278	BIS(2-CHLOROETHOXY) METH.	UG/L	TOTAL			U
				34408	ISOPHORONE	UG/L	TOTAL			U
				34447	NITROBENZENE	UG/L	TOTAL			U
				34428	N-NITROSODI-N-PROPYLAMINE	UG/L	TOTAL			U
				34433	N-NITROSODIPHENYLAMINE	UG/L	TOTAL			U
				34283	BIS(2-CHLOROISOPROPYL) ET.	UG/L	TOTAL			U
				34386	HEXACHLOROCYCLOPENTADIENE	UG/L	TOTAL			U
				34581	2-CHLORONAPHTHALENE	UG/L	TOTAL			U
				34200	ACENAPHTHYLENE	UG/L	TOTAL			U
				34205	ACENAPHTHENE	UG/L	TOTAL			U
				34381	FLUORENE	UG/L	TOTAL			U
				39700	HEXACHLOROBENZENE	UG/L	TOTAL			U
				34636	4-BROMOPHENYL PHENYL ET.	UG/L	TOTAL			U
				34461	PHENANTHRENE	UG/L	TOTAL			U
				34220	ANTHRACENE	UG/L	TOTAL			U
				34341	DIMETHYL PHTHALATE	UG/L	TOTAL			U
				34336	DIETHYL PHTHALATE	UG/L	TOTAL			U
				39110	DI-N-BUTYLPHTHALATE	UG/L	TOTAL	0.4		J
				34292	BUTYL BENZYL PHTHALATE	UG/L	TOTAL			U
				34596	DI-N-OCTYL PHTHALATE	UG/L	TOTAL			U
				39100	BIS(2-ETHYLHEXYL) PHTHAL.	UG/L	TOTAL	0.4		J
				34376	FLUORANTHENE	UG/L	TOTAL			U
				34469	PYRENE	UG/L	TOTAL			U
				34320	CHRYSENE	UG/L	TOTAL			U
				34526	1,2-BENZANTHRACENE	UG/L	TOTAL			U

TUT 001 1160

COMPLETED ANALYSIS REPORT — REPORT DATE: 87/12/22

PROJECT NO: 262 — PROJECT NAME: TURPENTINE RUN

STATION NO	DATE FROM / TO	TIME OF DAY	LABNO	PARNO	PARAMETER NAME	UNITS	CHEMISTRY	VALUE	REMARK
			000092	34641	4-CHLOROPHENYL PHENYL ET.	UG/L	TOTAL	U	
				34403	INDENO(1,2,3-C,D) PYRENE	UG/L	TOTAL	U	
				34247	BENZO(A)PYRENE	UG/L	TOTAL	U	
				34521	1,12-BENZOPERYLENE	UG/L	TOTAL	U	
				34556	1,2:5,6-DIBENZANTHRACENE	UG/L	TOTAL	U	
				34631	3,3'-DICHLOROBENZIDENE	UG/L	TOTAL	U	
				34626	2,6-DINITROTOLUENE	UG/L	TOTAL	U	
				34611	2,4-DINITROTOLUENE	UG/L	TOTAL	U	
				34346	1,2-DIPHENYLHYDRAZINE	UG/L	TOTAL	U	
				34230	3,4-BENZOFLUORANTHENE	UG/L	TOTAL	U	
				34242	11,12-BENZOFLUORANTHENE	UG/L	TOTAL	U	
TURP.RUN	87/10/13	1200							
DEPTH: 0000	SUBSTRATE: AQUEOUS								
DESCRIPTION: LAB BLANK									
	EXTRACTION DATE 10/13/87								
			000042	34586	2-CHLOROPHENOL	UG/L	TOTAL	U	
				34591	2-NITROPHENOL	UG/L	TOTAL	U	
				34694	PHENOL	UG/L	TOTAL	U	
				34606	2,4-DIMETHYLPHENOL	UG/L	TOTAL	U	
				34601	2,4-DICHLOROPHENOL	UG/L	TOTAL	U	
				34621	2,4,6-TRICHLOROPHENOL	UG/L	TOTAL	U	
				34452	P-CHLORO-M-CRESOL	UG/L	TOTAL	U	
				34616	2,4-DINITROPHENOL	UG/L	TOTAL	U	
				34657	4,6-DINITRO-O-CRESOL	UG/L	TOTAL	U	
				39032	PENTACHLOROPHENOL	UG/L	TOTAL	U	
				34646	4-NITROPHENOL	UG/L	TOTAL	U	
				34566	1,3-DICHLOROBENZENE	UG/L	TOTAL	U	
				34571	1,4-DICHLOROBENZENE	UG/L	TOTAL	U	
				34536	1,2-DICHLOROBENZENE	UG/L	TOTAL	U	
				34396	HEXACHLOROETHANE	UG/L	TOTAL	U	
				39702	HEXACHLOROBUTADIENE	UG/L	TOTAL	U	
				34551	1,2,4-TRICHLOROBENZENE	UG/L	TOTAL	U	
				34696	NAPHTHALENE	UG/L	TOTAL	U	
				34273	BIS(2-CHLOROETHYL) ET.	UG/L	TOTAL	U	
				34279	BIS(2-CHLOROETHOXY) METH.	UG/L	TOTAL	U	
				34408	ISOPHORONE	UG/L	TOTAL	U	
				34447	NITROBENZENE	UG/L	TOTAL	U	
				34428	N-NITROSODI-N-PROPYLAMINE	UG/L	TOTAL	U	
				34433	N-NITROSODIPHENYLAMINE	UG/L	TOTAL	U	
				34273	BIS(2-CHLOROISOPROPYL) ET.	UG/L	TOTAL	U	

THE 001 11161

COMPLETED ANALYSIS REPORT — REPORT DATE: 87/12/22

PROJECT NO: 262 — PROJECT NAME: TURPENTINE RUN

STATION NO	DATE FROM TO	TIME OF DAY	LABNO	PARNO	PARAMETER NAME	UNITS	CHEMISTRY	VALUE & REMARK
			000042	34386	HEXACHLOROCYCLOPENTADIENE	UG/L	TOTAL	U
				34591	2-CHLORONAPHTHALENE	UG/L	TOTAL	U
				34200	ACENAPHTHYLENE	UG/L	TOTAL	U
				34205	ACENAPHTHENE	UG/L	TOTAL	U
				34381	FLUORENE	UG/L	TOTAL	U
				39700	HEXACHLOROBENZENE	UG/L	TOTAL	U
				34636	4-BROMOPHENYL PHENYL ET.	UG/L	TOTAL	U
				34461	PHENANTHRENE	UG/L	TOTAL	U
				34220	ANTHRACENE	UG/L	TOTAL	U
				34341	DIMETHYL PHTHALATE	UG/L	TOTAL	U
				34336	DIETHYL PHTHALATE	UG/L	TOTAL	U
				35110	DI-N-BUTYLPHTHALATE	UG/L	TOTAL	0.5 M
				34292	BUTYL BENZYL PHTHALATE	UG/L	TOTAL	U
				34596	DI-N-OCTYL PHTHALATE	UG/L	TOTAL	U
				39100	BIS(2-ETHYLHEXYL) PHTHALA.	UG/L	TOTAL	1.0 M
				34376	FLUORANTHENE	UG/L	TOTAL	U
				34469	PYRENE	UG/L	TOTAL	U
				34320	CHRYSENE	UG/L	TOTAL	U
				34526	1,2-BENZANTHRACENE	UG/L	TOTAL	U
				34641	4-CHLOROPHENYL PHENYL ET.	UG/L	TOTAL	U
				34403	INDENO(1,2,3-C,D) PYRENE	UG/L	TOTAL	U
				34247	BENZO(A)PYRENE	UG/L	TOTAL	U
				34521	1,12-BENZOPERYLENE	UG/L	TOTAL	U
				34556	1,2:5,6-DIBENZANTHRACENE	UG/L	TOTAL	U
				34631	3,3'-DICHLOROBENZIDENE	UG/L	TOTAL	U
				34626	2,6-DINITROTOLUENE	UG/L	TOTAL	U
				34611	2,4-DINITROTOLUENE	UG/L	TOTAL	U
				34346	1,2-DIPHENYLHYDRAZINE	UG/L	TOTAL	U
				34230	3,4-BENZOFLUORANTHENE	UG/L	TOTAL	U
				34242	11,12-BENZOFLUORANTHENE	UG/L	TOTAL	U

TURP.RUN 87/10/14 1200
DEPTH: 0000 SUBSTRATE: AQUEOUS
DESCRIPTION: LAB BLANK
EXTRACTION DATE 10/14/87

			000052	34586	2-CHLOROPHENOL	UG/L	TOTAL	U
				34591	2-NITROPHENOL	UG/L	TOTAL	U
				34694	PHENOL	UG/L	TOTAL	U
				34606	2,4-DIMETHYLPHENOL	UG/L	TOTAL	U
				34601	2,4-DICHLOROPHENOL	UG/L	TOTAL	U
				34621	2,4,6-TRICHLOROPHENOL	UG/L	TOTAL	U

TUT 001 1262

COMPLETED ANALYSIS REPORT

REPORT DATE: 87/12/22

PROJECT NO: 262

PROJECT NAME: TURPENTINE RUN

STATION NO	DATE FROM TO	TIME OF DAY	LABNO	PARNO	PARAMETER NAME	UNITS	CHEMISTRY	VALUE	REMARK
			000052	34452	P-CHLORO-M-CRESOL	UG/L	TOTAL	U	
				34616	2,4-DINITROPHENOL	UG/L	TOTAL	U	
				34657	4,6-DINITRO-2-CRESOL	UG/L	TOTAL	U	
				39032	PENTACHLOROPHENOL	UG/L	TOTAL	U	
				34646	4-NITROPHENOL	UG/L	TOTAL	U	
				34566	1,3-DICHLOROBENZENE	UG/L	TOTAL	U	
				34571	1,4-DICHLOROBENZENE	UG/L	TOTAL	U	
				34536	1,2-DICHLOROBENZENE	UG/L	TOTAL	U	
				34396	HEXACHLOROETHANE	UG/L	TOTAL	U	
				39702	HEXACHLOROBUTADIENE	UG/L	TOTAL	U	
				34551	1,2,4-TRICHLOROBENZENE	UG/L	TOTAL	U	
				34696	NAPHTHALENE	UG/L	TOTAL	U	
				34273	BIS(2-CHLOROETHYL) ET.	UG/L	TOTAL	U	
				34278	BIS(2-CHLOROETHOXY) METH.	UG/L	TOTAL	U	
				34408	ISOPHORONE	UG/L	TOTAL	U	
				34447	NITROBENZENE	UG/L	TOTAL	U	
				34429	N-NITROSODI-N-PROPYLAMINE	UG/L	TOTAL	U	
				34433	N-NITROSODIPHENYLAMINE	UG/L	TOTAL	U	
				34283	BIS(2-CHLOROISOPROPYL) ET.	UG/L	TOTAL	U	
				34386	HEXACHLOROCYCLOPENTADIENE	UG/L	TOTAL	U	
				34591	2-CHLORONAPHTHALENE	UG/L	TOTAL	U	
				34200	ACENAPHTHYLENE	UG/L	TOTAL	U	
				34205	ACENAPHTHENE	UG/L	TOTAL	U	
				34391	FLOURENE	UG/L	TOTAL	U	
				39700	HEXACHLOROBENZENE	UG/L	TOTAL	U	
				34531	4-BROMOPHENYL PHENYL ET.	UG/L	TOTAL	U	
				34461	PHENANTHRENE	UG/L	TOTAL	U	
				34220	ANTHRACENE	UG/L	TOTAL	U	
				34341	DIMETHYL PHTHALATE	UG/L	TOTAL	U	
				34336	DIETHYL PHTHALATE	UG/L	TOTAL	U	
				39110	DI-N-BUTYLPHTHALATE	UG/L	TOTAL	0.6	
				34292	BUTYL BENZYL PHTHALATE	UG/L	TOTAL	U	
				34596	DI-N-OCTYL PHTHALATE	UG/L	TOTAL	U	
				39100	BIS(2-ETHYLHEXYL) PHTHAL.	UG/L	TOTAL	0.5	
				34376	FLUORANTHENE	UG/L	TOTAL	U	
				34469	PYRENE	UG/L	TOTAL	U	
				34320	CHRYSENE	UG/L	TOTAL	U	
				34526	1,2-BENZANTHRACENE	UG/L	TOTAL	U	
				34641	4-CHLOROPHENYL PHENYL ET.	UG/L	TOTAL	U	
				34403	INDENO(1,2,3-C,D) PYRENE	UG/L	TOTAL	U	
				34247	BENZO(A)PYRENE	UG/L	TOTAL	U	

TUF 001 1165

COMPLETE ANALYSIS REPORT REPORT DATE: 87/11/24

PROJECT NO: 262 PROJECT NAME: TURPENTINE RUN

STATION NO	DATE FROM TO	TIME OF DAY	LABNO	PARNO	PARAMETER NAME	UNITS	CHEMISTRY	VALUE & REMARK
			000052	34521	1,12-BENZOPERYLENE	UG/L	TOTAL	U
				34556	1,2,5,6-DIBENZANTHRACENE	UG/L	TOTAL	U
				34631	3,3'-DICHLOROBENZIDENE	UG/L	TOTAL	U
				34626	2,6-DINITROTOLUENE	UG/L	TOTAL	U
				34611	2,4-DINITROTOLUENE	UG/L	TOTAL	U
				34346	1,2-DIPHENYLHYDRAZINE	UG/L	TOTAL	U
				34230	3,4-BENZOFLUORANTHENE	UG/L	TOTAL	U
				34242	11,12-BENZOFLUORANTHENE	UG/L	TOTAL	U
TURP.RUN	87/10/05	1000						
DEPTH: 0000 SUBSTRATE: AQUEOUS								
DESCRIPTION: FIELD BLANK								
			090776	34418	METHYL CHLORIDE	UG/L	TOTAL	U
				34413	METHYL BROMIDE	UG/L	TOTAL	U
				39175	VINYL CHLORIDE	UG/L	TOTAL	U
				34311	CHLOROETHANE	UG/L	TOTAL	U
				34423	METHYLENE CHLORIDE	UG/L	TOTAL	U
				34501	1,1-DICHLOROETHYLENE	UG/L	TOTAL	U
				34496	1,1-DICHLOROETHANE	UG/L	TOTAL	U
				34546	1,2-TRANS DICHLOROETHYLENE	UG/L	TOTAL	U
				32106	CHLOROFORM	UG/L	TOTAL	U
				32103	1,2-DICHLOROETHANE	UG/L	TOTAL	U
				34506	1,1,1-TRICHLOROETHANE	UG/L	TOTAL	U
				32102	CARBON TETRACHLORIDE	UG/L	TOTAL	U
				32101	DICHLOROBROMOMETHANE	UG/L	TOTAL	U
				34541	1,2-DICHLOROPROPANE	UG/L	TOTAL	U
				34541	1,3-DICHLOROPROPYLENE	UG/L	TOTAL	U
				39180	TRICHLOROETHYLENE	UG/L	TOTAL	U
				34030	BENZENE	UG/L	TOTAL	U
				32105	CHLORODIBROMOMETHANE	UG/L	TOTAL	U
				34511	1,1,2-TRICHLOROETHANE	UG/L	TOTAL	U
				32104	BROMOFORM	UG/L	TOTAL	U
				34516	1,1,2,2-TETRACHLOROETHYLENE	UG/L	TOTAL	U
				34475	TETRACHLOROETHYLENE	UG/L	TOTAL	U
				34010	TOLUENE	UG/L	TOTAL	U
				34301	CHLOROBENZENE	UG/L	TOTAL	U
				34371	ETHYLBENZENE	UG/L	TOTAL	U
				34586	2-CHLOROPHENOL	UG/L	TOTAL	U
				34591	2-NITROPHENOL	UG/L	TOTAL	U
				34694	PHENOL	UG/L	TOTAL	U

TUT 001 1164

COMPLETED ANALYSIS REPORT — REPORT DATE: 97/12/02

PROJECT NO: 362 — PROJECT NAME: TURPENTINE RUN

STATION NO	DATE FROM TO	TIME OF DAY	LABNO	PARNO	PARAMETER NAME	UNITS	CHEMISTRY	VALUE	R	REMARK
			090776	34606	2,4-DIMETHYLPHENOL	UG/L	TOTAL		U	
				34601	2,4-DICHLOROPHENOL	UG/L	TOTAL		U	
				34621	2,4,6-TRICHLOROPHENOL	UG/L	TOTAL		U	
				34452	P-CHLORO-M-CRESOL	UG/L	TOTAL		U	
				34616	2,4-DINITROPHENOL	UG/L	TOTAL		U	
				34657	4,6-DINITRO-O-CRESOL	UG/L	TOTAL		U	
				39032	PENTACHLOROPHENOL	UG/L	TOTAL		U	
				34646	4-NITROPHENOL	UG/L	TOTAL		U	
				34566	1,3-DICHLOROBENZENE	UG/L	TOTAL		U	
				34571	1,4-DICHLOROBENZENE	UG/L	TOTAL	3.9		
				34536	1,2-DICHLOROBENZENE	UG/L	TOTAL		U	
				34396	HEXACHLOROETHANE	UG/L	TOTAL		U	
				39702	HEXACHLOROBUTADIENE	UG/L	TOTAL		U	
				34551	1,2,4-TRICHLOROBENZENE	UG/L	TOTAL		U	
				34696	NAPHTHALENE	UG/L	TOTAL		U	
				34274	BIS(2-CHLOROETHYL) ET.	UG/L	TOTAL		U	
				34278	BIS(2-CHLOROETHOXY) METH.	UG/L	TOTAL		U	
				34408	ISOPHORONE	UG/L	TOTAL		U	
				34447	NITROBENZENE	UG/L	TOTAL		U	
				34428	N-NITROSODI-N-PROPYLAMINE	UG/L	TOTAL		U	
				34433	N-NITROSODIPHENYLAMINE	UG/L	TOTAL		U	
				34283	BIS(2-CHLOROISOPROPYL) ET.	UG/L	TOTAL		U	
				34396	HEXACHLOROCYCLOPENTADIENE	UG/L	TOTAL		U	
				34581	2-CHLORONAPHTHALENE	UG/L	TOTAL		U	
				34200	ACENAPHTHYLENE	UG/L	TOTAL		U	
				34205	ACENAPHTHENE	UG/L	TOTAL		U	
				34381	FLUORENE	UG/L	TOTAL		U	
				39700	HEXACHLOROBENZENE	UG/L	TOTAL		U	
				34635	4-BROMOPHENYL PHENYL ET.	UG/L	TOTAL		U	
				34461	PHENANTHRENE	UG/L	TOTAL		U	
				34220	ANTHRACENE	UG/L	TOTAL		U	
				34341	DIMETHYL PHTHALATE	UG/L	TOTAL		U	
				34336	DIETHYL PHTHALATE	UG/L	TOTAL		U	
				39110	DI-N-BUTYLPHTHALATE	UG/L	TOTAL		U	
				34292	BUTYL BENZYL PHTHALATE	UG/L	TOTAL		U	
				34596	DI-N-OCTYL PHTHALATE	UG/L	TOTAL	12		
				39100	BIS(2-ETHYLHEXYL) PHTHAL.	UG/L	TOTAL	190	J	
				34376	FLUORANTHENE	UG/L	TOTAL		U	
				34469	PYRENE	UG/L	TOTAL		U	
				34320	CHRYSENE	UG/L	TOTAL		U	
				34526	1,2-BENZANTHRACENE	UG/L	TOTAL		U	

TUT 001 1165

COMPLETION ANALYSIS REPORT — REPORT DATE: 87/ /2

PROJECT NO: 262 — PROJECT NAME: TURPENTINE RUN

STATION NO	DATE FROM TO	TIME OF DAY	LABNO	PARNO	PARAMETER NAME	UNITS	CHEMISTRY	VALUE & REMARK
			090775	34561	4-CHLOROPHENYL PHENYL ET.	UG/L	TOTAL	U
				34403	INDENO(1,2,3-C,D) PYRENE	UG/L	TOTAL	U
				34247	BENZO(A)PYRENE	UG/L	TOTAL	U
				34521	1,12-BENZOPERYLENE	UG/L	TOTAL	U
				34556	1,2:5,6-DIBENZANTHRACENE	UG/L	TOTAL	U
				34631	3,3'-DICHLOROBENZIDENE	UG/L	TOTAL	U
				34626	2,6-DINITROTOLUENE	UG/L	TOTAL	U
				34611	2,4-DINITROTOLUENE	UG/L	TOTAL	U
				34346	1,2-DIPHENYLHYDRAZINE	UG/L	TOTAL	U
				34230	3,4-BENZOFLUORANTHENE	UG/L	TOTAL	U
				34242	11,12-BENZOFLUORANTHENE	UG/L	TOTAL	U
				39330	ALDRIN	UG/L	TOTAL	U
				39380	DIELDRIN	UG/L	TOTAL	U
				39350	CHLORDANE	UG/L	TOTAL	U
				39300	4,4'-DDT	UG/L	TOTAL	U
				39320	4,4'-DDE	UG/L	TOTAL	U
				39310	4,4'-DDD	UG/L	TOTAL	U
				34351	ALPHA ENDOSULFAN	UG/L	TOTAL	U
				34356	BETA ENDOSULFIN	UG/L	TOTAL	U
				34351	ENDOSULFAN SULFATE	UG/L	TOTAL	U
				39390	ENDRIN	UG/L	TOTAL	U
				34366	ENDRIN ALDEHYDE	UG/L	TOTAL	U
				39410	HEPTACLOR	UG/L	TOTAL	U
				39420	HEPTACHLOR EPOXIDE	UG/L	TOTAL	U
				39337	ALPHA-BHC	UG/L	TOTAL	U
				39338	BETA-BHC	UG/L	TOTAL	U
				39340	GAMMA-BHC	UG/L	TOTAL	U
				34259	DELTA-BHC	UG/L	TOTAL	U
				39400	TOXAPHENE	UG/L	TOTAL	U
				34671	PCB-1016	UG/L	TOTAL	U
				39488	PCB-1221	UG/L	TOTAL	U
				39492	PCB-1232	UG/L	TOTAL	U
				39496	PCB-1242	UG/L	TOTAL	U
				39500	PCB-1248	UG/L	TOTAL	U
				39504	PCB-1254	UG/L	TOTAL	U
				39508	PCB-1260	UG/L	TOTAL	U

TURP.RUN 87/10/05 1120
DEPTH: 0000 SUBSTRATE: AQUEOUS
DESCRIPTION: BRYAN WELL #1 FROM STANDPIPE

TUT 001 1166

COMPLETED ANALYSIS REPORT — REPORT DATE: 07/12/22

PROJECT NO: 202 — PROJECT NAME: TURPENTINE RUN

STATION NO	DATE FROM TO	TIME OF DAY	LABNO	PARNO	PARAMETER NAME	UNITS	CHEMISTRY	VALUE & REMARK
			090777	34418	METHYL CHLORIDE	UG/L	TOTAL	U
			090777	34413	METHYL BROMIDE	UG/L	TOTAL	U
				39175	VINYL CHLORIDE	UG/L	TOTAL	U
				34311	CHLOROETHANE	UG/L	TOTAL	U
				34423	METHYLENE CHLORIDE	UG/L	TOTAL	U
				34501	1,1-DICHLOROETHYLENE	UG/L	TOTAL	U
				34496	1,1-DICHLOROETHANE	UG/L	TOTAL	U
				34546	1,2-TRANS DICHLOROETHYLENE	UG/L	TOTAL	U
				32106	CHLOROFORM	UG/L	TOTAL	U
				32103	1,2-DICHLOROETHANE	UG/L	TOTAL	U
				34506	1,1,1-TRICHLOROETHANE	UG/L	TOTAL	U
				32102	CARBON TETRACHLORIDE	UG/L	TOTAL	U
				32101	DICHLOROBROMOMETHANE	UG/L	TOTAL	U
				34541	1,2-DICHLOROPROPANE	UG/L	TOTAL	U
				34561	1,3-DICHLOROPROPYLENE	UG/L	TOTAL	U
				39180	TRICHLOROETHYLENE	UG/L	TOTAL	U
				34030	BENZENE	UG/L	TOTAL	U
				32105	CHLORODIBROMOMETHANE	UG/L	TOTAL	U
				34511	1,1,2-TRICHLOROETHANE	UG/L	TOTAL	U
				32104	BROMOFORM	UG/L	TOTAL	U
				34516	1,1,2,2-TETRACHLOROETHANE	UG/L	TOTAL	U
				34475	TETRACHLOROETHYLENE	UG/L	TOTAL	U
				34010	TOLUENE	UG/L	TOTAL	2.4 M
				34301	CHLOROBENZENE	UG/L	TOTAL	U
				34371	ETHYLBENZENE	UG/L	TOTAL	U
				34586	2-CHLOROPHENOL	UG/L	TOTAL	U
				34591	2-NITROPHENOL	UG/L	TOTAL	U
				34694	PHENOL	UG/L	TOTAL	U
				34606	2,4-DIMETHYLPHENOL	UG/L	TOTAL	U
				34601	2,6-DICHLOROPHENOL	UG/L	TOTAL	U
				34621	2,4,6-TRICHLOROPHENOL	UG/L	TOTAL	U
				34452	P-CHLORO-M-CRESOL	UG/L	TOTAL	U
				34616	2,4-DINITROPHENOL	UG/L	TOTAL	U
				34657	4,6-DINITRO-O-CRESOL	UG/L	TOTAL	U
				39032	PENTACHLOROPHENOL	UG/L	TOTAL	U
				34646	4-NITROPHENOL	UG/L	TOTAL	U
				34566	1,3-DICHLOROBENZENE	UG/L	TOTAL	U
				34571	1,4-DICHLOROBENZENE	UG/L	TOTAL	U
				34536	1,2-DICHLOROBENZENE	UG/L	TOTAL	U
				34396	HEXACHLOROETHANE	UG/L	TOTAL	U
				39702	HEXACHLOROBUTADIENE	UG/L	TOTAL	U

TUT 003 1167

COMPLETED ANALYSIS REPORT

REPORT DATE: 87/12/22

PROJECT NO: 262 PROJECT NAME: TURPENTINE RUN

STATION NO	DATE FROM TO	TIME OR DAY	LABNO	PARNO	PARAMETER NAME	UNITS	CHEMISTRY	VALUE	REMARK
			093777	34551	1,2,4-TRICHLOROBENZENE	UG/L	TOTAL		U
				34696	NAPHTHALENE	UG/L	TOTAL		U
				34273	BIS(2-CHLOROETHYL) ET.	UG/L	TOTAL		U
				34278	BIS(2-CHLOROETHOXY) METH.	UG/L	TOTAL		U
				34408	ISOPHORONE	UG/L	TOTAL		U
				34447	NITROBENZENE	UG/L	TOTAL		U
				34428	N-NITROSODI-N-PROPYLAMINE	UG/L	TOTAL		U
				34433	N-NITROSODIPHENYLAMINE	UG/L	TOTAL		U
				34283	BIS(2-CHLOROISOPROPYL) ET.	UG/L	TOTAL		U
				34386	HEXACHLOROCYCLOPENTADIENE	UG/L	TOTAL		U
				34581	2-CHLORONAPHTHALENE	UG/L	TOTAL		U
				34200	ACENAPHTHYLENE	UG/L	TOTAL		U
				34205	ACENAPHTHENE	UG/L	TOTAL		U
				34381	FLOURENE	UG/L	TOTAL		U
				39700	HEXACHLOROBENZENE	UG/L	TOTAL		U
				34636	4-BROMOPHENYL PHENYL ET.	UG/L	TOTAL		U
				34461	PHENANTHRENE	UG/L	TOTAL		U
				34220	ANTHRACENE	UG/L	TOTAL		U
				34341	DIMETHYL PHTHALATE	UG/L	TOTAL		U
				34336	DIETHYL PHTHALATE	UG/L	TOTAL		U
				39110	DI-N-BUTYLPHTHALATE	UG/L	TOTAL		U
				34292	BUTYL BENZYL PHTHALATE	UG/L	TOTAL		U
				34596	DI-N-OCTYL PHTHALATE	UG/L	TOTAL	0.1	U
				39100	BIS(2-ETHYLHEXYL) PHTHAL.	UG/L	TOTAL		U
				34376	FLUORANTHENE	UG/L	TOTAL		U
				34469	PYRENE	UG/L	TOTAL		U
				34320	CHRYSENE	UG/L	TOTAL		U
				34526	1,2-BENZANTHRACENE	UG/L	TOTAL		U
				34641	4-CHLOROPHENYL PHENYL ET.	UG/L	TOTAL		U
				34403	INDENO(1,2,3-C,D) PYRENE	UG/L	TOTAL		U
				34247	BENZO(A)PYRENE	UG/L	TOTAL		U
				34521	1,12-BENZOPERYLENE	UG/L	TOTAL		U
				34556	1,2H5,6-DIBENZANTHRACENE	UG/L	TOTAL		U
				34671	3,3'-DICHLOROBENZIDENE	UG/L	TOTAL		U
				34626	2,6-DINITROTOLUENE	UG/L	TOTAL		U
				34611	2,4-DINITROTOLUENE	UG/L	TOTAL		U
				34346	1,2-DIPHENYLHYDRAZINE	UG/L	TOTAL		U
				34230	3,4-BENZOFLUORANTHENE	UG/L	TOTAL		U
				34242	11,12-BENZOFLUORANTHENE	UG/L	TOTAL		U
				39330	ALDRIN	UG/L	TOTAL		U
				39380	DIELDRIN	UG/L	TOTAL		U

TUT 001 1168

PROJECT NO: 262 PROJECT NAME: TURPENTINE RUN

STATION NO	DATE FROM TO	TIME OF DAY	LABNO	PARNO	PARAMETER NAME	UNITS	CHEMISTRY	VALUE	REMARK
			090777	39350	CHLORDANE	UG/L	TOTAL	U	
				39300	4,4'-DDT	UG/L	TOTAL	U	
				39320	4,4'-DDE	UG/L	TOTAL	U	
				39310	4,4'-DDD	UG/L	TOTAL	U	
				34361	ALPHA ENDOSULFAN	UG/L	TOTAL	U	
				34356	BETA ENDOSULFAN	UG/L	TOTAL	U	
				34351	ENDOSULFAN SULFATE	UG/L	TOTAL	U	
				39390	ENDRIN	UG/L	TOTAL	U	
				34366	ENDRIN ALDEHYDE	UG/L	TOTAL	U	
				39410	HEPTACLOR	UG/L	TOTAL	U	
				39420	HEPTACHLOR EPOXIDE	UG/L	TOTAL	U	
				39337	ALPHA-BHC	UG/L	TOTAL	U	
				39338	BETA-BHC	UG/L	TOTAL	U	
				39340	GAMMA-BHC	UG/L	TOTAL	U	
				34259	DELTA-BHC	UG/L	TOTAL	U	
				39400	TOXAPHENE	UG/L	TOTAL	U	H
				34671	PCB-1016	UG/L	TOTAL	U	
				39488	PCB-1221	UG/L	TOTAL	U	
				39482	PCB-1232	UG/L	TOTAL	U	
				39496	PCB-1242	UG/L	TOTAL	U	
				39500	PCB-1248	UG/L	TOTAL	U	
				39504	PCB-1254	UG/L	TOTAL	U	
				39504	PCB-1260	UG/L	TOTAL	U	
TURP.RUN	87/10/06	1225							
DEPTH: 0000 SUBSTRATE: AQUEOUS									
DESCRIPTION: TILLET WELL									
			090778	34419	METHYL CHLORIDE	UG/L	TOTAL	U	H
				34413	METHYL BROMIDE	UG/L	TOTAL	U	
				39175	VINYL CHLORIDE	UG/L	TOTAL	U	
				34311	CHLOROETHANE	UG/L	TOTAL	U	
				34423	METHYLENE CHLORIDE	UG/L	TOTAL	U	
				34501	1,1-DICHLOROETHYLENE	UG/L	TOTAL	U	
				34496	1,1-DICHLOROETHANE	UG/L	TOTAL	U	
				34546	1,2-TRANS DICHLOROETHYLENE	UG/L	TOTAL	600	
				32106	CHLOROFORM	UG/L	TOTAL	U	
				32104	1,2-DICHLOROETHANE	UG/L	TOTAL	U	
				34506	1,1,1-TRICHLOROETHANE	UG/L	TOTAL	U	
				32102	CARBON TETRACHLORIDE	UG/L	TOTAL	U	
				32101	DICHLOROBROMOMETHANE	UG/L	TOTAL	U	H

TUF 001 1169

PROJECT NO: 262 PROJECT NAME: TURPENTINE RUN

STATION NO	DATE FROM TO	TIME OF DAY	LABNO	PARMNO	PARAMETER NAME	UNITS	CHEMISTRY	VALUE	REMARK
			035775	34541	1,2-DICHLOROPROPANE	UG/L	TOTAL		U
				34561	1,3-DICHLOROPROPYLENE	UG/L	TOTAL		U
				39180	TRICHLOROETHYLENE	UG/L	TOTAL	25	
				34030	BENZENE	UG/L	TOTAL		U
				32105	CHLORODIBROMOMETHANE	UG/L	TOTAL		U
				34511	1,1,2-TRICHLOROETHANE	UG/L	TOTAL		U
				32104	BROMOFORM	UG/L	TOTAL		U
				34516	1,1,2,2-TETRACHLOROETHANE	UG/L	TOTAL		U
				34475	TETRACHLOROETHYLENE	UG/L	TOTAL	140	
				34010	TOLUENE	UG/L	TOTAL		U
				34301	CHLOROBENZENE	UG/L	TOTAL		U
				34371	ETHYLBENZENE	UG/L	TOTAL		U
				99999	TERT-BUTYLMETHYLETHER	UG/L	TOTAL	671	J
				34586	2-CHLOROPHENOL	UG/L	TOTAL		U
				34591	2-NITROPHENOL	UG/L	TOTAL		U
				34694	PHENOL	UG/L	TOTAL		U
				34606	2,4-DIMETHYLPHENOL	UG/L	TOTAL		U
				34601	2,4-DICHLOROPHENOL	UG/L	TOTAL		U
				34621	2,4,6-TRICHLOROPHENOL	UG/L	TOTAL		U
				34452	P-CHLORO-M-CRESOL	UG/L	TOTAL		U
				34616	2,6-DINITROPHENOL	UG/L	TOTAL		U
				34657	4,6-DINITRO-O-CRESOL	UG/L	TOTAL		U
				39032	PENTACHLOROPHENOL	UG/L	TOTAL		U
				34646	4-NITROPHENOL	UG/L	TOTAL		U
				34566	1,3-DICHLOROBENZENE	UG/L	TOTAL		U
				34571	1,4-DICHLOROBENZENE	UG/L	TOTAL		U
				34536	1,2-DICHLOROBENZENE	UG/L	TOTAL	0.3	
				34396	HEXACHLOROETHANE	UG/L	TOTAL		U
				39702	HEXACHLOROBUTADIENE	UG/L	TOTAL		U
				34551	1,2,4-TRICHLOROBENZENE	UG/L	TOTAL	0.2	
				34696	NAPHTHALENE	UG/L	TOTAL		U
				34273	BIS(2-CHLOROETHYL) ET.	UG/L	TOTAL		U
				34278	BIS(2-CHLOROETHOXY) METH.	UG/L	TOTAL		U
				34409	ISOPHORONE	UG/L	TOTAL		U
				34447	NITROBENZENE	UG/L	TOTAL		U
				34426	N-NITROSODI-N-PROPYLAMINE	UG/L	TOTAL		U
				34433	N-NITROSODIPHENYLAMINE	UG/L	TOTAL		U
				34283	BIS(2-CHLOROISOPROPYL) ET.	UG/L	TOTAL		U
				34386	HEXACHLOROCYCLOPENTADIENE	UG/L	TOTAL		U
				34581	2-CHLORONAPHTHALENE	UG/L	TOTAL		U
				34200	ACENAPHTHYLENE	UG/L	TOTAL		U

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PROJECT NO: 204 PROJECT NAME: TURPENTINE RUN

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STATION NO	DATE FROM TO	TIME OF DAY	LABNO	PARNO	PARAMETER NAME	UNITS	CHEMISTRY	VALUE & REMARK
			093778	34205	ACENAPHTHENE	UG/L	TOTAL	U
				34381	FLOURENE	UG/L	TOTAL	U
				39700	HEXACHLOROBENZENE	UG/L	TOTAL	U
				34636	4-BROMOPHENYL PHENYL ET.	UG/L	TOTAL	U
				34461	PHENANTHRENE	UG/L	TOTAL	U
				34220	ANTHRACENE	UG/L	TOTAL	U
				34341	DIMETHYL PHTHALATE	UG/L	TOTAL	U
				34336	DIETHYL PHTHALATE	UG/L	TOTAL	U
				39110	DI-N-BUTYLPHTHALATE	UG/L	TOTAL	U
				34292	BUTYL BENZYL PHTHALATE	UG/L	TOTAL	U
				34596	DI-N-OCTYL PHTHALATE	UG/L	TOTAL	U
				39100	BIS(2-ETHYLHEXYL) PHTHAL.	UG/L	TOTAL	U
				34376	FLUORANTHENE	UG/L	TOTAL	U
				34469	PYRENE	UG/L	TOTAL	U
				34320	CHRYSENE	UG/L	TOTAL	U
				34526	1,2-BENZANTHRACENE	UG/L	TOTAL	U
				34641	4-CHLOROPHENYL PHENYL ET.	UG/L	TOTAL	U
				34403	INDENO(1,2,3-C,D) PYRENE	UG/L	TOTAL	U
				34247	BENZO(A)PYRENE	UG/L	TOTAL	U
				34521	1,12-BENZOPERYLENE	UG/L	TOTAL	U
				34556	1,2:5,6-DIBENZANTHRACENE	UG/L	TOTAL	U
				34631	3,3'-DICHLOROBENZIDENE	UG/L	TOTAL	U
				99999	2-METHYL NAPHTHALENE	UG/L	TOTAL	0.4 M
				34626	2,6-DINITROTOLUENE	UG/L	TOTAL	U
				34611	2,4-DINITROTOLUENE	UG/L	TOTAL	U
				34346	1,2-DIPHENYLHYDRAZINE	UG/L	TOTAL	U
				34230	3,4-BENZOFLUORANTHENE	UG/L	TOTAL	U
				34242	11,12-BENZOFLUORANTHENE	UG/L	TOTAL	U
				39330	ALDRIN	UG/L	TOTAL	U
				39390	DIELDRIN	UG/L	TOTAL	U
				39350	CHLORDANE	UG/L	TOTAL	U
				39300	4,4'-DDT	UG/L	TOTAL	U
				39320	4,4'-DDE	UG/L	TOTAL	U
				39310	4,4'-DDD	UG/L	TOTAL	U
				34361	ALPHA ENDOSULFAN	UG/L	TOTAL	U
				34356	BETA ENDOSULFAN	UG/L	TOTAL	U
				34351	ENDOSULFAN SULFATE	UG/L	TOTAL	U
				39390	ENDRIN	UG/L	TOTAL	U
				34751	ENDRIN ALDEHYDE	UG/L	TOTAL	U
				39410	HEPTACLOR	UG/L	TOTAL	U
				39420	HEPTACHLOR EPOXIDE	UG/L	TOTAL	U

STATION NO	DATE FROM TO	TIME OF DAY	LABNO	NO	PARAMETER NAME	UNITS	CHEMISTRY	VALUE	S	R
			090778	39337	ALPHA-BHC	UG/L	TOTAL			U
				39338	BETA-BHC	UG/L	TOTAL			U
				39340	GAMMA-BHC	UG/L	TOTAL			U
				34259	DELTA-BHC	UG/L	TOTAL			U
				39400	TOXAPHENE	UG/L	TOTAL			U
				34671	PCB-1016	UG/L	TOTAL			U
				39488	PCB-1221	UG/L	TOTAL			U
				39492	PCB-1232	UG/L	TOTAL			U
				39496	PCB-1242	UG/L	TOTAL			U
				39500	PCB-1248	UG/L	TOTAL			U
				39504	PCB-1254	UG/L	TOTAL			U
				39508	PCB-1260	UG/L	TOTAL			U
URP. RUN 87/10/06 1340										
DEPTH: 0000 SUBSTRATE: AQUEOUS										
DESCRIPTION: FOUR WINDS PLAZA - WELL #1										
			090779	34418	METHYL CHLORIDE	UG/L	TOTAL			U
				34413	METHYL BROMIDE	UG/L	TOTAL			U
				39175	VINYL CHLORIDE	UG/L	TOTAL			U
				34311	CHLOROETHANE	UG/L	TOTAL			U
				34423	METHYLENE CHLORIDE	UG/L	TOTAL			U
				34501	1,1-DICHLOROETHYLENE	UG/L	TOTAL			U
				34496	1,1-DICHLOROETHANE	UG/L	TOTAL			U
				34546	1,2-TRANS DICHLOROETHYLENE	UG/L	TOTAL	2		
				32106	CHLOROFORM	UG/L	TOTAL			U
				32103	1,2-DICHLOROETHANE	UG/L	TOTAL			U
				34506	1,1,1-TRICHLOROETHANE	UG/L	TOTAL			U
				32102	CARBON TETRACHLORIDE	UG/L	TOTAL			U
				32101	DICHLOROBROMOMETHANE	UG/L	TOTAL			U
				34541	1,2-DICHLOROPROPANE	UG/L	TOTAL			U
				34551	1,3-DICHLOROPROPYLENE	UG/L	TOTAL			U
				39180	TRICHLOROETHYLENE	UG/L	TOTAL	1		
				34030	BENZENE	UG/L	TOTAL			U
				32105	CHLORODIBROMOMETHANE	UG/L	TOTAL			U
				34511	1,1,2-TRICHLOROETHANE	UG/L	TOTAL			U
				32104	BROMOFORM	UG/L	TOTAL			U
				34516	1,1,2,2-TETRACHLOROETHANE	UG/L	TOTAL			U
				34475	TETRACHLOROETHYLENE	UG/L	TOTAL	1		
				34010	TOLUENE	UG/L	TOTAL			U
				34301	CHLOROBENZENE	UG/L	TOTAL			U

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STATION NO	DATE FROM TO	TIME OF DAY	LABNO	PARNO	PARAMETER NAME	UNITS	CHEMISTRY	VALUE & REMARK
			090779	34371	ETHYLBENZENE	UG/L	TOTAL	U
				99999	TERT-BUTYLMETHYLETHER	UG/L	TOTAL	470 J
				34586	2-CHLOROPHENOL	UG/L	TOTAL	U
				34591	2-NITROPHENOL	UG/L	TOTAL	U
				34694	PHENOL	UG/L	TOTAL	U
				34606	2,4-DIMETHYLPHENOL	UG/L	TOTAL	U
				34601	2,4-DICHLOROPHENOL	UG/L	TOTAL	U
				34621	2,4,6-TRICHLOROPHENOL	UG/L	TOTAL	U
				34452	P-CHLORO-M-CRESOL	UG/L	TOTAL	U
				34616	2,4-DINITROPHENOL	UG/L	TOTAL	U
				34657	4,6-DINITRO-O-CRESOL	UG/L	TOTAL	U
				39032	PENTACHLOROPHENOL	UG/L	TOTAL	U
				34644	4-NITROPHENOL	UG/L	TOTAL	U
				34566	1,3-DICHLOROBENZENE	UG/L	TOTAL	U
				34571	1,4-DICHLOROBENZENE	UG/L	TOTAL	U
				34536	1,2-DICHLOROBENZENE	UG/L	TOTAL	U
				34396	HEXACHLOROETHANE	UG/L	TOTAL	U
				39702	HEXACHLOROBUTADIENE	UG/L	TOTAL	U
				34551	1,2,4-TRICHLOROBENZENE	UG/L	TOTAL	U
				34696	NAPHTHALENE	UG/L	TOTAL	U
				34273	BIS(2-CHLOROETHYL) ET.	UG/L	TOTAL	U
				34278	BIS(2-CHLOROETHOXY) METH.	UG/L	TOTAL	U
				34408	ISOPHORONE	UG/L	TOTAL	U
				34447	NITROBENZENE	UG/L	TOTAL	U
				34428	N-NITROSODI-N-PROPYLAMINE	UG/L	TOTAL	U
				34433	N-NITROSODIPHENYLAMINE	UG/L	TOTAL	U
				34283	BIS(2-CHLOROISOPROPYL) ET.	UG/L	TOTAL	U
				34386	HEXACHLOROCYCLOPENTADIENE	UG/L	TOTAL	U
				34581	2-CHLORONAPHTHALENE	UG/L	TOTAL	U
				34200	ACENAPHTHYLENE	UG/L	TOTAL	U
				34205	ACENAPHTHENE	UG/L	TOTAL	U
				34381	FLUORENE	UG/L	TOTAL	U
				39700	HEXACHLOROBENZENE	UG/L	TOTAL	U
				34636	4-BROMOPHENYL PHENYL ET.	UG/L	TOTAL	U
				34461	PHENANTHRENE	UG/L	TOTAL	U
				34220	ANTHRACENE	UG/L	TOTAL	U
				34341	DIMETHYL PHTHALATE	UG/L	TOTAL	U
				34336	DIETHYL PHTHALATE	UG/L	TOTAL	U
				39110	DI-N-BUTYLPHTHALATE	UG/L	TOTAL	U
				34292	BUTYL BENZYL PHTHALATE	UG/L	TOTAL	U
				34596	DI-N-OCTYL PHTHALATE	UG/L	TOTAL	U

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STATION NO	DATE FROM TO	TIME OF DAY	LABNO	PARNO	PARAMETER NAME	UNITS	CHEMISTRY	VALUE & REMARK
			093779	39100	BIS(2-ETHYLHEXYL) PHTHAL.	UG/L	TOTAL	U
				34376	FLUORANTHENE	UG/L	TOTAL	U
				34469	PYRENE	UG/L	TOTAL	U
				34320	CHRYSENE	UG/L	TOTAL	U
				34526	1,2-BENZANTHRACENE	UG/L	TOTAL	U
				34641	4-CHLOROPHENYL PHENYL ET.	UG/L	TOTAL	U
				34403	INDENO(1,2,3-C,D) PYRENE	UG/L	TOTAL	U
				34247	BENZO(A)PYRENE	UG/L	TOTAL	U
				34521	1,12-BENZOPERYLENE	UG/L	TOTAL	U
				34556	1,2:5,6-DIBENZANTHRACENE	UG/L	TOTAL	U
				34631	3,3'-DICHLOROBENZIDENE	UG/L	TOTAL	U
				34626	2,6-DINITROTOLUENE	UG/L	TOTAL	U
				34611	2,4-DINITROTOLUENE	UG/L	TOTAL	U
				34346	1,2-DIPHENYLHYDRAZINE	UG/L	TOTAL	U
				34230	3,4-BENZOFLUORANTHENE	UG/L	TOTAL	U
				34242	11,12-BENZOFLUORANTHENE	UG/L	TOTAL	U
				39330	ALDRIN	UG/L	TOTAL	U
				39380	DIELDRIN	UG/L	TOTAL	U
				39350	CHLORDANE	UG/L	TOTAL	U
				39300	4,4'-DDT	UG/L	TOTAL	U
				39320	4,4'-DDE	UG/L	TOTAL	U
				39310	4,4'-DDD	UG/L	TOTAL	U
				34361	ALPHA ENDOSULFAN	UG/L	TOTAL	U
				34356	BETA ENDOSULFAN	UG/L	TOTAL	U
				34351	ENDOSULFAN SULFATE	UG/L	TOTAL	U
				39390	ENDRIN	UG/L	TOTAL	U
				34366	ENDRIN ALDEHYDE	UG/L	TOTAL	U
				39413	HEPTACLOR	UG/L	TOTAL	U
				39420	HEPTACHLOR EPOXIDE	UG/L	TOTAL	U
				39337	ALPHA-BHC	UG/L	TOTAL	U
				39338	BETA-BHC	UG/L	TOTAL	U
				39340	GAMMA-BHC	UG/L	TOTAL	U
				34259	DELTA-BHC	UG/L	TOTAL	U
				39400	TOXAPHENE	UG/L	TOTAL	U
				34671	PCB-1016	UG/L	TOTAL	U
				39488	PCB-1221	UG/L	TOTAL	U
				39492	PCB-1232	UG/L	TOTAL	U
				39496	PCB-1242	UG/L	TOTAL	U
				39500	PCB-1248	UG/L	TOTAL	U
				39504	PCB-1254	UG/L	TOTAL	U
				39508	PCB-1260	UG/L	TOTAL	U

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PRG ( ) PS MAI JRPS RUN

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STATION NO	DATE FROM TO	TIME OF DAY	LABNO	PARNO	PARAMETER NAME	UNITS	CHEMISTRY	VALUE & REMARK	
JRP. RUN 87/10/06 1500									
ERIM: 0080 SUBSTRATE: AQUEOUS									
DESCRIPTION: ELGIN WELL #3									
			090780	34418	METHYL CHLORIDE	UG/L	TOTAL	U	
				34413	METHYL BROMIDE	UG/L	TOTAL	U	
				39175	VINYL CHLORIDE	UG/L	TOTAL	U	01
				34311	CHLOROETHANE	UG/L	TOTAL	U	
				34423	METHYLENE CHLORIDE	UG/L	TOTAL	U	
				34501	1,1-DICHLOROETHYLENE	UG/L	TOTAL	U	
				34496	1,1-DICHLOROETHANE	UG/L	TOTAL	U	
				34546	1,2-TRANS DICHLOROETHYLENE	UG/L	TOTAL	70	
				32106	CHLOROFORM	UG/L	TOTAL	U	
				32103	1,2-DICHLOROETHANE	UG/L	TOTAL	U	
				34506	1,1,1-TRICHLOROETHANE	UG/L	TOTAL	U	01
				32102	CARBON TETRACHLORIDE	UG/L	TOTAL	U	
				32101	DICHLOROBROMOMETHANE	UG/L	TOTAL	U	
				34541	1,2-DICHLOROPROPANE	UG/L	TOTAL	U	
				34561	1,3-DICHLOROPROPYLENE	UG/L	TOTAL	U	
				39180	TRICHLOROETHYLENE	UG/L	TOTAL	8.4	
				34030	BENZENE	UG/L	TOTAL	U	
				32105	CHLORODIBROMOMETHANE	UG/L	TOTAL	U	
				34511	1,1,2-TRICHLOROETHANE	UG/L	TOTAL	U	
				32104	BROMOFORM	UG/L	TOTAL	U	
				34516	1,1,2,2-TETRACHLOROETHANE	UG/L	TOTAL	U	
				34475	TETRACHLOROETHYLENE	UG/L	TOTAL	40	
				34010	TOLUENE	UG/L	TOTAL	U	08
				34301	CHLOROBENZENE	UG/L	TOTAL	U	
				34371	ETHYLBENZENE	UG/L	TOTAL	U	
				99999	TERT-BUTYLMETHYLETHER	UG/L	TOTAL	220	
				34586	2-CHLOROPHENOL	UG/L	TOTAL	U	
				34591	2-NITROPHENOL	UG/L	TOTAL	U	
				34694	PHENOL	UG/L	TOTAL	U	
				34606	2,4-DIMETHYLPHENOL	UG/L	TOTAL	U	
				34601	2,4-DICHLOROPHENOL	UG/L	TOTAL	U	
				34621	2,4,6-TRICHLOROPHENOL	UG/L	TOTAL	U	
				34452	P-CHLORO-M-CRESOL	UG/L	TOTAL	U	
				34616	2,4-DINITROPHENOL	UG/L	TOTAL	U	
				34657	4,6-DINITRO-O-CRESOL	UG/L	TOTAL	U	
				39032	PENTACHLOROPHENOL	UG/L	TOTAL	U	01
				34646	4-NITROPHENOL	UG/L	TOTAL	U	
				34566	1,3-DICHLOROBENZENE	UG/L	TOTAL	U	
				34571	1,4-DICHLOROBENZENE	UG/L	TOTAL	U	
				34536	1,2-DICHLOROBENZENE	UG/L	TOTAL	U	
				34395	HEXACHLOROETHANE	UG/L	TOTAL	U	

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COMPLETED ANALYSIS REPORT — REPORT DATE: 87/12/22

PROJECT NUM 262 — PROJECT NAME: PENTINE RUN

STATION NO	DATE FROM TO	TIME OF DAY	LABNO	PARNO	PARAMETER NAME	UNITS	CHEMISTRY	VALUE & REMARK
			090780	39702	HEXACHLOROBUTADIENE	UG/L	TOTAL	U
				34551	1,2,4-TRICHLOROBENZENE	UG/L	TOTAL	U
				34696	NAPHTHALENE	UG/L	TOTAL	U
				34273	BIS(2-CHLOROETHYL) ET.	UG/L	TOTAL	U
				34278	BIS(2-CHLOROETHOXY) METH.	UG/L	TOTAL	U
				34408	ISOPHORONE	UG/L	TOTAL	U
				34447	NITROBENZENE	UG/L	TOTAL	U
				34423	N-NITROSODI-N-PROPYLAMINE	UG/L	TOTAL	U
				34433	N-NITROSODIPHENYLAMINE	UG/L	TOTAL	U
				34283	BIS(2-CHLOROISOPROPYL) ET.	UG/L	TOTAL	U
				34386	HEXACHLOROCYCLOPENTADIENE	UG/L	TOTAL	U
				34581	2-CHLORONAPHTHALENE	UG/L	TOTAL	U
				34200	ACENAPHTHYLENE	UG/L	TOTAL	U
				34205	ACENAPHTHENE	UG/L	TOTAL	U
				34381	FLOURENE	UG/L	TOTAL	U
				39700	HEXACHLOROBENZENE	UG/L	TOTAL	U
				34676	4-BROMOPHENYL PHENYL ET.	UG/L	TOTAL	U
				34461	PHENANTHRENE	UG/L	TOTAL	U
				34220	ANTHRACENE	UG/L	TOTAL	U
				34341	DIMETHYL PHTHALATE	UG/L	TOTAL	U
				34336	DIETHYL PHTHALATE	UG/L	TOTAL	U
				39110	DI-N-BUTYLPHTHALATE	UG/L	TOTAL	U
				34292	BUTYL BENZYL PHTHALATE	UG/L	TOTAL	U
				34596	DI-N-OCTYL PHTHALATE	UG/L	TOTAL	U
				39100	BIS(2-ETHYLHEXYL) PHTHAL.	UG/L	TOTAL	U
				34376	FLUORANTHENE	UG/L	TOTAL	U
				34469	PYRENE	UG/L	TOTAL	U
				34320	CHRYSENE	UG/L	TOTAL	U
				34526	1,2-BENZANTHRACENE	UG/L	TOTAL	U
				34641	4-CHLOROPHENYL PHENYL ET.	UG/L	TOTAL	U
				34403	INDENO(1,2,3-C,D) PYRENE	UG/L	TOTAL	U
				34247	BENZO(A)PYRENE	UG/L	TOTAL	U
				34521	1,12-BENZOPERYLENE	UG/L	TOTAL	U
				34556	1,2:5,6-DIBENZANTHRACENE	UG/L	TOTAL	U
				34631	3,3'-DICHLOROBENZIDENE	UG/L	TOTAL	U
				34626	2,6-DINITROTOLUENE	UG/L	TOTAL	U
				34611	2,4-DINITROTOLUENE	UG/L	TOTAL	U
				34346	1,2-DIPHENYLHYDRAZINE	UG/L	TOTAL	U
				34230	3,4-BENZOFLUORANTHENE	UG/L	TOTAL	U
				34242	11,12-BENZOFLUORANTHENE	UG/L	TOTAL	U
				39330	ALDRIN	UG/L	TOTAL	U

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STATION NO	DATE FROM TO	TIME OF DAY	LABNO	PARNO	PARAMETER NAME	UNITS	CHEMISTRY	VALUE & REMARK
			090780	39380	DIELDRIN	UG/L	TOTAL	U
				39350	CHLORDANE	UG/L	TOTAL	U
				39300	4,4'-DDT	UG/L	TOTAL	U
				39320	4,4'-DDE	UG/L	TOTAL	U
				39310	4,4'-DDD	UG/L	TOTAL	U
				34361	ALPHA ENDOSULFAN	UG/L	TOTAL	U
				34356	BETA ENDOSULFAN	UG/L	TOTAL	U
				34351	ENDOSULFAN SULFATE	UG/L	TOTAL	U
				39390	ENDRIN	UG/L	TOTAL	U
				34366	ENDRIN ALDEHYDE	UG/L	TOTAL	U
				39410	HEPTACLOR	UG/L	TOTAL	U
				39420	HEPTACHLOR EPOXIDE	UG/L	TOTAL	U
				39337	ALPHA-BHC	UG/L	TOTAL	U
				39338	BETA-BHC	UG/L	TOTAL	U
				39340	GAMMA-BHC	UG/L	TOTAL	U
				34259	DELTA-BHC	UG/L	TOTAL	U
				39400	TOXAPHENE	UG/L	TOTAL	U
				34671	PCB-1016	UG/L	TOTAL	U
				39488	PCB-1221	UG/L	TOTAL	U
				39492	PCB-1232	UG/L	TOTAL	U
				39496	PCB-1242	UG/L	TOTAL	U
				39500	PCB-1248	UG/L	TOTAL	U
				39504	PCB-1254	UG/L	TOTAL	U
				39508	PCB-1260	UG/L	TOTAL	U
TURP. RUN 87/10/06 1525 DEPTH: 0000 SUBSTRATE: AQUEOUS DESCRIPTION: ELGIN WELL #2								
			090781	34418	METHYL CHLORIDE	UG/L	TOTAL	U
				34413	METHYL BROMIDE	UG/L	TOTAL	U
				39175	VINYL CHLORIDE	UG/L	TOTAL	U
				34311	METHYLENE CHLORIDE	UG/L	TOTAL	U
				34301	1,1-DICHLOROETHYLENE	UG/L	TOTAL	U
				34496	1,1-DICHLOROETHANE	UG/L	TOTAL	U
				34546	1,2-TRANS DICHLOROETHYLENE	UG/L	TOTAL	.7
				32106	CHLOROFORM	UG/L	TOTAL	U
				32103	1,2-DICHLOROETHANE	UG/L	TOTAL	U
				34506	1,1,1-TRICHLOROETHANE	UG/L	TOTAL	U
				32102	CARBON TETRACHLORIDE	UG/L	TOTAL	U

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PROJECT NO: 262 PROJECT NAME: TURPENTINE RUN

STATION NO	DATE FROM TO	TIME OF DAY	LABNO	PAR	PARAMETER NAME	UNITS	CHEMISTRY	VALUE & REMA
			090791	32101	DICHLOROBROMOMETHANE	UG/L	TOTAL	U
				34541	1,2-DICHLOROPROPANE	UG/L	TOTAL	U
				34561	1,3-DICHLOROPROPYLENE	UG/L	TOTAL	U
				39180	TRICHLOROETHYLENE	UG/L	TOTAL	7.6
				34030	BENZENE	UG/L	TOTAL	U
				32105	CHLORODIBROMOMETHANE	UG/L	TOTAL	U
				34511	1,1,2-TRICHLOROETHANE	UG/L	TOTAL	U
				32104	BROMOFORM	UG/L	TOTAL	U
				34516	1,1,2,2-TETRACHLOROETHANE	UG/L	TOTAL	U
				34475	TETRACHLOROETHYLENE	UG/L	TOTAL	21
				34010	TOLUENE	UG/L	TOTAL	U
				34301	CHLOROBENZENE	UG/L	TOTAL	U
				34371	ETHYLBENZENE	UG/L	TOTAL	U
				99999	TERT-BUTYLMETHYLETHER	UG/L	TOTAL	360 J
				34586	2-CHLOROPHENOL	UG/L	TOTAL	U
				34591	2-NITROPHENOL	UG/L	TOTAL	U
				34694	PHENOL	UG/L	TOTAL	U
				34606	2,4-DIMETHYLPHENOL	UG/L	TOTAL	U
				34601	2,4-DICHLOROPHENOL	UG/L	TOTAL	U
				34621	2,4,6-TRICHLOROPHENOL	UG/L	TOTAL	U
				34452	P-CHLORO-M-CRESOL	UG/L	TOTAL	U
				34616	2,4-DINITROPHENOL	UG/L	TOTAL	U
				34657	4,6-DINITRO-O-CRESOL	UG/L	TOTAL	U
				39032	PENTACHLOROPHENOL	UG/L	TOTAL	U
				34646	4-NITROPHENOL	UG/L	TOTAL	U
				34566	1,3-DICHLOROBENZENE	UG/L	TOTAL	U
				34571	1,4-DICHLOROBENZENE	UG/L	TOTAL	U
				34536	1,2-DICHLOROBENZENE	UG/L	TOTAL	U
				34396	HEXACHLOROETHANE	UG/L	TOTAL	U
				39702	HEXACHLOROBUTADIENE	UG/L	TOTAL	U
				34551	1,2,4-TRICHLOROBENZENE	UG/L	TOTAL	U
				34696	NAPHTHALENE	UG/L	TOTAL	U
				34273	BIS(2-CHLOROETHYL) ET.	UG/L	TOTAL	U
				34278	BIS(2-CHLOROETHOXY) METH.	UG/L	TOTAL	U
				34408	ISOPHORONE	UG/L	TOTAL	U
				34447	NITROBENZENE	UG/L	TOTAL	U
				34421	N-NITROSODI-N-PROPYLAMINE	UG/L	TOTAL	U
				34433	N-NITROSODIPHENYLAMINE	UG/L	TOTAL	U
				34283	BIS(2-CHLOROISOPROPYL) ET.	UG/L	TOTAL	U
				34386	HEXACHLOROCYCLOPENTADIENE	UG/L	TOTAL	U
				34581	2-CHLORONAPHTHALENE	UG/L	TOTAL	U

STATION NO	DATE FROM TO	TIME OF DAY	LABNO	PARNO	PARAMETER NAME	UNITS	CHEMISTRY	VALUE & REMARK
			090781	34200	ACENAPHTHYLENE	UG/L	TOTAL	U
				34205	ACENAPHTHENE	UG/L	TOTAL	U
				34381	FLOURENE	UG/L	TOTAL	U
				39700	HEXACHLOROBENZENE	UG/L	TOTAL	U
				34636	4-BROMOPHENYL PHENYL ET.	UG/L	TOTAL	U
				34461	PHENANTHRENE	UG/L	TOTAL	U
				34220	ANTHRACENE	UG/L	TOTAL	U
				34341	DIMETHYL PHTHALATE	UG/L	TOTAL	U
				34336	DIETHYL PHTHALATE	UG/L	TOTAL	U
				39110	DI-N-BUTYLPHTHALATE	UG/L	TOTAL	U
				34292	BUTYL BENZYL PHTHALATE	UG/L	TOTAL	U
				34596	DI-N-OCTYL PHTHALATE	UG/L	TOTAL	U
				39100	BIS(2-ETHYLHEXYL) PHTHAL.	UG/L	TOTAL	U
				34376	FLUORANTHENE	UG/L	TOTAL	U
				34469	PYRENE	UG/L	TOTAL	U
				34320	CHRYSENE	UG/L	TOTAL	U
				34526	1,2-BENZANTHRACENE	UG/L	TOTAL	U
				34641	4-CHLOROPHENYL PHENYL ET.	UG/L	TOTAL	U
				34403	INDENO(1,2,3-C,D) PYRENE	UG/L	TOTAL	U
				34247	BENZO(A)PYRENE	UG/L	TOTAL	U
				34521	1,12-BENZOPERYLENE	UG/L	TOTAL	U
				34556	1,2:5,6-DIBENZANTHRACENE	UG/L	TOTAL	U
				34631	3,3'-DICHLOROBENZIDENE	UG/L	TOTAL	U
				34626	2,6-DINITROTOLUENE	UG/L	TOTAL	U
				34611	2,4-DINITROTOLUENE	UG/L	TOTAL	U
				34346	1,2-DIPHENYLHYDRAZINE	UG/L	TOTAL	U
				34230	3,4-BENZOFLUORANTHENE	UG/L	TOTAL	U
				34242	11,12-BENZOFLUORANTHENE	UG/L	TOTAL	U
				39330	ALDRIN	UG/L	TOTAL	U
				39350	DIELDRIN	UG/L	TOTAL	U
				39350	CHLORDANE	UG/L	TOTAL	U
				39300	4,4'-DDT	UG/L	TOTAL	U
				39320	4,4'-DDE	UG/L	TOTAL	U
				39310	4,4'-DDD	UG/L	TOTAL	U
				34361	ALPHA ENDOSULFAN	UG/L	TOTAL	U
				34356	BETA ENDOSULFAN	UG/L	TOTAL	U
				34351	ENDOSULFAN SULFATE	UG/L	TOTAL	U
				39390	ENDRIN	UG/L	TOTAL	U
				34366	ENDRIN ALDEHYDE	UG/L	TOTAL	U
				39410	HEPTACLOR	UG/L	TOTAL	U
				39420	HEPTACHLOR EPOXIDE	UG/L	TOTAL	U

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STATION NO	DATE FROM TO	TIME OF DAY	LABNO	NO	PARAMETER NAME	UNITS	CHEMISTRY	VALUE	S	R
			090781	39337	ALPHA-BHC	UG/L	TOTAL			U
				39338	BETA-BHC	UG/L	TOTAL			U
				39340	GAMMA-BHC	UG/L	TOTAL			U
				34259	DELTA-BHC	UG/L	TOTAL			U
				39400	TOXAPHENE	UG/L	TOTAL			U
				34671	PCB-1016	UG/L	TOTAL			U
				39488	PCB-1221	UG/L	TOTAL			U
				39492	PCB-1232	UG/L	TOTAL			U
				39496	PCB-1242	UG/L	TOTAL			U
				39500	PCB-1248	UG/L	TOTAL			U
				39504	PCB-1254	UG/L	TOTAL			U
				39508	PCB-1260	UG/L	TOTAL			U
SURP. RUN 87/10/06 1530										
DEPTH: 0000 SUBSTRATE: AQUEOUS										
DESCRIPTION: ELGIN WELL #1										
			050742	34419	METHYL CHLORIDE	UG/L	TOTAL			U
				34413	METHYL BROMIDE	UG/L	TOTAL			U
				39175	VINYL CHLORIDE	UG/L	TOTAL			U
				34311	CHLOROETHANE	UG/L	TOTAL			U
				34423	METHYLENE CHLORIDE	UG/L	TOTAL			U
				34501	1,1-DICHLOROETHYLENE	UG/L	TOTAL			U
				34496	1,1-DICHLOROETHANE	UG/L	TOTAL			U
				34546	1,2-TRANS DICHLOROETHYLENE	UG/L	TOTAL	58		
				32106	CHLOROFORM	UG/L	TOTAL			U
				32103	1,2-DICHLOROETHANE	UG/L	TOTAL			U
				34506	1,1,1-TRICHLOROETHANE	UG/L	TOTAL			U
				32102	CARBON TETRACHLORIDE	UG/L	TOTAL			U
				32101	DICHLOROBROMOMETHANE	UG/L	TOTAL			U
				34541	1,2-DICHLOROPROPANE	UG/L	TOTAL			U
				34561	1,3-DICHLOROPROPYLENE	UG/L	TOTAL			U
				39180	TRICHLOROETHYLENE	UG/L	TOTAL	19		
				34030	BENZENE	UG/L	TOTAL			U
				32105	CHLORODIBROMOMETHANE	UG/L	TOTAL			U
				34511	1,1,2-TRICHLOROETHANE	UG/L	TOTAL			U
				32104	BROMOFORM	UG/L	TOTAL			U
				34516	1,1,2,2-TETRACHLOROETHANE	UG/L	TOTAL			U
				34475	TETRACHLOROETHYLENE	UG/L	TOTAL	130		
				34010	TOLUENE	UG/L	TOTAL			U
				34301	CHLOROBENZENE	UG/L	TOTAL			U

STATION NO	DATE FROM TO	TIME OF DAY	LABNO	PARNO	PARAMETER NAME	UNITS	CHEMISTRY	VALUE & REMARK
			030782	34371	ETHYLBENZENE	UG/L	TOTAL	U
				99999	TERT-BUTYLMETHYLETHER	UG/L	TOTAL	270 J
				34586	2-CHLOROPHENOL	UG/L	TOTAL	U
				34591	2-NITROPHENOL	UG/L	TOTAL	U
				34694	PHENOL	UG/L	TOTAL	U
				34606	2,6-DIMETHYLPHENOL	UG/L	TOTAL	U
				34601	2,4-DICHLOROPHENOL	UG/L	TOTAL	U
				34621	2,4,6-TRICHLOROPHENOL	UG/L	TOTAL	U
				34452	P-CHLORO-M-CRESOL	UG/L	TOTAL	U
				34616	2,4-DINITROPHENOL	UG/L	TOTAL	U
				34657	4,6-DINITRO-O-CRESOL	UG/L	TOTAL	U
				39032	PENTACHLOROPHENOL	UG/L	TOTAL	U
				34646	4-NITROPHENOL	UG/L	TOTAL	U
				34566	1,3-DICHLOROBENZENE	UG/L	TOTAL	U
				34571	1,4-DICHLOROBENZENE	UG/L	TOTAL	U
				34536	1,2-DICHLOROBENZENE	UG/L	TOTAL	U
				34396	HEXACHLOROETHANE	UG/L	TOTAL	U
				39702	HEXACHLOROBUTADIENE	UG/L	TOTAL	U
				34551	1,2,4-TRICHLOROBENZENE	UG/L	TOTAL	U
				34696	NAPHTHALENE	UG/L	TOTAL	U
				34273	BIS(2-CHLOROETHYL) ET.	UG/L	TOTAL	U
				34278	BIS(2-CHLOROETHOXY) METH.	UG/L	TOTAL	U
				34409	ISOPHORONE	UG/L	TOTAL	U
				34447	NITROBENZENE	UG/L	TOTAL	U
				34426	N-NITROSODI-N-PROPYLAMINE	UG/L	TOTAL	U
				34699	N-NITROSODIPHENYLAMINE	UG/L	TOTAL	U
				34283	BIS(2-CHLOROISOPROPYL) ET.	UG/L	TOTAL	U
				34386	HEXACHLOROCYCLOPENTADIENE	UG/L	TOTAL	U
				34581	2-CHLORONAPHTHALENE	UG/L	TOTAL	U
				34200	ACENAPHTHYLENE	UG/L	TOTAL	U
				34205	ACENAPHTHENE	UG/L	TOTAL	U
				34381	FLOURENE	UG/L	TOTAL	U
				39700	HEXACHLOROBENZENE	UG/L	TOTAL	U
				34636	4-BROMOPHENYL PHENYL ET.	UG/L	TOTAL	U
				34461	PHENANTHRENE	UG/L	TOTAL	U
				34220	ANTHRACENE	UG/L	TOTAL	U
				34341	DIMETHYL PHTHALATE	UG/L	TOTAL	U
				34336	DIETHYL PHTHALATE	UG/L	TOTAL	0.1 U
				39110	DI-N-BUTYLPHTHALATE	UG/L	TOTAL	U
				34292	BUTYL BENZYL PHTHALATE	UG/L	TOTAL	U
				34596	DI-N-OCTYL PHTHALATE	UG/L	TOTAL	U

COMPLE(ANALYSIS REPORT REPORT DATE: 87/1(

PROJECT NO: 262 PROJECT NAME: TURPENTINE RUN

STATION NO	DATE FROM TO	TIME OF DAY	LABNO	PARNO	PARAMETER NAME	UNITS	CHEMISTRY	VALUE & REMARK
			090782	39100	BIS(2-ETHYLHEXYL) PHTHAL.	UG/L	TOTAL	U
				34376	FLUORANTHENE	UG/L	TOTAL	U
				34469	PYRENE	UG/L	TOTAL	U
				34320	CHRYSENE	UG/L	TOTAL	U
				34526	1,2-BENZANTHRACENE	UG/L	TOTAL	U
				34641	4-CHLOROPHENYL PHENYL ET.	UG/L	TOTAL	U
				34403	INDENO(1,2,3-C,D) PYRENE	UG/L	TOTAL	U
				34247	BENZO(A)PYRENE	UG/L	TOTAL	U
				34521	1,12-BENZOPERYLENE	UG/L	TOTAL	U
				34556	1,2,5,6-DIBENZANTHRACENE	UG/L	TOTAL	U
				34031	3,3'-DICHLOROBENZIDENE	UG/L	TOTAL	U
				34626	2,6-DINITROTOLUENE	UG/L	TOTAL	U
				34611	2,4-DINITROTOLUENE	UG/L	TOTAL	U
				34346	1,2-DIPHENYLHYDRAZINE	UG/L	TOTAL	U
				34290	3,4-BENZOFLUORANTHENE	UG/L	TOTAL	U
				34242	11,12-BENZOFLUORANTHENE	UG/L	TOTAL	U
				39330	ALDRIN	UG/L	TOTAL	U
				39380	DIELDRIN	UG/L	TOTAL	U
				39350	CHLORDANE	UG/L	TOTAL	U
				39300	4,4'-DDT	UG/L	TOTAL	U
				39320	4,4'-DDE	UG/L	TOTAL	U
				39310	4,4'-DDD	UG/L	TOTAL	U
				34361	ALPHA-ENDOSULFAN	UG/L	TOTAL	U
				34356	BETA ENDOSULFAN	UG/L	TOTAL	U
				34351	ENDOSULFAN SULFATE	UG/L	TOTAL	U
				39390	ENDRIN	UG/L	TOTAL	U
				34366	ENDRIN ALDEHYDE	UG/L	TOTAL	U
				39410	HEPTACLOR	UG/L	TOTAL	U
				39420	HEPTACHLOR EPOXIDE	UG/L	TOTAL	U
				39337	ALPHA-BHC	UG/L	TOTAL	U
				39338	BETA-BHC	UG/L	TOTAL	U
				39340	GAMMA-BHC	UG/L	TOTAL	U
				34259	DELTA-BHC	UG/L	TOTAL	U
				39400	TOXAPHENE	UG/L	TOTAL	U
				39671	PCB-1016	UG/L	TOTAL	U
				39488	PCB-1221	UG/L	TOTAL	U
				39492	PCB-1232	UG/L	TOTAL	U
				39496	PCB-1242	UG/L	TOTAL	U
				39500	PCB-1248	UG/L	TOTAL	U
				39504	PCB-1254	UG/L	TOTAL	U
				39508	PCB-1260	UG/L	TOTAL	U

TUT 001 1182

COMPLETED ANALYSIS REPORT — REPORT DATE: 87/12/22

PROJECT NO: 262 — PROJECT NAME: TURPENTINE RUN

STATION NO	DATE FROM TO	TIME OF DAY	LABNO	PARNO	PARAMETER NAME	UNITS	CHEMISTRY	VALUE & REMARK
TURP. RUN 87/10/06 1745								
DEPTH: 0000 SUBSTRATE: AQUEOUS								
DESCRIPTION: PRINCOTT WELL								
			090783	34418	METHYL CHLORIDE	UG/L	TOTAL	U
				34413	METHYL BROMIDE	UG/L	TOTAL	U
				39175	VINYL CHLORIDE	UG/L	TOTAL	U
				34311	CHLOROETHANE	UG/L	TOTAL	U
				34423	METHYLENE CHLORIDE	UG/L	TOTAL	U
				34501	1,1-DICHLOROETHYLENE	UG/L	TOTAL	U
				34496	1,1-DICHLOROETHANE	UG/L	TOTAL	U
				34546	1,2-TRANS DICHLOROETHYLENE	UG/L	TOTAL	103
				32106	CHLOROFORM	UG/L	TOTAL	U
				32103	1,2-DICHLOROETHANE	UG/L	TOTAL	U
				34506	1,1,1-TRICHLOROETHANE	UG/L	TOTAL	U
				32102	CARBON TETRACHLORIDE	UG/L	TOTAL	U
				32101	DICHLOROBROMOMETHENE	UG/L	TOTAL	U
				34541	1,2-DICHLOROPROPANE	UG/L	TOTAL	U
				34561	1,3-DICHLOROPROPYLENE	UG/L	TOTAL	U
				39180	TRICHLOROETHYLENE	UG/L	TOTAL	1[illegible]
				34030	BENZENE	UG/L	TOTAL	U
				32105	CHLORODIBROMOMETHANE	UG/L	TOTAL	U
				34511	1,1,2-TRICHLOROETHANE	UG/L	TOTAL	U
				32104	BROMOFORM	UG/L	TOTAL	U
				34516	1,1,2,2-TETRACHLOROETHANE	UG/L	TOTAL	U
				34475	TETRACHLOROETHYLENE	UG/L	TOTAL	1[illegible]
				34010	TOLUENE	UG/L	TOTAL	U
				34301	CHLOROBENZENE	UG/L	TOTAL	U
				34371	ETHYLBENZENE	UG/L	TOTAL	U
				99999	TERT-BUTYLMETHYLETHER	UG/L	TOTAL	1[illegible]
				34586	2-CHLOROPHENOL	UG/L	TOTAL	U
				34591	2-NITROPHENOL	UG/L	TOTAL	U
				34694	PHENOL	UG/L	TOTAL	U
				34606	2,4-DIMETHYLPHENOL	UG/L	TOTAL	U
				34601	2,4-DICHLOROPHENOL	UG/L	TOTAL	U
				34621	2,4,6-TRICHLOROPHENOL	UG/L	TOTAL	U
				34452	P-CHLORO-M-CRESOL	UG/L	TOTAL	U
				34616	2,4-DINITROPHENOL	UG/L	TOTAL	U
				34657	4,6-DINITRO-O-CRESOL	UG/L	TOTAL	U
				39032	PENTACHLOROPHENOL	UG/L	TOTAL	U
				34646	4-NITROPHENOL	UG/L	TOTAL	U
				34566	1,3-DICHLOROBENZENE	UG/L	TOTAL	U
				34571	1,4-DICHLOROBENZENE	UG/L	TOTAL	U
				34536	1,2-DICHLOROBENZENE	UG/L	TOTAL	U
				34396	HEXACHLOROETHANE	UG/L	TOTAL	U

TUT 001 1183

COMPLETED A(SIS REPORT

REPORT DATE: 87/12/22

PROJECT NO: 262

PROJECT NAME: TURPENTINE RUN

STATION NO	DATE FROM TO	TIME OF DAY	LABNO	PARNO	PARAMETER NAME	UNITS	CHEMISTRY	VALUE & REMARK
			040783	39702	HEXACHLOROBUTADIENE	UG/L	TOTAL	U
				34551	1,2,4-TRICHLOROBENZENE	UG/L	TOTAL	U
				34696	NAPHTHALENE	UG/L	TOTAL	U
				34273	BIS(2-CHLOROETHYL) ET.	UG/L	TOTAL	U
				34278	BIS(2-CHLOROETHOXY) METH.	UG/L	TOTAL	U
				34408	ISOPHORONE	UG/L	TOTAL	U
				34447	NITROBENZENE	UG/L	TOTAL	U
				34428	N-NITROSODI-N-PROPYLAMINE	UG/L	TOTAL	U
				34433	N-NITROSODIPHENYLAMINE	UG/L	TOTAL	U
				34283	BIS(2-CHLOROISOPROPYL) ET.	UG/L	TOTAL	U
				34298	HEXACHLOROCYCLOPENTADIENE	UG/L	TOTAL	U
				34581	2-CHLORONAPHTHALENE	UG/L	TOTAL	U
				34200	ACENAPHTHYLENE	UG/L	TOTAL	U
				34205	ACENAPHTHENE	UG/L	TOTAL	U
				34391	FLOURENE	UG/L	TOTAL	U
				39700	HEXACHLOROBENZENE	UG/L	TOTAL	U
				34536	4-BROMOPHENYL PHENYL ET.	UG/L	TOTAL	U
				34461	PHENANTHRENE	UG/L	TOTAL	U
				34220	ANTHRACENE	UG/L	TOTAL	U
				34341	DIMETHYL PHTHALATE	UG/L	TOTAL	U
				34330	DIETHYL PHTHALATE	UG/L	TOTAL	U
				39110	DI-N-BUTYLPHTHALATE	UG/L	TOTAL	U
				34292	BUTYL BENZYL PHTHALATE	UG/L	TOTAL	U
				34596	DI-N-OCTYL PHTHALATE	UG/L	TOTAL	U
				39100	BIS(2-ETHYLHEXYL) PHTHAL.	UG/L	TOTAL	U
				34376	FLUORANTHENE	UG/L	TOTAL	U
				34469	PYRENE	UG/L	TOTAL	U
				34320	CHRYSENE	UG/L	TOTAL	U
				34526	1,2-BENZANTHRACENE	UG/L	TOTAL	U
				34641	4-CHLOROPHENYL PHENYL ET.	UG/L	TOTAL	U
				34403	INDENO(1,2,3-C,D) PYRENE	UG/L	TOTAL	U
				34247	BENZO(A)PYRENE	UG/L	TOTAL	U
				34521	1,12-BENZOPERYLENE	UG/L	TOTAL	U
				34556	1,2:5,6-DIBENZANTHRACENE	UG/L	TOTAL	U
				34631	3,3'-DICHLOROBENZIDENE	UG/L	TOTAL	U
				34626	2,6-DINITROTOLUENE	UG/L	TOTAL	U
				34611	2,4-DINITROTOLUENE	UG/L	TOTAL	U
				34346	1,2-DIPHENYLHYDRAZINE	UG/L	TOTAL	U
				34230	3,4-BENZOFLUORANTHENE	UG/L	TOTAL	U
				34262	11,12-BENZOFLUORANTHENE	UG/L	TOTAL	U
				39350	ALDRIN	UG/L	TOTAL	U

TUT 001 1184

COMPLETED ANALYSIS REPORT — REPORT DATE: 87/12/22

PROJECT NO: 262 — PROJECT NAME: TURPENTINE RUN

STATION NO	DATE FROM TO	TIME OF DAY	LABNO	PARNO	PARAMETER NAME	UNITS	CHEMISTRY	VALUE & REMARK
			090783	39380	DIELDRIN	UG/L	TOTAL	U
				39350	CHLORDANE	UG/L	TOTAL	U
				39300	4,4'-DDT	UG/L	TOTAL	U
				39320	4,4'-DDE	UG/L	TOTAL	U
				39310	4,4'-DDD	UG/L	TOTAL	U
				34361	ALPHA ENDOSULFAN	UG/L	TOTAL	U
				34398	BETA ENDOSULFAN	UG/L	TOTAL	U
				34351	ENDOSULFAN SULFATE	UG/L	TOTAL	U
				39390	ENDRIN	UG/L	TOTAL	U
				34366	ENDRIN ALDEHYDE	UG/L	TOTAL	U
				39410	HEPTACLOR	UG/L	TOTAL	U
				39420	HEPTACHLOR EPOXIDE	UG/L	TOTAL	U
				39337	ALPHA-BHC	UG/L	TOTAL	U
				39338	BETA-BHC	UG/L	TOTAL	U
				39340	GAMMA-BHC	UG/L	TOTAL	U
				34259	DELTA-BHC	UG/L	TOTAL	U
				39400	TOXAPHENE	UG/L	TOTAL	U
				34671	PCB-1016	UG/L	TOTAL	U
				39488	PCB-1221	UG/L	TOTAL	U
				39492	PCB-1232	UG/L	TOTAL	U
				39496	PCB-1242	UG/L	TOTAL	U
				39500	PCB-1248	UG/L	TOTAL	U
				39504	PCB-1254	UG/L	TOTAL	U
				39508	PCB-1260	UG/L	TOTAL	U
TURP-RUN	87/10/07	0855						
LOCATION CODE: 3700 SUBSTRATE: AQUEOUS								
DESCRIPTION: VINA HOUSING WELL #1								
			090784	34418	METHYL CHLORIDE	UG/L	TOTAL	U
				34413	METHYL BROMIDE	UG/L	TOTAL	U
				39175	VINYL CHLORIDE	UG/L	TOTAL	U
				34311	CHLOROETHANE	UG/L	TOTAL	U
				34423	METHYLENE CHLORIDE	UG/L	TOTAL	U
				34501	1,1-DICHLOROETHYLENE	UG/L	TOTAL	U
				34499	1,1-DICHLOROETHANE	UG/L	TOTAL	U
				34546	1,2-TRANS DICHLOROETHYLENE	UG/L	TOTAL	
				32106	CHLOROFORM	UG/L	TOTAL	U
				32103	1,2-DICHLOROETHANE	UG/L	TOTAL	U
				34506	1,1,1-TRICHLOROETHANE	UG/L	TOTAL	
				32102	CARBON TETRACHLORIDE	UG/L	TOTAL	U

COMPLETED ANALYSIS REPORT — REPORT DATE: 87/12/22

PROJECT NO: 262 — PROJECT NAME: TURPENTINE RUN

STATION NO	DATE FROM TO	TIME OF DAY	L-BNO	PARNO	PARAMETER NAME	UNITS	CHEMISTRY	VALUE	E	REMARK
			898784	32101	DICHLOROBROMOMETHANE	UG/L	TOTAL			U
				34541	1,2-DICHLOROPROPANE	UG/L	TOTAL			U
				34561	1,3-DICHLOROPROPYLENE	UG/L	TOTAL			U
				39180	TRICHLOROETHYLENE	UG/L	TOTAL	0.4		M
				34030	BENZENE	UG/L	TOTAL			U
				32105	CHLORODIBROMOMETHANE	UG/L	TOTAL			U
				34511	1,1,2-TRICHLOROETHANE	UG/L	TOTAL			U
				32104	BROMOFORM	UG/L	TOTAL			U
				34516	1,1,2,2-TETRACHLOROETHANE	UG/L	TOTAL			U
				34475	TETRACHLOROETHYLENE	UG/L	TOTAL	5.7		
				34010	TOLUENE	UG/L	TOTAL			U
				34301	CHLOROBENZENE	UG/L	TOTAL			U
				34371	ETHYLBENZENE	UG/L	TOTAL			U
				34586	2-CHLOROPHENOL	UG/L	TOTAL			U
				34591	2-NITROPHENOL	UG/L	TOTAL			U
				34594	PHENOL	UG/L	TOTAL			U
				34279	2,4-DIMETHYLPHENOL	UG/L	TOTAL			U
				34601	2,4-DICHLOROPHENOL	UG/L	TOTAL			U
				34621	2,4,6-TRICHLOROPHENOL	UG/L	TOTAL			U
				34452	P-CHLORO-M-CRESOL	UG/L	TOTAL			U
				34616	2,4-DINITROPHENOL	UG/L	TOTAL			U
				34657	4,6-DINITRO-O-CRESOL	UG/L	TOTAL			U
				39592	PENTACHLOROPHENOL	UG/L	TOTAL			U
				34646	4-NITROPHENOL	UG/L	TOTAL			U
				34566	1,3-DICHLOROBENZENE	UG/L	TOTAL			U
				34571	1,4-DICHLOROBENZENE	UG/L	TOTAL			U
				34536	1,2-DICHLOROBENZENE	UG/L	TOTAL			U
				34396	HEXACHLOROETHANE	UG/L	TOTAL			U
				39702	HEXACHLOROBUTADIENE	UG/L	TOTAL			U
				34551	1,2,4-TRICHLOROBENZENE	UG/L	TOTAL			U
				34696	NAPHTHALENE	UG/L	TOTAL			U
				34273	BIS(2-CHLOROETHYL) ET.	UG/L	TOTAL			U
				34278	BIS(2-CHLOROETHOXY) METH.	UG/L	TOTAL			U
				34408	ISOPHORONE	UG/L	TOTAL			U
				34447	NITROBENZENE	UG/L	TOTAL			U
				34428	N-NITROSODI-N-PROPYLAMINE	UG/L	TOTAL			U
				34433	N-NITROSODIPHENYLAMINE	UG/L	TOTAL			U
				34283	BIS(2-CHLOROISOPROPYL) ET.	UG/L	TOTAL			U
				34386	HEXACHLOROCYCLOPENTADIENE	UG/L	TOTAL			U
				34581	2-CHLORONAPHTHALENE	UG/L	TOTAL			U
				34200	ACENAPHTHYLENE	UG/L	TOTAL			U

TUT 001 1186

COMPLETED ANALYSIS REPORT — REPORT DATE: 87/12/22

PROJECT NO: 262 — PROJECT NAME: TURPENTINE RUN

STATION NO	DATE FROM TO	TIME OF DAY	LABNO	PARNO	PARAMETER NAME	UNITS	CHEMISTRY	VALUE & REMARK
			090784	34209	ACENAPHTHENE	UG/L	TOTAL	U
				34381	FLOURENE	UG/L	TOTAL	U
				39700	HEXACHLOROBENZENE	UG/L	TOTAL	U
				34636	4-BROMOPHENYL PHENYL ET.	UG/L	TOTAL	U
				34461	PHENANTHRENE	UG/L	TOTAL	U
				34220	ANTHRACENE	UG/L	TOTAL	U
				34341	DIMETHYL PHTHALATE	UG/L	TOTAL	U
				34336	DIETHYL PHTHALATE	UG/L	TOTAL	U
				39110	DI-N-BUTYLPHTHALATE	UG/L	TOTAL	U
				34292	BUTYL BENZYL PHTHALATE	UG/L	TOTAL	U
				34596	DI-N-OCTYL PHTHALATE	UG/L	TOTAL	U
				39100	BIS(2-ETHYLHEXYL) PHTHAL.	UG/L	TOTAL	U
				34376	FLUORANTHENE	UG/L	TOTAL	U
				34469	PYRENE	UG/L	TOTAL	U
				34320	CHRYSENE	UG/L	TOTAL	U
				34526	1,2-BENZANTHRACENE	UG/L	TOTAL	U
				34641	4-CHLOROPHENYL PHENYL ET.	UG/L	TOTAL	U
				34403	INDENO(1,2,3-C,D) PYRENE	UG/L	TOTAL	U
				34247	BENZO(A)PYRENE	UG/L	TOTAL	U
				34521	1,12-BENZOPERYLENE	UG/L	TOTAL	U
				34556	1,2:5,6-DIBENZANTHRACENE	UG/L	TOTAL	U
				34631	3,3'-DICHLOROBENZIDENE	UG/L	TOTAL	U
				34526	2,6-DINITROTOLUENE	UG/L	TOTAL	U
				34611	2,4-DINITROTOLUENE	UG/L	TOTAL	U
				34346	1,2-DIPHENYLHYDRAZINE	UG/L	TOTAL	U
				34230	3,4-BENZOFLUORANTHENE	UG/L	TOTAL	U
				34242	11,12-BENZOFLUORANTHENE	UG/L	TOTAL	U
				99999	BENZOIC ACID	UG/L	TOTAL	3.7
				39330	ALDRIN	UG/L	TOTAL	U
				39390	DIELDRIN	UG/L	TOTAL	U
				39350	CHLORDANE	UG/L	TOTAL	U
				39300	4,4'-DDT	UG/L	TOTAL	U
				39370	4,4'-DDE	UG/L	TOTAL	U
				39310	4,4'-DDD	UG/L	TOTAL	U
				34381	ALPHA ENDOSULFAN	UG/L	TOTAL	U
				34356	BETA ENDOSULFAN	UG/L	TOTAL	U
				34351	ENDOSULFAN SULFATE	UG/L	TOTAL	U
				39390	ENDRIN	UG/L	TOTAL	U
				34366	ENDRIN ALDEHYDE	UG/L	TOTAL	U
				39410	HEPTACLOR	UG/L	TOTAL	U
				39420	HEPTACHLOR EPOXIDE	UG/L	TOTAL	U

TUT 001 1187

COMPLETED LYSIS REPORT REPORT DATE: 87/12/2

PROJECT NO: 262 PROJECT NAME: TURPENTINE RUN

STATION NO	DATE FROM TO	TIME OF DAY	LABNO	PARNO	PARAMETER NAME	UNITS	CHEMISTRY	VALUE	C	REMARK
			091784	39337	ALPHA-BHC	UG/L	TOTAL			U
				39338	BETA-BHC	UG/L	TOTAL			U
				39340	GAMMA-BHC	UG/L	TOTAL			U
				34259	DELTA-BHC	UG/L	TOTAL			U
				39400	TOXAPHENE	UG/L	TOTAL			U
				34671	PCB-1016	UG/L	TOTAL			U
				39488	PCB-1221	UG/L	TOTAL			U
				39492	PCB-1232	UG/L	TOTAL			U
				39498	PCB-1242	UG/L	TOTAL			U
				39500	PCB-1248	UG/L	TOTAL			U
				39504	PCB-1254	UG/L	TOTAL			U
				39508	PCB-1260	UG/L	TOTAL			U
TURP.RUN	87/10/07	0859								
LOCATION CODE: 3700 SUBSTRATE: AQUEOUS										
DESCRIPTION: VITA HOUSING WELL #9										
			090782	34418	METHYL CHLORIDE	UG/L	TOTAL			U
				34413	METHYL BROMIDE	UG/L	TOTAL			U
				39175	VINYL CHLORIDE	UG/L	TOTAL			U
				34311	CHLOROETHANE	UG/L	TOTAL			U
				34423	METHYLENE CHLORIDE	UG/L	TOTAL	6.8		
				34501	1,1-DICHLOROETHYLENE	UG/L	TOTAL			U
				34496	1,1-DICHLOROETHANE	UG/L	TOTAL			U
				34546	1,2-TRANS DICHLOROETHYLENE	UG/L	TOTAL			U
				32106	CHLOROFORM	UG/L	TOTAL			U
				32103	1,2-DICHLOROETHANE	UG/L	TOTAL			U
				34506	1,1,1-TRICHLOROETHANE	UG/L	TOTAL			U
				32102	CARBON TETRACHLORIDE	UG/L	TOTAL			U
				32101	DICHLOROBROMOMETHANE	UG/L	TOTAL			U
				34541	1,2-DICHLOROPROPANE	UG/L	TOTAL			U
				34561	1,3-DICHLOROPROPYLENE	UG/L	TOTAL			U
				39180	TRICHLOROETHYLENE	UG/L	TOTAL	0.9		
				34030	BENZENE	UG/L	TOTAL			U
				32105	CHLORODIBROMOMETHANE	UG/L	TOTAL			U
				34511	1,1,2-TRICHLOROETHANE	UG/L	TOTAL			U
				32104	BROMOFORM	UG/L	TOTAL			U
				34516	1,1,2,2-TETRACHLOROETHANE	UG/L	TOTAL			U
				34475	TETRACHLOROETHYLENE	UG/L	TOTAL			U
				34010	TOLUENE	UG/L	TOTAL			U
				34301	CHLOROBENZENE	UG/L	TOTAL			U

TUT 001 1188

COMPLETED ANALYSIS REPORT — REPORT DATE: 87/12/22

PROJECT NO: 262 — PROJECT NAME: TURPENTINE RUN

STATION NO	DATE FROM TO	TIME OF DAY	LABNO	PARNO	PARAMETER NAME	UNITS	CHEMISTRY	VALUE & REMARK
			090799	34371	ETHYLBENZENE	UG/L	TOTAL	U
				34586	2-CHLOROPHENOL	UG/L	TOTAL	U
				34591	2-NITROPHENOL	UG/L	TOTAL	U
				34694	PHENOL	UG/L	TOTAL	U
				34606	2,6-DIMETHYLPHENOL	UG/L	TOTAL	U
				34601	2,4-DICHLOROPHENOL	UG/L	TOTAL	U
				34921	2,4,6-TRICHLOROPHENOL	UG/L	TOTAL	U
				34452	P-CHLORO-M-CRESOL	UG/L	TOTAL	U
				34616	2,4-DINITROPHENOL	UG/L	TOTAL	U
				34657	4,6-DINITRO-O-CRESOL	UG/L	TOTAL	U
				39032	PENTACHLOROPHENOL	UG/L	TOTAL	U
				34646	4-NITROPHENOL	UG/L	TOTAL	U
				34566	1,3-DICHLOROBENZENE	UG/L	TOTAL	U
				34571	1,4-DICHLOROBENZENE	UG/L	TOTAL	U
				34536	1,2-DICHLOROBENZENE	UG/L	TOTAL	U
				34396	HEXACHLOROETHANE	UG/L	TOTAL	U
				39702	HEXACHLOROBUTADIENE	UG/L	TOTAL	U
				34551	1,2,4-TRICHLOROBENZENE	UG/L	TOTAL	U
				34696	NAPHTHALENE	UG/L	TOTAL	U
				34273	BIS(2-CHLOROETHYL) ET.	UG/L	TOTAL	U
				34278	BIS(2-CHLOROETHOXY) METH.	UG/L	TOTAL	U
				34406	ISOPHORONE	UG/L	TOTAL	U
				34447	NITROBENZENE	UG/L	TOTAL	U
				34428	N-NITROSODI-N-PROPYLAMINE	UG/L	TOTAL	U
				34433	N-NITROSODIPHENYLAMINE	UG/L	TOTAL	U
				34283	BIS(2-CHLOROISOPROPYL) ET.	UG/L	TOTAL	U
				34386	HEXACHLOROCYCLOPENTADIENE	UG/L	TOTAL	U
				34581	2-CHLORONAPHTHALENE	UG/L	TOTAL	U
				34200	ACENAPHTHYLENE	UG/L	TOTAL	U
				34205	ACENAPHTHENE	UG/L	TOTAL	U
				34381	FLUORENE	UG/L	TOTAL	U
				39700	HEXACHLOROBENZENE	UG/L	TOTAL	U
				34636	4-BROMOPHENYL PHENYL ET.	UG/L	TOTAL	U
				34461	PHENANTHRENE	UG/L	TOTAL	U
				34220	ANTHRACENE	UG/L	TOTAL	U
				34341	DIMETHYL PHTHALATE	UG/L	TOTAL	U
				34336	DIETHYL PHTHALATE	UG/L	TOTAL	U
				39110	DI-N-BUTYLPHTHALATE	UG/L	TOTAL	U
				34292	BUTYL BENZYL PHTHALATE	UG/L	TOTAL	U
				34596	DI-N-OCTYL PHTHALATE	UG/L	TOTAL	U
				34100	BIS(2-ETHYLHEXYL) PHTHAL.	UG/L	TOTAL	U

COMPLE ANALYSIS REPORT REPORT DATE: 87/1 .2

PROJECT NO: 262 PROJECT NAME: TURPENTINE RUN

STATION NO	DATE FROM TO	TIME OF DAY	LABNO	PARNO	PARAMETER NAME	UNITS	CHEMISTRY	VALUE & REMARK
			093785	34376	FLUORANTHENE	UG/L	TOTAL	U
				34469	PYRENE	UG/L	TOTAL	U
				34320	CHRYSENE	UG/L	TOTAL	U
				34526	1,2-BENZANTHRACENE	UG/L	TOTAL	U
				34641	4-CHLOROPHENYL PHENYL ET.	UG/L	TOTAL	U
				34403	INDENO(1,2,3-C,D) PYRENE	UG/L	TOTAL	U
				34247	BENZO(A)PYRENE	UG/L	TOTAL	U
				34521	1,12-BENZOPERYLENE	UG/L	TOTAL	U
				34556	1,2:5,6-DIBENZANTHRACENE	UG/L	TOTAL	U
				34631	3,3'-DICHLOROBENZIDENE	UG/L	TOTAL	U
				34620	2,6-DINITROTOLUENE	UG/L	TOTAL	U
				34611	2,4-DINITROTOLUENE	UG/L	TOTAL	U
				34346	1,2-DIPHENYLHYDRAZINE	UG/L	TOTAL	U
				34270	3,4-BENZOFLUORANTHENE	UG/L	TOTAL	U
				34242	11,12-BENZOFLUORANTHENE	UG/L	TOTAL	U
				99999	BENZOIC ACID	UG/L	TOTAL	2.2 M
				99999	4-METHOXY 1,1-DIMET.-ETH.-PHEN	UG/L	TOTAL	2.1 J
				99999	2-BUTOXYETHYL PHOSPHATE	UG/L	TOTAL	3.1 J
				39330	ALDRIN	UG/L	TOTAL	U
				39360	DIELDRIN	UG/L	TOTAL	U
				39390	CHLORDANE	UG/L	TOTAL	U
				39300	4,4'-DDT	UG/L	TOTAL	U
				39320	4,4'-DDE	UG/L	TOTAL	U
				39310	4,4'-DDD	UG/L	TOTAL	U
				34361	ALPHA ENDOSULFAN	UG/L	TOTAL	U
				34356	BETA ENDOSULFAN	UG/L	TOTAL	U
				34351	ENDOSULFAN SULFATE	UG/L	TOTAL	U
				39390	ENDRIN	UG/L	TOTAL	U
				34366	ENDRIN ALDEHYDE	UG/L	TOTAL	U
				39410	HEPTACLOR	UG/L	TOTAL	U
				39420	HEPTACHLOR EPOXIDE	UG/L	TOTAL	U
				39337	ALPHA-BHC	UG/L	TOTAL	U
				39338	BETA-BHC	UG/L	TOTAL	U
				39340	GAMMA-BHC	UG/L	TOTAL	U
				34259	DELTA-BHC	UG/L	TOTAL	U
				39400	TOXAPHENE	UG/L	TOTAL	U
				34671	PCB-1016	UG/L	TOTAL	U
				39488	PCB-1221	UG/L	TOTAL	U
				39492	PCB-1232	UG/L	TOTAL	U
				39496	PCB-1242	UG/L	TOTAL	U
				39500	PCB-1248	UG/L	TOTAL	U

COMPLETED ANALYSIS REPORT — REPORT DATE: 97/12/22

PROJECT NO: 262 — PROJECT NAME: TURPENTINE RUN

STATION NO	DATE FROM TO	TIME OF DAY	LABNO	PARNO	PARAMETER NAME	UNITS	CHEMISTRY	VALUE & REMARK
			090789	39504	PCB-1254	UG/L	TOTAL	U
				39508	PCB-1260	UG/L	TOTAL	U
TURP-RUN	07/10/07	1045						
LOCATION CODE: 3700 SUBSTRATE: AQUEOUS								
DESCRIPTION: HARTMAN ESTATE WELL								
			090789	34418	METHYL CHLORIDE	UG/L	TOTAL	U
				34413	METHYL BROMIDE	UG/L	TOTAL	U
				39175	VINYL CHLORIDE	UG/L	TOTAL	U
				34311	CHLOROETHANE	UG/L	TOTAL	U
				34423	METHYLENE CHLORIDE	UG/L	TOTAL	U
				34501	1,1-DICHLOROETHYLENE	UG/L	TOTAL	U
				34496	1,1-DICHLOROETHANE	UG/L	TOTAL	U
				34546	1,2-TRANS DICHLOROETHYLENE	UG/L	TOTAL	U
				32105	CHLOROFORM	UG/L	TOTAL	U
				32103	1,2-DICHLOROETHANE	UG/L	TOTAL	U
				34506	1,1,1-TRICHLOROETHANE	UG/L	TOTAL	U
				32102	CARBON TETRACHLORIDE	UG/L	TOTAL	U
				32101	DICHLOROBROMOMETHANE	UG/L	TOTAL	U
				34541	1,2-DICHLOROPROPANE	UG/L	TOTAL	U
				34541	1,3-DICHLOROPROPYLENE	UG/L	TOTAL	U
				39180	TRICHLOROETHYLENE	UG/L	TOTAL	U
				34030	BENZENE	UG/L	TOTAL	U
				32105	CHLORODIBROMOMETHANE	UG/L	TOTAL	U
				34511	1,1,2-TRICHLOROETHANE	UG/L	TOTAL	U
				32104	BROMOFORM	UG/L	TOTAL	U
				34516	1,1,2,2-TETRACHLOROETHANE	UG/L	TOTAL	U
				34475	TETRACHLOROETHYLENE	UG/L	TOTAL	U
				34010	TOLUENE	UG/L	TOTAL	U
				34301	CHLOROBENZENE	UG/L	TOTAL	U
				34371	ETHYLBENZENE	UG/L	TOTAL	U
				34586	2-CHLOROPHENOL	UG/L	TOTAL	U
				34591	2-NITROPHENOL	UG/L	TOTAL	U
				34594	PHENOL	UG/L	TOTAL	U
				34606	2,4-DIMETHYLPHENOL	UG/L	TOTAL	U
				34601	2,4-DICHLOROPHENOL	UG/L	TOTAL	U
				34521	2,4,6-TRICHLOROPHENOL	UG/L	TOTAL	U
				34452	P-CHLORO-M-CRESOL	UG/L	TOTAL	U
				34616	2,4-DINITROPHENOL	UG/L	TOTAL	U
				34657	4,6-DINITRO-O-CRESOL	UG/L	TOTAL	U

COMPLETE ANALYSIS REPORT — REPORT DATE: 87/12/22

PROJECT NO: 262 — PROJECT NAME: TURPENTINE RUN

STATION NO	DATE FROM TO	TIME OF DAY	LABNO	PARNO	PARAMETER NAME	UNITS	CHEMISTRY	VALUE	REMARK
			090706	39032	PENTACHLOROPHENOL	UG/L	TOTAL		U
				34646	4-NITROPHENOL	UG/L	TOTAL		U
				34566	1,3-DICHLOROBENZENE	UG/L	TOTAL		U
				34571	1,4-DICHLOROBENZENE	UG/L	TOTAL		U
				34536	1,2-DICHLOROBENZENE	UG/L	TOTAL		U
				34396	HEXACHLOROETHANE	UG/L	TOTAL		U
				39702	HEXACHLOROBUTADIENE	UG/L	TOTAL		U
				34551	1,2,4-TRICHLOROBENZENE	UG/L	TOTAL		U
				34696	NAPHTHALENE	UG/L	TOTAL		U
				34273	BIS(2-CHLOROETHYL) ET.	UG/L	TOTAL		U
				34278	BIS(2-CHLOROETHOXY) METH.	UG/L	TOTAL		U
				34408	ISOPHORONE	UG/L	TOTAL		U
				34447	NITROBENZENE	UG/L	TOTAL		U
				34428	N-NITROSODI-N-PROPYLAMINE	UG/L	TOTAL		U
				34433	N-NITROSODIPHENYLAMINE	UG/L	TOTAL		U
				34283	BIS(2-CHLOROISOPROPYL) ET.	UG/L	TOTAL		U
				34396	HEXACHLOROCYCLOPENTADIENE	UG/L	TOTAL		U
				34581	2-CHLORONAPHTHALENE	UG/L	TOTAL		U
				34200	ACENAPHTHYLENE	UG/L	TOTAL		U
				34205	ACENAPHTHENE	UG/L	TOTAL		U
				34381	FLUORENE	UG/L	TOTAL		U
				39700	HEXACHLOROBENZENE	UG/L	TOTAL		U
				34536	4-BROMOPHENYL PHENYL ET.	UG/L	TOTAL		U
				34461	PHENANTHRENE	UG/L	TOTAL		U
				34220	ANTHRACENE	UG/L	TOTAL		U
				34341	DIMETHYL PHTHALATE	UG/L	TOTAL		U
				34336	DIETHYL PHTHALATE	UG/L	TOTAL	0.2	
				39110	DI-N-BUTYLPHTHALATE	UG/L	TOTAL		U
				34292	BUTYL-BENZYL PHTHALATE	UG/L	TOTAL		U
				34596	DI-N-OCTYL PHTHALATE	UG/L	TOTAL		U
				39100	BIS(2-ETHYLHEXYL) PHTHAL.	UG/L	TOTAL		U
				34376	FLUORANTHENE	UG/L	TOTAL		U
				34469	PYRENE	UG/L	TOTAL		U
				34320	CHRYSENE	UG/L	TOTAL		U
				34526	1,2-BENZANTHRACENE	UG/L	TOTAL		U
				34641	4-CHLOROPHENYL PHENYL ET.	UG/L	TOTAL		U
				34403	INDENO(1,2,3-C,D) PYRENE	UG/L	TOTAL		U
				34247	BENZO(A)PYRENE	UG/L	TOTAL		U
				34521	1,12-BENZOPERYLENE	UG/L	TOTAL		U
				34556	1,2:5,6-DIBENZANTHRACENE	UG/L	TOTAL		U
				34591	3,3'-DICHLOROBENZIDENE	UG/L	TOTAL		U

COMPLETED ANALYSIS REPORT — REPORT DATE: 87/12/22

PROJECT NO: 262 — PROJECT NAME: TURPENTINE RUN

STATION NO	DATE FROM TO	TIME OF DAY	LABNO	PARNO	PARAMETER NAME	UNITS	CHEMISTRY	VALUE & REMARK
			099786	34626	2,6-DINITROTOLUENE	UG/L	TOTAL	U
				34611	2,4-DINITROTOLUENE	UG/L	TOTAL	U
				34346	1,2-DIPHENYLHYDRAZINE	UG/L	TOTAL	U
				34230	3,4-BENZOFLUORANTHENE	UG/L	TOTAL	U
				34242	11,12-BENZOFLUORANTHENE	UG/L	TOTAL	U
				39330	ALDRIN	UG/L	TOTAL	U
				39380	DIELDRIN	UG/L	TOTAL	U
				39350	CHLORDANE	UG/L	TOTAL	U
				39300	4,4'-DDT	UG/L	TOTAL	U
				39320	4,4'-DDE	UG/L	TOTAL	U
				39310	4,4'-DDD	UG/L	TOTAL	U
				34361	ALPHA ENDOSULFAN	UG/L	TOTAL	U
				34356	BETA ENDOSULFAN	UG/L	TOTAL	U
				34351	ENDOSULFAN SULFATE	UG/L	TOTAL	U
				39390	ENDRIN	UG/L	TOTAL	U
				34366	ENDRIN ALDEHYDE	UG/L	TOTAL	U
				39410	HEPTACHLOR	UG/L	TOTAL	U
				39420	HEPTACHLOR EPOXIDE	UG/L	TOTAL	U
				39337	ALPHA-BHC	UG/L	TOTAL	U
				39338	BETA-BHC	UG/L	TOTAL	U
				39340	GAMMA-BHC	UG/L	TOTAL	U
				34259	DELTA-BHC	UG/L	TOTAL	U
				39400	TOXAPHENE	UG/L	TOTAL	U
				34671	PCB-1016	UG/L	TOTAL	U
				39488	PCB-1221	UG/L	TOTAL	U
				39492	PCB-1232	UG/L	TOTAL	U
				39496	PCB-1242	UG/L	TOTAL	U
				39500	PCB-1248	UG/L	TOTAL	U
				39504	PCB-1254	UG/L	TOTAL	U
				39508	PCB-1260	UG/L	TOTAL	U

TURP.RUN 87/10/07 1300
LOCATION CODE: 3700 SUBSTRATE: AQUEOUS
DESCRIPTION: DEMITERIS WELL

			099787	34418	METHYL CHLORIDE	UG/L	TOTAL	U
				34413	METHYL BROMIDE	UG/L	TOTAL	U
				39175	VINYL CHLORIDE	UG/L	TOTAL	U
				34311	CHLOROETHANE	UG/L	TOTAL	U
				34423	METHYLENE CHLORIDE	UG/L	TOTAL	U
				34501	1,1-DICHLOROETHYLENE	UG/L	TOTAL	U

COMPLETE(ALYSIS REPORT REPORT DATE: 87/12//

PROJECT NO: 262 PROJECT NAME: TURPENTINE RUN

STATION NO	DATE FROM TO	TIME OF DAY	LABNO	PARNO	PARAMETER NAME	UNITS	CHEMISTRY	VALUE & REMARK
			090787	34496	1,1-DICHLOROETHANE	UG/L	TOTAL	U
				34546	1,2-TRANS DICHLOROETHYLENE	UG/L	TOTAL	U
				32106	CHLOROFORM	UG/L	TOTAL	U
				32103	1,2-DICHLOROETHANE	UG/L	TOTAL	U
				34506	1,1,1-TRICHLOROETHANE	UG/L	TOTAL	U
				32102	CARBON TETRACHLORIDE	UG/L	TOTAL	U
				32101	DICHLOROBROMOMETHANE	UG/L	TOTAL	U
				34541	1,2-DICHLOROPROPANE	UG/L	TOTAL	U
				34561	1,3-DICHLOROPROPYLENE	UG/L	TOTAL	U
				39180	TRICHLOROETHYLENE	UG/L	TOTAL	U
				34030	BENZENE	UG/L	TOTAL	U
				32105	CHLORODIBROMOMETHANE	UG/L	TOTAL	U
				34511	1,1,2-TRICHLOROETHANE	UG/L	TOTAL	U
				32104	BROMOFORM	UG/L	TOTAL	U
				34516	1,1,2,2-TETRACHLOROETHANE	UG/L	TOTAL	U
				34475	TETRACHLOROETHYLENE	UG/L	TOTAL	0.7
				34010	TOLUENE	UG/L	TOTAL	U
				34301	CHLOROBENZENE	UG/L	TOTAL	U
				34371	ETHYLBENZENE	UG/L	TOTAL	U
				34586	2-CHLOROPHENOL	UG/L	TOTAL	U
				34591	2-NITROPHENOL	UG/L	TOTAL	U
				34694	PHENOL	UG/L	TOTAL	U
				34606	2,4-DIMETHYLPHENOL	UG/L	TOTAL	U
				34601	2,4-DICHLOROPHENOL	UG/L	TOTAL	U
				34621	2,4,6-TRICHLOROPHENOL	UG/L	TOTAL	U
				34452	P-CHLORO-M-CRESOL	UG/L	TOTAL	U
				34616	2,4-DINITROPHENOL	UG/L	TOTAL	U
				34657	4,6-DINITRO-O-CRESOL	UG/L	TOTAL	U
				39032	PENTACHLOROPHENOL	UG/L	TOTAL	U
				34646	4-NITROPHENOL	UG/L	TOTAL	U
				34566	1,3-DICHLOROBENZENE	UG/L	TOTAL	U
				34571	1,4-DICHLOROBENZENE	UG/L	TOTAL	U
				34536	1,2-DICHLOROBENZENE	UG/L	TOTAL	U
				34396	HEXACHLOROETHANE	UG/L	TOTAL	U
				39702	HEXACHLOROBUTADIENE	UG/L	TOTAL	U
				34551	1,2,4-TRICHLOROBENZENE	UG/L	TOTAL	U
				34696	NAPHTHALENE	UG/L	TOTAL	U
				34273	BIS(2-CHLOROETHYL) ET.	UG/L	TOTAL	U
				34278	BIS(2-CHLOROETHOXY) METH.	UG/L	TOTAL	U
				34408	ISOPHORONE	UG/L	TOTAL	U
				34447	NITROBENZENE	UG/L	TOTAL	U

COMPLETED ANALYSIS REPORT — REPORT DATE: 87/12/22

PROJECT NO: 262 — PROJECT NAME: TURPENTINE RUN

STATION NO	DATE FROM TO	TIME OF DAY	LABNO	PARNO	PARAMETER NAME	UNITS	CHEMISTRY	VALUE	Q	REMARK
			099787	34428	N-NITROSODI-N-PROPYLAMINE	UG/L	TOTAL		U	
				34433	N-NITROSODIPHENYLAMINE	UG/L	TOTAL		U	
				34283	BIS(2-CHLOROISOPROPYL) ET.	UG/L	TOTAL		U	
				34386	HEXACHLOROCYCLOPENTADIENE	UG/L	TOTAL		U	
				34581	2-CHLORONAPHTHALENE	UG/L	TOTAL		U	
				34200	ACENAPHTHYLENE	UG/L	TOTAL		U	
				34209	ACENAPHTHENE	UG/L	TOTAL		U	
				34381	FLOURENE	UG/L	TOTAL		U	
				39700	HEXACHLOROBENZENE	UG/L	TOTAL		U	
				34636	4-BROMOPHENYL PHENYL ET.	UG/L	TOTAL		U	
				34681	PHENANTHRENE	UG/L	TOTAL		U	
				34220	ANTHRACENE	UG/L	TOTAL		U	
				34341	DIMETHYL PHTHALATE	UG/L	TOTAL		U	
				34336	DIETHYL PHTHALATE	UG/L	TOTAL	0.1	M	
				39110	DI-N-BUTYLPHTHALATE	UG/L	TOTAL		U	
				34292	BUTYL BENZYL PHTHALATE	UG/L	TOTAL		U	
				34596	DI-N-OCTYL PHTHALATE	UG/L	TOTAL		U	
				39100	BIS(2-ETHYLHEXYL) PHTHAL.	UG/L	TOTAL		U	
				34376	FLUORANTHENE	UG/L	TOTAL		U	
				34469	PYRENE	UG/L	TOTAL		U	
				34320	CHRYSENE	UG/L	TOTAL		U	
				34526	1,2-BENZANTHRACENE	UG/L	TOTAL		U	
				34641	4-CHLOROPHENYL PHENYL ET.	UG/L	TOTAL		U	
				34403	INDENO(1,2,3-C,D) PYRENE	UG/L	TOTAL		U	
				34247	BENZO(A)PYRENE	UG/L	TOTAL		U	
				34521	1,12-BENZOPERYLENE	UG/L	TOTAL		U	
				34556	1,2:5,6-DIBENZANTHRACENE	UG/L	TOTAL		U	
				34631	3,3'-DICHLOROBENZIDENE	UG/L	TOTAL		U	
				34626	2,6-DINITROTOLUENE	UG/L	TOTAL		U	
				34611	2,4-DINITROTOLUENE	UG/L	TOTAL		U	
				34346	1,2-DIPHENYLHYDRAZINE	UG/L	TOTAL		U	
				34630	3,4-BENZOFLUORANTHENE	UG/L	TOTAL		U	
				34242	11,12-BENZOFLUORANTHENE	UG/L	TOTAL		U	
				39330	ALDRIN	UG/L	TOTAL		U	
				39390	DIELDRIN	UG/L	TOTAL		U	
				39350	CHLORDANE	UG/L	TOTAL		U	
				39300	4,4'-DDT	UG/L	TOTAL		U	
				39320	4,4'-DDE	UG/L	TOTAL		U	
				39310	4,4'-DDD	UG/L	TOTAL		U	
				34361	ALPHA ENDOSULFAN	UG/L	TOTAL		U	
				34398	BETA ENDOSULFAN	UG/L	TOTAL		U	

COMPLETED ...LYSIS REPORT REPORT DATE: 87/12/2

PROJECT NO: 262 PROJECT NAME: TURPENTINE RUN

STATION NO	DATE FROM TO	TIME OF DAY	LABNO	PARNO	PARAMETER NAME	UNITS	CHEMISTRY	VALUE	REMARK
			090787	34351	ENDOSULFAN SULFATE	UG/L	TOTAL	U	
				39390	ENDRIN	UG/L	TOTAL	U	
				34366	ENDRIN ALDEHYDE	UG/L	TOTAL	U	
				39410	HEPTACLOR	UG/L	TOTAL	U	
				39420	HEPTACHLOR EPOXIDE	UG/L	TOTAL	U	
				39337	ALPHA-BHC	UG/L	TOTAL	U	
				39338	BETA-BHC	UG/L	TOTAL	U	
				39340	GAMMA-BHC	UG/L	TOTAL	U	
				34259	DELTA-BHC	UG/L	TOTAL	U	
				39400	TOXAPHENE	UG/L	TOTAL	U	
				34671	PCB-1016	UG/L	TOTAL	U	
				39488	PCB-1221	UG/L	TOTAL	U	
				39492	PCB-1232	UG/L	TOTAL	U	
				39496	PCB-1242	UG/L	TOTAL	U	
				39500	PCB-1248	UG/L	TOTAL	U	
				39504	PCB-1254	UG/L	TOTAL	U	
				39508	PCB-1260	UG/L	TOTAL	U	
TURP.RUN	87/10/05	1021							
DEPTH: 0000	SUBSTRATE: AQUEOUS								
DESCRIPTION:	RODRIGUEZ AUTO PARTS								
	WELL # 3								
			091302	34418	METHYL CHLORIDE	UG/L	TOTAL	U	
				34413	METHYL BROMIDE	UG/L	TOTAL	U	
				39175	VINYL CHLORIDE	UG/L	TOTAL	U	
				34311	CHLOROETHANE	UG/L	TOTAL	U	
				34423	METHYLENE CHLORIDE	UG/L	TOTAL	U	
				34501	1,1-DICHLOROETHYLENE	UG/L	TOTAL	U	
				34496	1,1-DICHLOROETHANE	UG/L	TOTAL	U	
				34546	1,2-TRANS DICHLOROETHYLENE	UG/L	TOTAL	U	
				32106	CHLOROFORM	UG/L	TOTAL	U	
				32103	1,2-DICHLOROETHANE	UG/L	TOTAL	U	
				34506	1,1,1-TRICHLOROETHANE	UG/L	TOTAL	U	
				32102	CARBON TETRACHLORIDE	UG/L	TOTAL	U	
				32101	DICHLOROBROMOMETHANE	UG/L	TOTAL	U	
				34541	1,2-DICHLOROPROPANE	UG/L	TOTAL	U	
				34551	1,3-DICHLOROPROPYLENE	UG/L	TOTAL	U	
				39180	TRICHLOROETHYLENE	UG/L	TOTAL	U	
				34030	BENZENE	UG/L	TOTAL	U	
				32105	CHLORODIBROMOMETHANE	UG/L	TOTAL	U	
				34511	1,1,2-TRICHLOROETHANE	UG/L	TOTAL	U	

TUT 001 1196

COMPLE(ANALYSIS REPORT REPORT DATE: 87/1(2

PROJECT NO: 2o2 PROJECT NAME: TURPENTINE RUN

STATION NO	DATE FROM TO	TIME OF DAY	LABNO	PARNO	PARAMETER NAME	UNITS	CHEMISTRY	VALUE & REMARK
			091302	32104	BROMOFORM	UG/L	TOTAL	U
				34516	1,1,2,2-TETRACHLORDETHANE	UG/L	TOTAL	U
				34475	TETRACHLOROETHYLENE	UG/L	TOTAL	U
				34010	TOLUENE	UG/L	TOTAL	U
				34301	CHLOROBENZENE	UG/L	TOTAL	U
				34371	ETHYLBENZENE	UG/L	TOTAL	U
				34586	2-CHLOROPHENOL	UG/L	TOTAL	U
				34591	2-NITROPHENOL	UG/L	TOTAL	U
				34694	PHENOL	UG/L	TOTAL	U
				34606	2,4-DIMETHYLPHENOL	UG/L	TOTAL	U
				34601	2,4-DICHLOROPHENOL	UG/L	TOTAL	U
				34621	2,4,6-TRICHLOROPHENOL	UG/L	TOTAL	U
				34452	P-CHLORO-M-CRESOL	UG/L	TOTAL	U
				34616	2,4-DINITROPHENOL	UG/L	TOTAL	U
				34657	4,6-DINITRO-O-CRESOL	UG/L	TOTAL	U
				39032	PENTACHLOROPHENOL	UG/L	TOTAL	U
				34646	4-NITROPHENOL	UG/L	TOTAL	U
				34566	1,3-DICHLOROBENZENE	UG/L	TOTAL	U
				34571	1,4-DICHLOROBENZENE	UG/L	TOTAL	U
				34536	1,2-DICHLOROBENZENE	UG/L	TOTAL	U
				34396	HEXACHLOROETHANE	UG/L	TOTAL	U
				39702	HEXACHLOROBUTADIENE	UG/L	TOTAL	U
				34551	1,2,4-TRICHLOROBENZENE	UG/L	TOTAL	U
				34696	NAPHTHALENE	UG/L	TOTAL	U
				34273	BIS(2-CHLOROETHYL) ET.	UG/L	TOTAL	U
				34278	BIS(2-CHLOROETHOXY) METH.	UG/L	TOTAL	U
				34409	ISOPHORONE	UG/L	TOTAL	U
				34447	NITROBENZENE	UG/L	TOTAL	U
				34429	N-NITROSODI-N-PROPYLAMINE	UG/L	TOTAL	U
				34433	N-NITROSODIPHENYLAMINE	UG/L	TOTAL	U
				34283	BIS(2-CHLOROISOPROPYL) ET.	UG/L	TOTAL	U
				34385	HEXACHLOROCYCLOPENTADIENE	UG/L	TOTAL	U
				34581	2-CHLORONAPHTHALENE	UG/L	TOTAL	U
				34200	ACENAPHTHYLENE	UG/L	TOTAL	U
				34209	ACENAPHTHENE	UG/L	TOTAL	U
				34381	FLOURENE	UG/L	TOTAL	U
				39700	HEXACHLOROBENZENE	UG/L	TOTAL	U
				34636	4-BROMOPHENYL PHENYL ET.	UG/L	TOTAL	U
				34461	PHENANTHRENE	UG/L	TOTAL	U
				34220	ANTHRACENE	UG/L	TOTAL	U
				34341	DIMETHYL PHTHALATE	UG/L	TOTAL	U

TUT 001 1197

COMPLETED ANALYSIS REPORT — REPORT DATE: 87/12/22

PROJECT NO: 262 — PROJECT NAME: TURPENTINE RUN

STATION NO	DATE FROM TO	TIME OF DAY	LABNO	PARNO	PARAMETER NAME	UNITS	CHEMISTRY	VALUE & REMARK
			011302	34336	DIETHYL PHTHALATE	UG/L	TOTAL	U
				39110	DI-N-BUTYLPHTHALATE	UG/L	TOTAL	U
				34292	BUTYL BENZYL PHTHALATE	UG/L	TOTAL	U
				34596	DI-N-OCTYL PHTHALATE	UG/L	TOTAL	U
				39100	BIS(2-ETHYLHEXYL) PHTHAL.	UG/L	TOTAL	U
				34376	FLUORANTHENE	UG/L	TOTAL	U
				34469	PYRENE	UG/L	TOTAL	U
				34320	CHRYSENE	UG/L	TOTAL	U
				34526	1,2-BENZANTHRACENE	UG/L	TOTAL	U
				34641	4-CHLOROPHENYL PHENYL ET.	UG/L	TOTAL	U
				34403	INDENO(1,2,3-C,D) PYRENE	UG/L	TOTAL	U
				34247	BENZO(A)PYRENE	UG/L	TOTAL	U
				34521	1,12-BENZOPERYLENE	UG/L	TOTAL	U
				34556	1,2:5,6-DIBENZANTHRACENE	UG/L	TOTAL	U
				34691	3,3'-DICHLOROBENZIDENE	UG/L	TOTAL	U
				34626	2,6-DINITROTOLUENE	UG/L	TOTAL	U
				34611	2,4-DINITROTOLUENE	UG/L	TOTAL	U
				34346	1,2-DIPHENYLHYDRAZINE	UG/L	TOTAL	U
				34230	3,4-BENZOFLUORANTHENE	UG/L	TOTAL	U
				34242	11,12-BENZOFLUORANTHENE	UG/L	TOTAL	U
				39333	ALDRIN	UG/L	TOTAL	U
				39360	DIELDRIN	UG/L	TOTAL	U
				39350	CHLORDANE	UG/L	TOTAL	U
				39300	4,4'-DDT	UG/L	TOTAL	U
				39320	4,4'-DDE	UG/L	TOTAL	U
				39310	4,4'-DDD	UG/L	TOTAL	U
				34351	ALPHA ENDOSULFAN	UG/L	TOTAL	U
				34356	BETA ENDOSULFAN	UG/L	TOTAL	U
				34351	ENDOSULFAN SULFATE	UG/L	TOTAL	U
				39390	ENDRIN	UG/L	TOTAL	U
				34366	ENDRIN ALDEHYDE	UG/L	TOTAL	U
				39410	HEPTACLOR	UG/L	TOTAL	U
				39420	HEPTACHLOR EPOXIDE	UG/L	TOTAL	U
				39337	ALPHA-BHC	UG/L	TOTAL	U
				39338	BETA-BHC	UG/L	TOTAL	U
				39340	GAMMA-BHC	UG/L	TOTAL	U
				34259	DELTA-BHC	UG/L	TOTAL	U
				39400	TOXAPHENE	UG/L	TOTAL	U
				34671	PCB-1016	UG/L	TOTAL	U
				39488	PCB-1221	UG/L	TOTAL	U
				39492	PCB-1232	UG/L	TOTAL	U

COMPLETED(LYSIS REPORT REPORT DATE: 87/12/2(

PROJECT NO: 262 PROJECT NAME: TURPENTINE RUN

STATION NO	DATE FROM TO	TIME OF DAY	LABNO	PARNO	PARAMETER NAME	UNITS	CHEMISTRY	VALUE	REMARK
			091302	39496	PCB-1242	UG/L	TOTAL		U
				39500	PCB-1248	UG/L	TOTAL		U
				39504	PCB-1254	UG/L	TOTAL		U
				39508	PCB-1260	UG/L	TOTAL		U
TURP.RUN	87/10/06	1130							
DEPTH: 0000	SUBSTRATE: AQUEOUS								
DESCRIPTION: RAMSEY MOTORS WELL LOCATED NEAR AUTO REPAIR WORKS									
			091303	34418	METHYL CHLORIDE	UG/L	TOTAL		U
				34413	METHYL BROMIDE	UG/L	TOTAL		U
				39175	VINYL CHLORIDE	UG/L	TOTAL		U
				34311	CHLOROETHANE	UG/L	TOTAL		U
				34423	METHYLENE CHLORIDE	UG/L	TOTAL		U
				34501	1,1-DICHLOROETHYLENE	UG/L	TOTAL		U
				34476	1,1-DICHLOROETHANE	UG/L	TOTAL		U
				34546	1,2-TRANS DICHLOROETHYLENE	UG/L	TOTAL	6.3	
				32106	CHLOROFORM	UG/L	TOTAL		U
				32103	1,2-DICHLOROETHANE	UG/L	TOTAL		U
				34506	1,1,1-TRICHLOROETHANE	UG/L	TOTAL		U
				32102	CARBON TETRACHLORIDE	UG/L	TOTAL		U
				32101	DICHLOROBROMOMETHANE	UG/L	TOTAL		U
				34541	1,2-DICHLOROPROPANE	UG/L	TOTAL		U
				34551	1,3-DICHLOROPROPYLENE	UG/L	TOTAL		U
				39180	TRICHLOROETHYLENE	UG/L	TOTAL	1.7	M
				34030	BENZENE	UG/L	TOTAL		U
				32105	CHLORODIBROMOMETHANE	UG/L	TOTAL		U
				34511	1,1,2-TRICHLOROETHANE	UG/L	TOTAL		U
				32104	BROMOFORM	UG/L	TOTAL		U
				34516	1,1,2,2-TETRACHLOROETHANE	UG/L	TOTAL		U
				34475	TETRACHLOROETHYLENE	UG/L	TOTAL	22	
				34010	TOLUENE	UG/L	TOTAL		U
				34301	CHLOROBENZENE	UG/L	TOTAL		U
				34371	ETHYLBENZENE	UG/L	TOTAL		U
				34586	2-CHLOROPHENOL	UG/L	TOTAL		U
				34591	2-NITROPHENOL	UG/L	TOTAL		U
				34694	PHENOL	UG/L	TOTAL		U
				34606	2,4-DIMETHYLPHENOL	UG/L	TOTAL		U
				34601	2,4-DICHLOROPHENOL	UG/L	TOTAL		U
				34621	2,4,6-TRICHLOROPHENOL	UG/L	TOTAL		U
				34452	P-CHLORO-M-CRESOL	UG/L	TOTAL		U

TUT 001 11997

COMPLETED ANALYSIS REPORT — REPORT DATE: 07/12/22

PROJECT NO: 262 — PROJECT NAME: TURPENTINE RUN

STATION NO	DATE FROM TO	TIME OF DAY	LABNO	PARNO	PARAMETER NAME	UNITS	CHEMISTRY	VALUE C	REMARK
			071303	34616	2,4-DINITROPHENOL	UG/L	TOTAL	U	
				34657	4,6-DINITRO-O-CRESOL	UG/L	TOTAL	U	
				39032	PENTACHLOROPHENOL	UG/L	TOTAL	U	
				34646	4-NITROPHENOL	UG/L	TOTAL	U	
				34566	1,3-DICHLOROBENZENE	UG/L	TOTAL	U	
				34571	1,4-DICHLOROBENZENE	UG/L	TOTAL	U	
				34536	1,2-DICHLOROBENZENE	UG/L	TOTAL	U	
				34396	HEXACHLOROETHANE	UG/L	TOTAL	U	
				39702	HEXACHLOROBUTADIENE	UG/L	TOTAL	U	
				34551	1,2,4-TRICHLOROBENZENE	UG/L	TOTAL	U	
				34696	NAPHTHALENE	UG/L	TOTAL	U	
				34273	BIS(2-CHLOROETHYL) ET.	UG/L	TOTAL	U	
				34278	BIS(2-CHLOROETHOXY) METH.	UG/L	TOTAL	U	
				34408	ISOPHORONE	UG/L	TOTAL	U	
				34447	NITROBENZENE	UG/L	TOTAL	U	
				34428	N-NITROSODI-N-PROPYLAMINE	UG/L	TOTAL	U	
				34493	N-NITROSODIPHENYLAMINE	UG/L	TOTAL	U	
				34283	BIS(2-CHLOROISOPROPYL) ET.	UG/L	TOTAL	U	
				34386	HEXACHLOROCYCLOPENTADIENE	UG/L	TOTAL	U	
				34521	2-CHLORONAPHTHALENE	UG/L	TOTAL	U	
				34200	ACENAPHTHYLENE	UG/L	TOTAL	U	
				34205	ACENAPHTHENE	UG/L	TOTAL	U	
				34381	FLOURENE	UG/L	TOTAL	U	
				39700	HEXACHLOROBENZENE	UG/L	TOTAL	U	
				34676	4-BROMOPHENYL PHENYL ET.	UG/L	TOTAL	U	
				34461	PHENANTHRENE	UG/L	TOTAL	U	
				34220	ANTHRACENE	UG/L	TOTAL	U	
				34341	DIMETHYL PHTHALATE	UG/L	TOTAL	U	
				34336	DIETHYL PHTHALATE	UG/L	TOTAL	U	
				39110	DI-N-BUTYLPHTHALATE	UG/L	TOTAL	U	
				34292	BUTYL BENZYL PHTHALATE	UG/L	TOTAL	U	
				34596	DI-N-OCTYL PHTHALATE	UG/L	TOTAL	0.2	
				39100	BIS(2-ETHYLHEXYL) PHTHAL.	UG/L	TOTAL	U	
				34376	FLUORANTHENE	UG/L	TOTAL	U	
				34469	PYRENE	UG/L	TOTAL	U	
				34320	CHRYSENE	UG/L	TOTAL	U	
				34526	1,2-BENZANTHRACENE	UG/L	TOTAL	U	
				34641	4-CHLOROPHENYL PHENYL ET.	UG/L	TOTAL	U	
				34403	INDENO(1,2,3-C,D) PYRENE	UG/L	TOTAL	U	
				34247	BENZO(A)PYRENE	UG/L	TOTAL	U	
				34521	1,12-BENZOPERYLENE	UG/L	TOTAL	U	

COMPLETED LYSIS REPORT — REPORT DATE: 97/12/27

PROJECT NO: 262 — PROJECT NAME: TURPENTINE RUN

STATION NO	DATE FROM / TO	TIME OF DAY	LABNO	PARNO	PARAMETER NAME	UNITS	CHEMISTRY	VALUE & REMARK
			091303	34556	1,2:5,6-DIBENZANTHRACENE	UG/L	TOTAL	U
				34631	3,3'-DICHLOROBENZIDENE	UG/L	TOTAL	U
				34626	2,6-DINITROTOLUENE	UG/L	TOTAL	U
				34611	2,4-DINITROTOLUENE	UG/L	TOTAL	U
				34346	1,2-DIPHENYLHYDRAZINE	UG/L	TOTAL	U
				34230	3,4-BENZOFLUORANTHENE	UG/L	TOTAL	U
				34242	11,12-BENZOFLUORANTHENE	UG/L	TOTAL	U
				39330	ALDRIN	UG/L	TOTAL	U
				39380	DIELDRIN	UG/L	TOTAL	U
				39350	CHLORDANE	UG/L	TOTAL	U
				39300	4,4'-DDT	UG/L	TOTAL	U
				39320	4,4'-DDE	UG/L	TOTAL	U
				39310	4,4'-DDD	UG/L	TOTAL	U
				34361	ALPHA ENDOSULFAN	UG/L	TOTAL	U
				34356	BETA ENDOSULFAN	UG/L	TOTAL	U
				34351	ENDOSULFAN SULFATE	UG/L	TOTAL	U
				39390	ENDRIN	UG/L	TOTAL	U
				34366	ENDRIN ALDEHYDE	UG/L	TOTAL	U
				39410	HEPTACLOR	UG/L	TOTAL	U
				39420	HEPTACHLOR EPOXIDE	UG/L	TOTAL	U
				39397	ALPHA-BHC	UG/L	TOTAL	U
				39338	BETA-BHC	UG/L	TOTAL	U
				39340	GAMMA-BHC	UG/L	TOTAL	U
				34259	DELTA-BHC	UG/L	TOTAL	U
				39400	TOXAPHENE	UG/L	TOTAL	U
				34671	PCB-1016	UG/L	TOTAL	U
				39488	PCB-1221	UG/L	TOTAL	U
				39492	PCB-1232	UG/L	TOTAL	U
				39494	PCB-1242	UG/L	TOTAL	U
				39500	PCB-1248	UG/L	TOTAL	U
				39504	PCB-1254	UG/L	TOTAL	U
				39508	PCB-1260	UG/L	TOTAL	U
TURP.RUN	87/10/09	1200						
DEPTH: 0000	SUBSTRATE: AQUEOUS							
DESCRIPTION: STEELE FROM SPIGOT AT WELLHEAD								
			091304	34418	METHYL CHLORIDE	UG/L	TOTAL	U
				34413	METHYL BROMIDE	UG/L	TOTAL	U
				39175	VINYL CHLORIDE	UG/L	TOTAL	U
				34311	CHLOROETHANE	UG/L	TOTAL	U

TUT 001 1201

COMPLETED ANALYSIS REPORT — REPORT DATE: 87/12/22

PROJECT NO: 262 — PROJECT NAME: TURPENTINE RUN

STATION NO	DATE FROM TO	TIME OF DAY	LABNO	PARNU	PARAMETER NAME	UNITS	CHEMISTRY	VALUE	C	REMARK
			091304	34423	METHYLENE CHLORIDE	UG/L	TOTAL			U
				34501	1,1-DICHLOROETHYLENE	UG/L	TOTAL			U
				34496	1,1-DICHLOROETHANE	UG/L	TOTAL			U
				34546	1,2-TRANS DICHLOROETHYLENE	UG/L	TOTAL	47		
				32106	CHLOROFORM	UG/L	TOTAL			U
				32103	1,2-DICHLOROETHANE	UG/L	TOTAL			U
				34506	1,1,1-TRICHLOROETHANE	UG/L	TOTAL			U
				32102	CARBON TETRACHLORIDE	UG/L	TOTAL			U
				32101	DICHLOROBROMOMETHANE	UG/L	TOTAL			U
				34541	1,2-DICHLOROPROPANE	UG/L	TOTAL			U
				34561	1,3-DICHLOROPROPYLENE	UG/L	TOTAL			U
				39180	TRICHLOROETHYLENE	UG/L	TOTAL	15		
				34030	BENZENE	UG/L	TOTAL			U
				32105	CHLORODIBROMOMETHANE	UG/L	TOTAL			U
				34511	1,1,2-TRICHLOROETHANE	UG/L	TOTAL			U
				32104	BROMOFORM	UG/L	TOTAL			U
				34516	1,1,2,2-TETRACHLOROETHANE	UG/L	TOTAL			U
				34475	TETRACHLOROETHYLENE	UG/L	TOTAL	320		
				34010	TOLUENE	UG/L	TOTAL			U
				34301	CHLOROBENZENE	UG/L	TOTAL			U
				34371	ETHYLBENZENE	UG/L	TOTAL			U
				99999	TERT-BUTYLMETHYLETHER	UG/L	TOTAL	37		J
				34586	2-CHLOROPHENOL	UG/L	TOTAL			U
				34591	2-NITROPHENOL	UG/L	TOTAL			U
				34694	PHENOL	UG/L	TOTAL			U
				34606	2,4-DIMETHYLPHENOL	UG/L	TOTAL			U
				34601	2,4-DICHLOROPHENOL	UG/L	TOTAL			U
				34621	2,4,6-TRICHLOROPHENOL	UG/L	TOTAL			U
				34452	P-CHLORO-M-CRESOL	UG/L	TOTAL			U
				34616	2,4-DINITROPHENOL	UG/L	TOTAL			U
				34657	4,6-DINITRO-O-CRESOL	UG/L	TOTAL			U
				39032	PENTACHLOROPHENOL	UG/L	TOTAL			U
				34646	4-NITROPHENOL	UG/L	TOTAL			U
				34566	1,3-DICHLOROBENZENE	UG/L	TOTAL			U
				34571	1,4-DICHLOROBENZENE	UG/L	TOTAL			U
				34536	1,2-DICHLOROBENZENE	UG/L	TOTAL	1.0		J
				34396	HEXACHLOROETHANE	UG/L	TOTAL			U
				39702	HEXACHLOROBUTADIENE	UG/L	TOTAL			U
				34551	1,2,4-TRICHLOROBENZENE	UG/L	TOTAL			U
				34696	NAPHTHALENE	UG/L	TOTAL			U
				34273	BIS(2-CHLOROETHYL) ET.	UG/L	TOTAL			U

TLT 001 1202

COMPLETED (YSIS REPORT REPORT DATE: 87/12/2(

PROJECT NO: 262 PROJECT NAME: TURPENTINE RUN

STATION NO	DATE FROM TO	TIME OF DAY	LABNO	PARNO	PARAMETER NAME	UNITS	CHEMISTRY	VALUE & REMARK
			091304	34278	BIS(2-CHLOROETHOXY) METH.	UG/L	TOTAL	U
				34408	ISOPHORONE	UG/L	TOTAL	U
				34447	NITROBENZENE	UG/L	TOTAL	U
				34424	N-NITROSODI-N-PROPYLAMINE	UG/L	TOTAL	U
				34433	N-NITROSODIPHENYLAMINE	UG/L	TOTAL	U
				34[illegible]	BIS(2-CHLOROISOPROPYL) ET.	UG/L	TOTAL	U
				34386	HEXACHLOROCYCLOPENTADIENE	UG/L	TOTAL	U
				34591	2-CHLORONAPHTHALENE	UG/L	TOTAL	U
				34200	ACENAPHTHYLENE	UG/L	TOTAL	U
				34205	ACENAPHTHENE	UG/L	TOTAL	U
				34391	FLOURENE	UG/L	TOTAL	U
				39700	HEXACHLOROBENZENE	UG/L	TOTAL	U
				34698	4-BROMOPHENYL PHENYL ET.	UG/L	TOTAL	U
				34461	PHENANTHRENE	UG/L	TOTAL	U
				34220	ANTHRACENE	UG/L	TOTAL	U
				34341	DIMETHYL PHTHALATE	UG/L	TOTAL	U
				34336	DIETHYL PHTHALATE	UG/L	TOTAL	U
				39110	DI-N-BUTYLPHTHALATE	UG/L	TOTAL	U
				34292	BUTYL BENZYL PHTHALATE	UG/L	TOTAL	U
				34596	DI-N-OCTYL PHTHALATE	UG/L	TOTAL	0.5 M
				39100	BIS(2-ETHYLHEXYL) PHTHAL.	UG/L	TOTAL	U
				34376	FLUORANTHENE	UG/L	TOTAL	U
				34469	PYRENE	UG/L	TOTAL	U
				34370	CHRYSENE	UG/L	TOTAL	U
				34526	1,2-BENZANTHRACENE	UG/L	TOTAL	U
				34641	4-CHLOROPHENYL PHENYL ET.	UG/L	TOTAL	U
				34403	INDENO(1,2,3-C,D) PYRENE	UG/L	TOTAL	U
				34247	BENZO(A)PYRENE	UG/L	TOTAL	U
				34521	1,12-BENZOPERYLENE	UG/L	TOTAL	U
				34556	1,2[illegible],6-DIBENZANTHRACENE	UG/L	TOTAL	U
				34631	3,3'-DICHLOROBENZIDINE	UG/L	TOTAL	U
				34626	2,4-DINITROTOLUENE	UG/L	TOTAL	U
				34611	2,4-DINITROTOLUENE	UG/L	TOTAL	U
				34346	1,2-DIPHENYLHYDRAZINE	UG/L	TOTAL	U
				34230	3,4-BENZOFLUORANTHENE	UG/L	TOTAL	U
				34242	11,12-BENZOFLUORANTHENE	UG/L	TOTAL	U
				39330	ALDRIN	UG/L	TOTAL	U
				39380	DIELDRIN	UG/L	TOTAL	U
				39350	CHLORDANE	UG/L	TOTAL	U
				39300	4,4'-DDT	UG/L	TOTAL	U
				39320	4,4'-DDE	UG/L	TOTAL	U

TUT 001 1205

COMPLETED ANALYSIS REPORT — REPORT DATE: 87/12/22

PROJECT NO: 262 — PROJECT NAME: TURPENTINE RUN

STATION NO	DATE FROM TO	TIME OF DAY	LABNO	PARNO	PARAMETER NAME	UNITS	CHEMISTRY	VALUE	R	REMARK
			091304	39310	4,4'-DDD	UG/L	TOTAL	U		
				34361	ALPHA ENDOSULFAN	UG/L	TOTAL	U		
				34356	BETA ENDOSULFAN	UG/L	TOTAL	U		
				34351	ENDOSULFAN SULFATE	UG/L	TOTAL	U		
				39390	ENDRIN	UG/L	TOTAL	U		
				34366	ENDRIN ALDEHYDE	UG/L	TOTAL	U		
				39410	HEPTACLOR	UG/L	TOTAL	U		
				39420	HEPTACHLOR EPOXIDE	UG/L	TOTAL	U		
				39337	ALPHA-BHC	UG/L	TOTAL	U		
				39338	BETA-BHC	UG/L	TOTAL	U		
				39340	GAMMA-BHC	UG/L	TOTAL	U		
				34259	DELTA-BHC	UG/L	TOTAL	U		
				39400	TOXAPHENE	UG/L	TOTAL	U		
				34671	PCB-1016	UG/L	TOTAL	U		
				39488	PCB-1221	UG/L	TOTAL	U		
				39492	PCB-1232	UG/L	TOTAL	U		
				39496	PCB-1242	UG/L	TOTAL	U		
				39500	PCB-1248	UG/L	TOTAL	U		
				39504	PCB-1254	UG/L	TOTAL	U		
				39508	PCB-1260	UG/L	TOTAL	U		
TURP.RUN	87/10/06	1310								
DEPTH: 0000 SUBSTRATE: AQUEOUS										
DESCRIPTION: HARVEY WELL BEHIND O'HENRY DRY CLEANERS IN WOODS										
			091305	34418	METHYL CHLORIDE	UG/L	TOTAL	U		
				34413	METHYL BROMIDE	UG/L	TOTAL	U		
				39175	VINYL CHLORIDE	UG/L	TOTAL	U		
				34311	CHLOROETHANE	UG/L	TOTAL	U		
				34423	METHYLENE CHLORIDE	UG/L	TOTAL	120000		
				34501	1,1-DICHLOROETHYLENE	UG/L	TOTAL	U		
				34496	1,1-DICHLOROETHANE	UG/L	TOTAL	U		
				34546	1,2-TRANS DICHLOROETHYLENE	UG/L	TOTAL			
				32106	CHLOROFORM	UG/L	TOTAL	U		
				32103	1,2-DICHLOROETHANE	UG/L	TOTAL	U		
				34506	1,1,1-TRICHLOROETHANE	UG/L	TOTAL	U		
				32102	CARBON TETRACHLORIDE	UG/L	TOTAL	U		
				32101	DICHLOROBROMOMETHANE	UG/L	TOTAL	U		
				34541	1,2-DICHLOROPROPANE	UG/L	TOTAL	J		
				34551	1,3-DICHLOROPROPYLENE	UG/L	TOTAL	U		
				39180	TRICHLOROETHYLENE	UG/L	TOTAL			

TUT 001 1204

COMPLETED A(SIS REPORT REPORT DATE: 87/12/22(

PROJECT NO: 262 PROJECT NAME: TURPENTINE RUN

STATION NO	DATE FROM TO	TIME OF DAY	LABNO	PARNO	PARAMETER NAME	UNITS	CHEMISTRY	VALUE & REMARK
			091909	34030	BENZENE	UG/L	TOTAL	U
				32105	CHLORODIBROMOMETHANE	UG/L	TOTAL	U
				34511	1,1,2-TRICHLOROETHANE	UG/L	TOTAL	U
				32104	BROMOFORM	UG/L	TOTAL	U
				34516	1,1,2,2-TETRACHLOROETHANE	UG/L	TOTAL	U
				34475	TETRACHLOROETHYLENE	UG/L	TOTAL	2000
				34010	TOLUENE	UG/L	TOTAL	U
				34301	CHLOROBENZENE	UG/L	TOTAL	U
				34371	ETHYLBENZENE	UG/L	TOTAL	U
				34586	2-CHLOROPHENOL	UG/L	TOTAL	U
				34591	2-NITROPHENOL	UG/L	TOTAL	U
				34694	PHENOL	UG/L	TOTAL	U
				34608	2,4-DIMETHYLPHENOL	UG/L	TOTAL	U
				34601	2,4-DICHLOROPHENOL	UG/L	TOTAL	U
				34621	2,4,6-TRICHLOROPHENOL	UG/L	TOTAL	U
				34452	P-CHLORO-M-CRESOL	UG/L	TOTAL	U
				34616	2,4-DINITROPHENOL	UG/L	TOTAL	U
				34657	4,6-DINITRO-O-CRESOL	UG/L	TOTAL	U
				39032	PENTACHLOROPHENOL	UG/L	TOTAL	U
				34646	4-NITROPHENOL	UG/L	TOTAL	U
				34566	1,3-DICHLOROBENZENE	UG/L	TOTAL	U
				34571	1,4-DICHLOROBENZENE	UG/L	TOTAL	U
				34536	1,2-DICHLOROBENZENE	UG/L	TOTAL	U
				34396	HEXACHLOROETHANE	UG/L	TOTAL	U
				39702	HEXACHLOROBUTADIENE	UG/L	TOTAL	U
				34551	1,2,4-TRICHLOROBENZENE	UG/L	TOTAL	U
				34696	NAPHTHALENE	UG/L	TOTAL	U
				34273	BIS(2-CHLOROETHYL) ET.	UG/L	TOTAL	U
				34278	BIS(2-CHLOROETHOXY) METH.	UG/L	TOTAL	U
				34409	ISOPHORONE	UG/L	TOTAL	U
				34447	NITROBENZENE	UG/L	TOTAL	U
				34428	N-NITROSODI-N-PROPYLAMINE	UG/L	TOTAL	U
				34491	N-NITROSODIPHENYLAMINE	UG/L	TOTAL	U
				34283	BIS(2-CHLOROISOPROPYL) ET.	UG/L	TOTAL	U
				34596	HEXACHLOROCYCLOPENTADIENE	UG/L	TOTAL	U
				34581	2-CHLORONAPHTHALENE	UG/L	TOTAL	U
				34200	ACENAPHTHYLENE	UG/L	TOTAL	U
				34205	ACENAPHTHENE	UG/L	TOTAL	U
				34381	FLOURENE	UG/L	TOTAL	U
				39700	HEXACHLOROBENZENE	UG/L	TOTAL	U
				34636	4-BROMOPHENYL PHENYL ET.	UG/L	TOTAL	U

TUT 001 1205

COMPLETED ANALYSIS REPORT — REPORT DATE: 97/12/22

PROJECT NO: 262 — PROJECT NAME: TURPENTINE RUN

STATION NO	DATE FROM TO	TIME OF DAY	LABNO	PARNO	PARAMETER NAME	UNITS	CHEMISTRY	VALUE & REMARK
			891305	34461	PHENANTHRENE	UG/L	TOTAL	U
				34220	ANTHRACENE	UG/L	TOTAL	U
				34341	DIMETHYL PHTHALATE	UG/L	TOTAL	U
				34336	DIETHYL PHTHALATE	UG/L	TOTAL	U
				39110	DI-N-BUTYLPHTHALATE	UG/L	TOTAL	U
				34292	BUTYL BENZYL PHTHALATE	UG/L	TOTAL	U
				34596	DI-N-OCTYL PHTHALATE	UG/L	TOTAL	U
				39100	BIS(2-ETHYLHEXYL) PHTHAL.	UG/L	TOTAL	U
				34376	FLUORANTHENE	UG/L	TOTAL	U
				34469	PYRENE	UG/L	TOTAL	U
				34320	CHRYSENE	UG/L	TOTAL	U
				34526	1,2-BENZANTHRACENE	UG/L	TOTAL	U
				34641	4-CHLOROPHENYL PHENYL ET.	UG/L	TOTAL	U
				34403	INDENO(1,2,3-C,D) PYRENE	UG/L	TOTAL	U
				34247	BENZO(A)PYRENE	UG/L	TOTAL	U
				34521	1,12-BENZOPERYLENE	UG/L	TOTAL	U
				34556	1,2:5,6-DIBENZANTHRACENE	UG/L	TOTAL	U
				34631	3,3'-DICHLOROBENZIDENE	UG/L	TOTAL	U
				34626	2,6-DINITROTOLUENE	UG/L	TOTAL	U
				34611	2,4-DINITROTOLUENE	UG/L	TOTAL	U
				34346	1,2-DIPHENYLHYDRAZINE	UG/L	TOTAL	U
				34230	3,4-BENZOFLUORANTHENE	UG/L	TOTAL	U
				34242	11,12-BENZOFLUORANTHENE	UG/L	TOTAL	U
				39330	ALDRIN	UG/L	TOTAL	U
				39390	DIELDRIN	UG/L	TOTAL	U
				39350	CHLORDANE	UG/L	TOTAL	U
				39300	4,4'-DDT	UG/L	TOTAL	U
				39320	4,4'-DDE	UG/L	TOTAL	U
				39310	4,4'-DDD	UG/L	TOTAL	U
				34351	ALPHA ENDOSULFAN	UG/L	TOTAL	U
				34356	BETA ENDOSULFAN	UG/L	TOTAL	U
				34351	ENDOSULFAN SULFATE	UG/L	TOTAL	U
				39390	ENDRIN	UG/L	TOTAL	U
				34356	ENDRIN ALDEHYDE	UG/L	TOTAL	U
				39410	HEPTACLOR	UG/L	TOTAL	U
				39420	HEPTACHLOR EPOXIDE	UG/L	TOTAL	U
				39337	ALPHA-BHC	UG/L	TOTAL	U
				39338	BETA-BHC	UG/L	TOTAL	U
				39340	GAMMA-BHC	UG/L	TOTAL	U
				34259	DELTA-BHC	UG/L	TOTAL	U
				39400	TOXAPHENE	UG/L	TOTAL	U

TUT 001 1206

COMPLETE[ ]LYSIS REPORT REPORT DATE: 87/12/[ ]

PROJECT NO: 202 PROJECT NAME: TURPENTINE RUN

STATION NO	DATE FROM TO	TIME OF DAY	LABNO	PARNO	PARAMETER NAME	UNITS	CHEMISTRY	VALUE	C	REMARK
			091305	34671	PCB-1016	UG/L	TOTAL		U	
				39488	PCB-1221	UG/L	TOTAL		U	
				39492	PCB-1232	UG/L	TOTAL		U	
				39496	PCB-1242	UG/L	TOTAL		U	
				39500	PCB-1248	UG/L	TOTAL		U	
				39504	PCB-1254	UG/L	TOTAL		U	
				39508	PCB-1260	UG/L	TOTAL		U	
SURP.RUN	87/10/06	1445								
DEPTH: 0000 SUBSTRATE: AQUEOUS										
DESCRIPTION: MATHIAS WELL PUMP NOT OPERATING										
			091306	34418	METHYL CHLORIDE	UG/L	TOTAL		U	
				34413	METHYL BROMIDE	UG/L	TOTAL		U	
				39175	VINYL CHLORIDE	UG/L	TOTAL		U	
				34311	CHLOROETHANE	UG/L	TOTAL		U	
				34423	METHYLENE CHLORIDE	UG/L	TOTAL		U	
				34501	1,1-DICHLOROETHYLENE	UG/L	TOTAL		U	
				34496	1,1-DICHLOROETHANE	UG/L	TOTAL		U	
				34546	1,2-TRANS DICHLOROETHYLENE	UG/L	TOTAL		U	
				32106	CHLOROFORM	UG/L	TOTAL		U	
				32103	1,2-DICHLOROETHANE	UG/L	TOTAL		U	
				34506	1,1,1-TRICHLOROETHANE	UG/L	TOTAL		U	
				32102	CARBON TETRACHLORIDE	UG/L	TOTAL		U	
				32101	DICHLOROBROMOMETHANE	UG/L	TOTAL		U	
				34541	1,2-DICHLOROPROPANE	UG/L	TOTAL		U	
				34561	1,3-DICHLOROPROPYLENE	UG/L	TOTAL		U	
				39180	TRICHLOROETHYLENE	UG/L	TOTAL	0.6		
				34030	BENZENE	UG/L	TOTAL		U	
				32105	CHLORODIBROMOMETHANE	UG/L	TOTAL		U	
				34511	1,1,2-TRICHLOROETHANE	UG/L	TOTAL		U	
				32104	BROMOFORM	UG/L	TOTAL		U	
				34516	1,1,2,2-TETRACHLOROETHANE	UG/L	TOTAL		U	
				34475	TETRACHLOROETHYLENE	UG/L	TOTAL	1.5		
				34010	TOLUENE	UG/L	TOTAL		U	
				34301	CHLOROBENZENE	UG/L	TOTAL		U	
				34371	ETHYLBENZENE	UG/L	TOTAL		U	
				34586	4-CHLOROPHENOL	UG/L	TOTAL		U	
				34591	2-NITROPHENOL	UG/L	TOTAL		U	
				34694	PHENOL	UG/L	TOTAL		U	
				34606	2,4-DIMETHYLPHENOL	UG/L	TOTAL		U	

TUT 001 1207

COMPLETED ANALYSIS REPORT

REPORT DATE: 87/12/22

PROJECT NO: 262

PROJECT NAME: TURPENTINE RUN

STATION NO	DATE FROM TO	TIME OF DAY	LABNO	PARNO	PARAMETER NAME	UNITS	CHEMISTRY	VALUE	C	REMARK
			091306	34601	2,4-DICHLOROPHENOL	UG/L	TOTAL		U	
				34621	2,4,6-TRICHLOROPHENOL	UG/L	TOTAL		U	
				34452	P-CHLORO-M-CRESOL	UG/L	TOTAL		U	
				34616	2,4-DINITROPHENOL	UG/L	TOTAL		U	
				34657	4,6-DINITRO-O-CRESOL	UG/L	TOTAL		U	
				39032	PENTACHLOROPHENOL	UG/L	TOTAL		U	
				34646	4-NITROPHENOL	UG/L	TOTAL		U	
				34566	1,3-DICHLOROBENZENE	UG/L	TOTAL		U	
				34571	1,4-DICHLOROBENZENE	UG/L	TOTAL	0.3		
				34536	1,2-DICHLOROBENZENE	UG/L	TOTAL		U	
				34390	HEXACHLOROETHANE	UG/L	TOTAL		U	
				34704	HEXACHLOROBUTADIENE	UG/L	TOTAL		U	
				34551	1,2,4-TRICHLOROBENZENE	UG/L	TOTAL		U	
				34696	NAPHTHALENE	UG/L	TOTAL		U	
				34273	BIS(2-CHLOROETHYL) ET.	UG/L	TOTAL		U	
				34278	BIS(2-CHLOROETHOXY) METH.	UG/L	TOTAL		U	
				34408	ISOPHORONE	UG/L	TOTAL		U	
				34447	NITROBENZENE	UG/L	TOTAL		U	
				34428	N-NITROSODI-N-PROPYLAMINE	UG/L	TOTAL		U	
				34433	N-NITROSODIPHENYLAMINE	UG/L	TOTAL		U	
				34259	BIS(2-CHLOROISOPROPYL) ET.	UG/L	TOTAL		U	
				34386	HEXACHLOROCYCLOPENTADIENE	UG/L	TOTAL		U	
				34581	2-CHLORONAPHTHALENE	UG/L	TOTAL		U	
				34200	ACENAPHTHYLENE	UG/L	TOTAL		U	
				34205	ACENAPHTHENE	UG/L	TOTAL		U	
				34381	FLOURENE	UG/L	TOTAL		U	
				34700	HEXACHLOROBENZENE	UG/L	TOTAL		U	
				34636	4-BROMOPHENYL PHENYL ET.	UG/L	TOTAL		U	
				34461	PHENANTHRENE	UG/L	TOTAL		U	
				34220	ANTHRACENE	UG/L	TOTAL		U	
				34341	DIMETHYL PHTHALATE	UG/L	TOTAL		U	
				34336	DIETHYL PHTHALATE	UG/L	TOTAL		U	
				39110	DI-N-BUTYLPHTHALATE	UG/L	TOTAL		U	
				34292	BUTYL BENZYL PHTHALATE	UG/L	TOTAL		U	
				34596	DI-N-OCTYL PHTHALATE	UG/L	TOTAL	1.2		
				39100	BIS(2-ETHYLHEXYL) PHTHAL.	UG/L	TOTAL	1		
				34376	FLUORANTHENE	UG/L	TOTAL		U	
				34469	PYRENE	UG/L	TOTAL		U	
				34520	CHRYSENE	UG/L	TOTAL		U	
				34526	1,2-BENZANTHRACENE	UG/L	TOTAL		U	
				34641	4-CHLOROPHENYL PHENYL ET.	UG/L	TOTAL		U	

TUT 001 1208

COMPLETE ANALYSIS REPORT — REPORT DATE: 87/12/

PROJECT NO: 262 — PROJECT NAME: TURPENTINE RUN

STATION NO	DATE FROM TO	TIME OF DAY	LABNO	PARNO	PARAMETER NAME	UNITS	CHEMISTRY	VALUE	C	REMARK
			091306	34403	INDENO(1,2,3-C,D) PYRENE	UG/L	TOTAL			U
				34247	BENZO(A)PYRENE	UG/L	TOTAL			U
				34521	1,12-BENZOPERYLENE	UG/L	TOTAL			U
				34556	1,2:5,6-DIBENZANTHRACENE	UG/L	TOTAL			U
				34531	3,3'-DICHLOROBENZIDINE	UG/L	TOTAL			U
				34626	2,6-DINITROTOLUENE	UG/L	TOTAL			U
				34611	2,4-DINITROTOLUENE	UG/L	TOTAL			U
				34346	1,2-DIPHENYLHYDRAZINE	UG/L	TOTAL			U
				34230	3,4-BENZOFLUORANTHENE	UG/L	TOTAL			U
				34242	11,12-BENZOFLUORANTHENE	UG/L	TOTAL			U
				99999	2-ETHYL-1-HEXENOL	UG/L	TOTAL	4.7		J
				99999	N,2-DIMETHYL-1-PROPANEAMINE	UG/L	TOTAL	32		J
				39330	ALDRIN	UG/L	TOTAL			U
				39380	DIELDRIN	UG/L	TOTAL			U
				39389	CHLORDANE	UG/L	TOTAL			U
				39300	4,4'-DDT	UG/L	TOTAL			U
				39320	4,4'-DDE	UG/L	TOTAL			U
				39310	4,4'-DDD	UG/L	TOTAL			U
				34341	ALPHA ENDOSULFAN	UG/L	TOTAL			U
				34356	BETA ENDOSULFAN	UG/L	TOTAL			U
				34391	ENDOSULFAN SULFATE	UG/L	TOTAL			U
				39390	ENDRIN	UG/L	TOTAL			U
				34366	ENDRIN ALDEHYDE	UG/L	TOTAL			U
				39410	HEPTACLOR	UG/L	TOTAL			U
				39420	HEPTACHLOR EPOXIDE	UG/L	TOTAL			U
				39337	ALPHA-BHC	UG/L	TOTAL			U
				39338	BETA-BHC	UG/L	TOTAL			U
				39340	GAMMA-BHC	UG/L	TOTAL			U
				34259	DELTA-BHC	UG/L	TOTAL			U
				39400	TOXAPHENE	UG/L	TOTAL			U
				34671	PCB-1016	UG/L	TOTAL			U
				39493	PCB-1221	UG/L	TOTAL			U
				39492	PCB-1232	UG/L	TOTAL			U
				39496	PCB-1242	UG/L	TOTAL			U
				39500	PCB-1248	UG/L	TOTAL			U
				39504	PCB-1254	UG/L	TOTAL			U
				39508	PCB-1260	UG/L	TOTAL			U

TUT 001 1209

COMPLETED ANALYSIS REPORT — REPORT DATE: 87/12/22

PROJECT NO: 262 — PROJECT NAME: TURPENTINE RUN

STATION NO	DATE FROM / TO	TIME OF DAY	LABNO	PARNO	PARAMETER NAME	UNITS	CHEMISTRY	VALUE	REMARK
TURP.RUN	87/10/06	1600							
DEPTH: 0000	SUBSTRATE: AQUEOUS								
DESCRIPTION: SMITH WELL									
			051307	34010	METHYL CHLORIDE	UG/L	TOTAL		U
				34413	METHYL BROMIDE	UG/L	TOTAL		U
				39175	VINYL CHLORIDE	UG/L	TOTAL		U
				34311	CHLOROETHANE	UG/L	TOTAL		U
				34423	METHYLENE CHLORIDE	UG/L	TOTAL		U
				34501	1,1-DICHLOROETHYLENE	UG/L	TOTAL		U
				34498	1,1-DICHLOROETHANE	UG/L	TOTAL		U
				34546	1,2-TRANS DICHLOROETHYLENE	UG/L	TOTAL	100	
				32106	CHLOROFORM	UG/L	TOTAL	0.9	J
				32103	1,2-DICHLOROETHANE	UG/L	TOTAL		U
				34506	1,1,1-TRICHLOROETHANE	UG/L	TOTAL		U
				32102	CARBON TETRACHLORIDE	UG/L	TOTAL		U
				32101	DICHLOROBROMOMETHANE	UG/L	TOTAL		U
				34541	1,2-DICHLOROPROPANE	UG/L	TOTAL		U
				34561	1,3-DICHLOROPROPYLENE	UG/L	TOTAL		U
				39180	TRICHLOROETHYLENE	UG/L	TOTAL	21	
				34030	BENZENE	UG/L	TOTAL		U
				32105	CHLORODIBROMOMETHANE	UG/L	TOTAL		U
				34511	1,1,2-TRICHLOROETHANE	UG/L	TOTAL		U
				32104	BROMOFORM	UG/L	TOTAL		U
				34516	1,1,2,2-TETRACHLOROETHANE	UG/L	TOTAL		U
				34475	TETRACHLOROETHYLENE	UG/L	TOTAL	170	
				34010	TOLUENE	UG/L	TOTAL		U
				34301	CHLOROBENZENE	UG/L	TOTAL		U
				34371	ETHYLBENZENE	UG/L	TOTAL		U
				99999	TERT-BUTYLMETHYLETHER	UG/L	TOTAL	34	J
				34586	2-CHLOROPHENOL	UG/L	TOTAL		U
				34591	2-NITROPHENOL	UG/L	TOTAL		U
				34694	PHENOL	UG/L	TOTAL		U
				34606	2,4-DIMETHYLPHENOL	UG/L	TOTAL		U
				34601	2,4-DICHLOROPHENOL	UG/L	TOTAL		U
				34621	2,4,6-TRICHLOROPHENOL	UG/L	TOTAL		U
				34452	P-CHLORO-M-CRESOL	UG/L	TOTAL		U
				34616	2,4-DINITROPHENOL	UG/L	TOTAL		U
				34597	4,6-DINITRO-O-CRESOL	UG/L	TOTAL		U
				39032	PENTACHLOROPHENOL	UG/L	TOTAL		U
				34606	4-NITROPHENOL	UG/L	TOTAL		U
				34566	1,3-DICHLOROBENZENE	UG/L	TOTAL		U
				34571	1,4-DICHLOROBENZENE	UG/L	TOTAL		U
				34536	1,2-DICHLOROBENZENE	UG/L	TOTAL		U
				34990	HEXACHLOROETHANE	UG/L	TOTAL		U

TUT 001 1210

COMPLETED ANALYSIS REPORT — REPORT DATE: 87/12/22

PROJECT NO: 262 — PROJECT NAME: TURPENTINE RUN

STATION NO	DATE FROM TO	TIME OF DAY	LABNO	PARNO	PARAMETER NAME	UNITS	CHEMISTRY	VALUE	REMARK
			091307	39702	HEXACHLOROBUTADIENE	UG/L	TOTAL	U	
				34551	1,2,4-TRICHLOROBENZENE	UG/L	TOTAL	U	
				34696	NAPHTHALENE	UG/L	TOTAL	U	
				34273	BIS(2-CHLOROETHYL) ET.	UG/L	TOTAL	U	
				34278	BIS(2-CHLOROETHOXY) METH.	UG/L	TOTAL	U	
				34408	ISOPHORONE	UG/L	TOTAL	U	
				34447	NITROBENZENE	UG/L	TOTAL	U	
				34428	N-NITROSODI-N-PROPYLAMINE	UG/L	TOTAL	U	
				34433	N-NITROSODIPHENYLAMINE	UG/L	TOTAL	U	
				34283	BIS(2-CHLOROISOPROPYL) ET.	UG/L	TOTAL	U	
				34386	HEXACHLOROCYCLOPENTADIENE	UG/L	TOTAL	U	
				34581	2-CHLORONAPHTHALENE	UG/L	TOTAL	U	
				34200	ACENAPHTHYLENE	UG/L	TOTAL	U	
				34205	ACENAPHTHENE	UG/L	TOTAL	U	
				34381	FLUORENE	UG/L	TOTAL	U	
				39700	HEXACHLOROBENZENE	UG/L	TOTAL	U	
				34636	4-BROMOPHENYL PHENYL ET.	UG/L	TOTAL	U	
				34461	PHENANTHRENE	UG/L	TOTAL	U	
				34220	ANTHRACENE	UG/L	TOTAL	U	
				34341	DIMETHYL PHTHALATE	UG/L	TOTAL	U	
				34336	DIETHYL PHTHALATE	UG/L	TOTAL	U	
				39110	DI-N-BUTYLPHTHALATE	UG/L	TOTAL	U	
				34292	BUTYL BENZYL PHTHALATE	UG/L	TOTAL	U	
				34596	DI-N-OCTYL PHTHALATE	UG/L	TOTAL	U	
				39100	BIS(2-ETHYLHEXYL) PHTHAL.	UG/L	TOTAL	U	
				34376	FLUORANTHENE	UG/L	TOTAL	U	
				34469	PYRENE	UG/L	TOTAL	U	
				34320	CHRYSENE	UG/L	TOTAL	U	
				34526	1,2-BENZANTHRACENE	UG/L	TOTAL	U	
				34641	4-CHLOROPHENYL PHENYL ET.	UG/L	TOTAL	U	
				34403	INDENO(1,2,3-C,D) PYRENE	UG/L	TOTAL	U	
				34247	BENZO(A)PYRENE	UG/L	TOTAL	U	
				34521	3,12-BENZOPERYLENE	UG/L	TOTAL	U	
				34556	1,2,5,6-DIBENZANTHRACENE	UG/L	TOTAL	U	
				34631	3,3'-DICHLOROBENZIDINE	UG/L	TOTAL	U	
				34626	2,6-DINITROTOLUENE	UG/L	TOTAL	U	
				34611	2,4-DINITROTOLUENE	UG/L	TOTAL	U	
				34346	1,2-DIPHENYLHYDRAZINE	UG/L	TOTAL	U	
				34230	3,4-BENZOFLUORANTHENE	UG/L	TOTAL	U	
				34242	11,12-BENZOFLUORANTHENE	UG/L	TOTAL	U	
				39330	ALDRIN	UG/L	TOTAL	U	

TUT 001 1211

COMPLETED ANALYSIS REPORT — REPORT DATE: 87/12/22

PROJECT NO: 262 — PROJECT NAME: TURPENTINE RUN

STATION NO	DATE FROM / TO	TIME OR DAY	LABNO	PARNO	PARAMETER NAME	UNITS	CHEMISTRY	VALUE & REMARK
			091307	39380	DIELDRIN	UG/L	TOTAL	U
				39350	CHLORDANE	UG/L	TOTAL	U
				39300	4,4'-DDT	UG/L	TOTAL	U
				39320	4,4'-DDE	UG/L	TOTAL	U
				39310	4,4'-DDD	UG/L	TOTAL	U
				34351	ALPHA ENDOSULFAN	UG/L	TOTAL	U
				34356	BETA ENDOSULFAN	UG/L	TOTAL	U
				34351	ENDOSULFAN SULFATE	UG/L	TOTAL	U
				39390	ENDRIN	UG/L	TOTAL	U
				34366	ENDRIN ALDEHYDE	UG/L	TOTAL	U
				39010	HEPTACLOR	UG/L	TOTAL	U
				39420	HEPTACHLOR EPOXIDE	UG/L	TOTAL	U
				39337	ALPHA-BHC	UG/L	TOTAL	U
				39338	BETA-BHC	UG/L	TOTAL	U
				39340	GAMMA-BHC	UG/L	TOTAL	U
				34259	DELTA-BHC	UG/L	TOTAL	U
				39030	TOXAPHENE	UG/L	TOTAL	U
				34671	PCB-1016	UG/L	TOTAL	U
				39488	PCB-1221	UG/L	TOTAL	U
				39492	PCB-1232	UG/L	TOTAL	U
				39496	PCB-1242	UG/L	TOTAL	U
				39500	PCB-1248	UG/L	TOTAL	U
				39504	PCB-1254	UG/L	TOTAL	U
				39508	PCB-1260	UG/L	TOTAL	U
TURP.RUN 87/10/09 1845 DEPTH: 0000 SUBSTRATE: AQUEOUS DESCRIPTION: DEVCON WELL #1								
			091308	34418	METHYL CHLORIDE	UG/L	TOTAL	U
				34413	METHYL BROMIDE	UG/L	TOTAL	U
				39175	VINYL CHLORIDE	UG/L	TOTAL	U
				34311	CHLOROETHANE	UG/L	TOTAL	U
				34423	METHYLENE CHLORIDE	UG/L	TOTAL	U
				34501	1,1-DICHLOROETHYLENE	UG/L	TOTAL	U
				34496	1,1-DICHLOROETHANE	UG/L	TOTAL	U
				34546	1,2-TRANS DICHLOROETHYLENE	UG/L	TOTAL	U
				32106	CHLOROFORM	UG/L	TOTAL	U
				32103	1,2-DICHLOROETHANE	UG/L	TOTAL	U
				34506	1,1,1-TRICHLOROETHANE	UG/L	TOTAL	U
				32102	CARBON TETRACHLORIDE	UG/L	TOTAL	U

TUT 001 1212

COMPLETED ANALYSIS REPORT — REPORT DATE: 87/12/22

PROJECT NO: 262 — PROJECT NAME: TURPENTINE RUN

STATION NO	DATE FROM TO	TIME OF DAY	LABNO	PARNO	PARAMETER NAME	UNITS	CHEMISTRY	VALUE & REMARK
			091309	32101	DICHLOROBROMOMETHANE	UG/L	TOTAL	U
				34541	1,2-DICHLOROPROPANE	UG/L	TOTAL	U
				34541	1,3-DICHLOROPROPYLENE	UG/L	TOTAL	U
				39180	TRICHLOROETHYLENE	UG/L	TOTAL	U
				34030	BENZENE	UG/L	TOTAL	U
				32105	CHLORODIBROMOMETHANE	UG/L	TOTAL	U
				34511	1,1,2-TRICHLOROETHANE	UG/L	TOTAL	U
				32104	BROMOFORM	UG/L	TOTAL	U
				34516	1,1,2,2-TETRACHLOROETHANE	UG/L	TOTAL	U
				34475	TETRACHLOROETHYLENE	UG/L	TOTAL	U
				34010	TOLUENE	UG/L	TOTAL	U
				34301	CHLOROBENZENE	UG/L	TOTAL	U
				34371	ETHYLBENZENE	UG/L	TOTAL	U
				34586	2-CHLOROPHENOL	UG/L	TOTAL	U
				34591	2-NITROPHENOL	UG/L	TOTAL	U
				34694	PHENOL	UG/L	TOTAL	U
				34606	2,4-DIMETHYLPHENOL	UG/L	TOTAL	U
				34601	2,4-DICHLOROPHENOL	UG/L	TOTAL	U
				34621	2,4,6-TRICHLOROPHENOL	UG/L	TOTAL	U
				34452	P-CHLORO-M-CRESOL	UG/L	TOTAL	U
				34615	2,4-DINITROPHENOL	UG/L	TOTAL	U
				34657	4,6-DINITRO-O-CRESOL	UG/L	TOTAL	U
				39032	PENTACHLOROPHENOL	UG/L	TOTAL	U
				34644	4-NITROPHENOL	UG/L	TOTAL	U
				34566	1,3-DICHLOROBENZENE	UG/L	TOTAL	U
				34571	1,4-DICHLOROBENZENE	UG/L	TOTAL	U
				34536	1,2-DICHLOROBENZENE	UG/L	TOTAL	U
				34396	HEXACHLOROETHANE	UG/L	TOTAL	U
				39702	HEXACHLOROBUTADIENE	UG/L	TOTAL	U
				34551	1,2,4-TRICHLOROBENZENE	UG/L	TOTAL	U
				34696	NAPHTHALENE	UG/L	TOTAL	U
				34273	BIS(2-CHLOROETHYL) ET.	UG/L	TOTAL	U
				34278	BIS(2-CHLOROETHOXY) METH.	UG/L	TOTAL	U
				34408	ISOPHORONE	UG/L	TOTAL	U
				34447	NITROBENZENE	UG/L	TOTAL	U
				34428	N-NITROSODI-N-PROPYLAMINE	UG/L	TOTAL	U
				34433	N-NITROSODIPHENYLAMINE	UG/L	TOTAL	U
				34283	BIS(2-CHLOROISOPROPYL) ET.	UG/L	TOTAL	U
				34386	HEXACHLOROCYCLOPENTADIENE	UG/L	TOTAL	U
				34581	2-CHLORONAPHTHALENE	UG/L	TOTAL	U
				34200	ACENAPHTHYLENE	UG/L	TOTAL	U

TUT 001 1213

COMPLETED ANALYSIS REPORT — REPORT DATE: 87/12/22

PROJECT NO: 262 — PROJECT NAME: TURPENTINE RUN

STATION NO	DATE FROM TO	TIME OF DAY	LABNO	PARNO	PARAMETER NAME	UNITS	CHEMISTRY	VALUE & REMARK
			091304	34205	ACENAPHTHENE	UG/L	TOTAL	U
				34381	FLOURENE	UG/L	TOTAL	U
				39700	HEXACHLOROBENZENE	UG/L	TOTAL	U
				34636	4-BROMOPHENYL PHENYL ET.	UG/L	TOTAL	U
				34461	PHENANTHRENE	UG/L	TOTAL	0.1 M
				34220	ANTHRACENE	UG/L	TOTAL	U
				34341	DIMETHYL PHTHALATE	UG/L	TOTAL	U
				34336	DIETHYL PHTHALATE	UG/L	TOTAL	U
				39110	DI-N-BUTYLPHTHALATE	UG/L	TOTAL	U
				34292	BUTYL BENZYL PHTHALATE	UG/L	TOTAL	U
				34596	DI-N-OCTYL PHTHALATE	UG/L	TOTAL	5.7
				39100	BIS(2-ETHYLHEXYL) PHTHAL.	UG/L	TOTAL	U
				34376	FLUORANTHENE	UG/L	TOTAL	U
				34469	PYRENE	UG/L	TOTAL	U
				34320	CHRYSENE	UG/L	TOTAL	U
				34526	1,2-BENZANTHRACENE	UG/L	TOTAL	U
				34641	4-CHLOROPHENYL PHENYL ET.	UG/L	TOTAL	U
				34403	INDENO(1,2,3-C,D) PYRENE	UG/L	TOTAL	U
				34247	BENZO(A)PYRENE	UG/L	TOTAL	U
				34521	1,12-BENZOPERYLENE	UG/L	TOTAL	U
				34556	1,2:5,6-DIBENZANTHRACENE	UG/L	TOTAL	U
				34631	3,3'-DICHLOROBENZIDENE	UG/L	TOTAL	U
				34626	2,6-DINITROTOLUENE	UG/L	TOTAL	U
				34611	2,4-DINITROTOLUENE	UG/L	TOTAL	U
				34346	1,2-DIPHENYLHYDRAZINE	UG/L	TOTAL	U
				34230	3,4-BENZOFLUORANTHENE	UG/L	TOTAL	U
				34242	11,12-BENZOFLUORANTHENE	UG/L	TOTAL	U
				39333	ALDRIN	UG/L	TOTAL	U
				39350	DIELDRIN	UG/L	TOTAL	U
				39356	CHLORDANE	UG/L	TOTAL	U
				39300	4,4'-DDT	UG/L	TOTAL	U
				39320	4,4'-DDE	UG/L	TOTAL	U
				39310	4,4'-DDD	UG/L	TOTAL	U
				34361	ALPHA ENDOSULFAN	UG/L	TOTAL	U
				34356	BETA ENDOSULFAN	UG/L	TOTAL	U
				34351	ENDOSULFAN SULFATE	UG/L	TOTAL	U
				39390	ENDRIN	UG/L	TOTAL	U
				34356	ENDRIN ALDEHYDE	UG/L	TOTAL	U
				39410	HEPTACLOR	UG/L	TOTAL	U
				39420	HEPTACHLOR EPOXIDE	UG/L	TOTAL	U
				39337	ALPHA-BHC	UG/L	TOTAL	U

TUT 001 1214

COMPLETED ANALYSIS REPORT — REPORT DATE: 87/12/22

PROJECT NO: 262 — PROJECT NAME: TURPENTINE RUN

STATION NO	DATE FROM / TO	TIME OF DAY	LABNO	PARNO	PARAMETER NAME	UNITS	CHEMISTRY	VALUE & REMARK
			091308	39338	BETA-BHC	UG/L	TOTAL	
				39340	GAMMA-BHC	UG/L	TOTAL	
				34259	DELTA-BHC	UG/L	TOTAL	
				39400	TOXAPHENE	UG/L	TOTAL	
				34671	PCB-1016	UG/L	TOTAL	
				39488	PCB-1221	UG/L	TOTAL	
				39492	PCB-1232	UG/L	TOTAL	
				39496	PCB-1242	UG/L	TOTAL	
				39500	PCB-1248	UG/L	TOTAL	
				39504	PCB-1254	UG/L	TOTAL	
				39508	PCB-1260	UG/L	TOTAL	
TURP.RUN 87/10/05 1715								
DEPTH: 0000 SUBSTRATE: AQUEOUS								
DESCRIPTION: DEVCON WELL #3								
			091309	34418	METHYL CHLORIDE	UG/L	TOTAL	
				34413	METHYL BROMIDE	UG/L	TOTAL	
				39175	VINYL CHLORIDE	UG/L	TOTAL	
				34311	CHLOROETHANE	UG/L	TOTAL	
				34423	METHYLENE CHLORIDE	UG/L	TOTAL	
				34501	1,2-DICHLOROETHYLENE	UG/L	TOTAL	
				34496	1,1-DICHLOROETHANE	UG/L	TOTAL	
				34546	1,2-TRANS DICHLOROETHYLENE	UG/L	TOTAL	
				32106	CHLOROFORM	UG/L	TOTAL	
				32103	1,2-DICHLOROETHANE	UG/L	TOTAL	
				34506	1,1,1-TRICHLOROETHANE	UG/L	TOTAL	
				32102	CARBON TETRACHLORIDE	UG/L	TOTAL	
				32101	DICHLOROBROMOMETHANE	UG/L	TOTAL	
				34541	1,2-DICHLOROPROPANE	UG/L	TOTAL	
				34551	1,3-DICHLOROPROPYLENE	UG/L	TOTAL	
				39180	TRICHLOROETHYLENE	UG/L	TOTAL	
				34030	BENZENE	UG/L	TOTAL	
				32105	CHLORODIBROMOMETHANE	UG/L	TOTAL	
				34511	1,1,2-TRICHLOROETHANE	UG/L	TOTAL	
				32104	BROMOFORM	UG/L	TOTAL	
				34516	1,1,2,2-TETRACHLOROETHANE	UG/L	TOTAL	
				34475	TETRACHLOROETHYLENE	UG/L	TOTAL	
				34010	TOLUENE	UG/L	TOTAL	
				34301	CHLOROBENZENE	UG/L	TOTAL	
				34371	ETHYLBENZENE	UG/L	TOTAL	

TLL 1215 001 TOO

COMPLETED ANALYSIS REPORT — REPORT DATE: 87/12/22

PROJECT NO: 262 — PROJECT NAME: TURPENTINE RUN

STATION NO	DATE FROM TO	TIME OF DAY	LABNO	PARNO	PARAMETER NAME	UNITS	CHEMISTRY	VALUE & REMARK
			091309	34586	2-CHLOROPHENOL	UG/L	TOTAL	U
				34591	2-NITROPHENOL	UG/L	TOTAL	U
				34694	PHENOL	UG/L	TOTAL	U
				34606	2,4-DIMETHYLPHENOL	UG/L	TOTAL	U
				34601	2,4-DICHLOROPHENOL	UG/L	TOTAL	U
				34621	2,4,6-TRICHLOROPHENOL	UG/L	TOTAL	U
				34452	P-CHLORO-M-CRESOL	UG/L	TOTAL	U
				34616	2,4-DINITROPHENOL	UG/L	TOTAL	U
				34657	4,6-DINITRO-O-CRESOL	UG/L	TOTAL	U
				39032	PENTACHLOROPHENOL	UG/L	TOTAL	U
				34646	4-NITROPHENOL	UG/L	TOTAL	U
				34566	1,3-DICHLOROBENZENE	UG/L	TOTAL	U
				34571	1,4-DICHLOROBENZENE	UG/L	TOTAL	U
				34536	1,2-DICHLOROBENZENE	UG/L	TOTAL	U
				34396	HEXACHLOROETHANE	UG/L	TOTAL	U
				39702	HEXACHLOROBUTADIENE	UG/L	TOTAL	U
				34551	1,2,4-TRICHLOROBENZENE	UG/L	TOTAL	U
				34696	NAPHTHALENE	UG/L	TOTAL	U
				34273	BIS(2-CHLOROETHYL) ET.	UG/L	TOTAL	U
				34278	BIS(2-CHLOROETHOXY) METH.	UG/L	TOTAL	U
				34409	ISOPHORONE	UG/L	TOTAL	U
				34447	NITROBENZENE	UG/L	TOTAL	U
				34428	N-NITROSODI-N-PROPYLAMINE	UG/L	TOTAL	U
				34433	N-NITROSODIPHENYLAMINE	UG/L	TOTAL	U
				34283	BIS(2-CHLOROISOPROPYL) ET.	UG/L	TOTAL	U
				34386	HEXACHLOROCYCLOPENTADIENE	UG/L	TOTAL	U
				34581	2-CHLORONAPHTHALENE	UG/L	TOTAL	U
				34200	ACENAPHTHYLENE	UG/L	TOTAL	U
				34205	ACENAPHTHENE	UG/L	TOTAL	U
				34381	FLOURENE	UG/L	TOTAL	U
				39700	HEXACHLOROBENZENE	UG/L	TOTAL	U
				34636	4-BROMOPHENYL PHENYL ET.	UG/L	TOTAL	U
				34651	PHENANTHRENE	UG/L	TOTAL	U
				34220	ANTHRACENE	UG/L	TOTAL	U
				34341	DIMETHYL PHTHALATE	UG/L	TOTAL	U
				34336	DIETHYL PHTHALATE	UG/L	TOTAL	U
				39110	DI-N-BUTYLPHTHALATE	UG/L	TOTAL	U
				34292	BUTYL BENZYL PHTHALATE	UG/L	TOTAL	U
				34596	DI-N-OCTYL PHTHALATE	UG/L	TOTAL	U
				39100	BIS(2-ETHYLHEXYL) PHTHAL.	UG/L	TOTAL	U
				34376	FLUORANTHENE	UG/L	TOTAL	U

TUT 001 1216

COMPLETED ANALYSIS REPORT — REPORT DATE: 97/12/22

PROJECT NO: 262 — PROJECT NAME: TURPENTINE RUN

STATION NO	DATE FROM TO	TIME OF DAY	LABNO	PARNO	PARAMETER NAME	UNITS	CHEMISTRY	VALUE & REMARK
			091309	34469	PYRENE	UG/L	TOTAL	
				34320	CHRYSENE	UG/L	TOTAL	
				34526	1,2-BENZANTHRACENE	UG/L	TOTAL	
				34641	4-CHLOROPHENYL PHENYL ET.	UG/L	TOTAL	
				34403	INDENO(1,2,3-C,D) PYRENE	UG/L	TOTAL	
				34247	BENZO(A)PYRENE	UG/L	TOTAL	
				34521	1,12-BENZOPERYLENE	UG/L	TOTAL	
				34556	1,2:5,6-DIBENZANTHRACENE	UG/L	TOTAL	
				34631	3,3'-DICHLOROBENZIDENE	UG/L	TOTAL	
				34626	2,6-DINITROTOLUENE	UG/L	TOTAL	
				34611	2,4-DINITROTOLUENE	UG/L	TOTAL	
				34346	1,2-DIPHENYLHYDRAZINE	UG/L	TOTAL	
				34230	3,4-BENZOFLUORANTHENE	UG/L	TOTAL	
				34242	11,12-BENZOFLUORANTHENE	UG/L	TOTAL	
				39330	ALDRIN	UG/L	TOTAL	
				39390	DIELDRIN	UG/L	TOTAL	
				39350	CHLORDANE	UG/L	TOTAL	
				39300	4,4'-DDT	UG/L	TOTAL	
				39320	4,4'-DDE	UG/L	TOTAL	
				39310	4,4'-DDD	UG/L	TOTAL	
				34351	ALPHA ENDOSULFAN	UG/L	TOTAL	
				34356	BETA ENDOSULFAN	UG/L	TOTAL	
				34351	ENDOSULFAN SULFATE	UG/L	TOTAL	
				39390	ENDRIN	UG/L	TOTAL	
				34366	ENDRIN ALDEHYDE	UG/L	TOTAL	
				39410	HEPTACLOR	UG/L	TOTAL	
				39420	HEPTACHLOR EPOXIDE	UG/L	TOTAL	
				39337	ALPHA-BHC	UG/L	TOTAL	
				39338	BETA-BHC	UG/L	TOTAL	
				39340	GAMMA-BHC	UG/L	TOTAL	
				34259	DELTA-BHC	UG/L	TOTAL	
				39400	TOXAPHENE	UG/L	TOTAL	
				34671	PCB-1016	UG/L	TOTAL	
				39488	PCB-1221	UG/L	TOTAL	
				39492	PCB-1232	UG/L	TOTAL	
				39496	PCB-1242	UG/L	TOTAL	
				39500	PCB-1248	UG/L	TOTAL	
				39504	PCB-1254	UG/L	TOTAL	
				39508	PCB-1260	UG/L	TOTAL	

TUT 001 1217

COMPLETED ANALYSIS REPORT — REPORT DATE: 87/12/22

PROJECT NO: 262 — PROJECT NAME: TURPENTINE RUN

STATION NO	DATE FROM TO	TIME OF DAY	LABNO	PARNO	PARAMETER NAME	UNITS	CHEMISTRY	VALUE	REMARK
TURP.RUN	87/10/05	1920							
DEPTH: 0000 SUBSTRATE: AQUEOUS									
DESCRIPTION: ALPHA LEONARD WELLHEAD									
			091315	34418	METHYL CHLORIDE	UG/L	TOTAL		U
				34413	METHYL BROMIDE	UG/L	TOTAL		U
				39175	VINYL CHLORIDE	UG/L	TOTAL		U
				34311	CHLOROETHANE	UG/L	TOTAL		U
				34423	METHYLENE CHLORIDE	UG/L	TOTAL		U
				34501	1,1-DICHLOROETHYLENE	UG/L	TOTAL		U
				34496	1,1-DICHLOROETHANE	UG/L	TOTAL		U
				34546	1,2-TRANS DICHLOROETHYLENE	UG/L	TOTAL		U
				32106	CHLOROFORM	UG/L	TOTAL		U
				32103	1,2-DICHLOROETHANE	UG/L	TOTAL		U
				34506	1,1,1-TRICHLOROETHANE	UG/L	TOTAL		U
				32102	CARBON TETRACHLORIDE	UG/L	TOTAL		U
				32101	DICHLOROBROMOMETHANE	UG/L	TOTAL		U
				34541	1,2-DICHLOROPROPANE	UG/L	TOTAL		U
				34561	1,3-DICHLOROPROPYLENE	UG/L	TOTAL		U
				39180	TRICHLOROETHYLENE	UG/L	TOTAL		U
				34030	BENZENE	UG/L	TOTAL		U
				32105	CHLORODIBROMOMETHANE	UG/L	TOTAL		U
				34511	1,1,2-TRICHLOROETHANE	UG/L	TOTAL		U
				32104	BROMOFORM	UG/L	TOTAL		U
				34516	1,1,2,2-TETRACHLOROETHANE	UG/L	TOTAL		U
				34475	TETRACHLOROETHYLENE	UG/L	TOTAL	0.1	
				34010	TOLUENE	UG/L	TOTAL	22	
				34301	CHLOROBENZENE	UG/L	TOTAL		U
				34371	ETHYLBENZENE	UG/L	TOTAL		U
				34586	2-CHLOROPHENOL	UG/L	TOTAL		U
				34591	2-NITROPHENOL	UG/L	TOTAL		U
				34694	PHENOL	UG/L	TOTAL		U
				34606	2,4-DIMETHYLPHENOL	UG/L	TOTAL		U
				34601	2,4-DICHLOROPHENOL	UG/L	TOTAL		U
				34621	2,4,6-TRICHLOROPHENOL	UG/L	TOTAL		U
				34452	P-CHLORO-M-CRESOL	UG/L	TOTAL		U
				34616	2,4-DINITROPHENOL	UG/L	TOTAL		U
				34657	4,6-DINITRO-O-CRESOL	UG/L	TOTAL		U
				39032	PENTACHLOROPHENOL	UG/L	TOTAL		U
				34646	4-NITROPHENOL	UG/L	TOTAL		U
				34566	1,3-DICHLOROBENZENE	UG/L	TOTAL		U
				34571	1,4-DICHLOROBENZENE	UG/L	TOTAL		U
				34536	1,2-DICHLOROBENZENE	UG/L	TOTAL		U
				34226	HEXACHLOROETHANE	UG/L	TOTAL		U
				39702	HEXACHLOROBUTADIENE	UG/L	TOTAL		U

TUT 001 1218

COMPLETED ANALYSIS REPORT — REPORT DATE: 87/12/22

PROJECT NO: 262 — PROJECT NAME: TURPENTINE RUN

STATION NO	DATE FROM TO	TIME OF DAY	LABNO	PARNO	PARAMETER NAME	UNITS	CHEMISTRY	VALUE & REMARK
			091310	34551	1,2,4-TRICHLOROBENZENE	UG/L	TOTAL	U
				34696	NAPHTHALENE	UG/L	TOTAL	U
				34273	BIS(2-CHLOROETHYL) ET.	UG/L	TOTAL	U
				34278	BIS(2-CHLOROETHOXY) METH.	UG/L	TOTAL	U
				34408	ISOPHORONE	UG/L	TOTAL	U
				34447	NITROBENZENE	UG/L	TOTAL	U
				34428	N-NITROSODI-N-PROPYLAMINE	UG/L	TOTAL	U
				34433	N-NITROSODIPHENYLAMINE	UG/L	TOTAL	U
				34283	BIS(2-CHLORDISOPROPYL) ET.	UG/L	TOTAL	U
				34386	HEXACHLOROCYCLOPENTADIENE	UG/L	TOTAL	U
				34581	2-CHLORONAPHTHALENE	UG/L	TOTAL	U
				34200	ACENAPHTHYLENE	UG/L	TOTAL	U
				34205	ACENAPHTHENE	UG/L	TOTAL	U
				34381	FLOURENE	UG/L	TOTAL	U
				39700	HEXACHLOROBENZENE	UG/L	TOTAL	U
				34636	4-BROMOPHENYL PHENYL ET.	UG/L	TOTAL	U
				34461	PHENANTHRENE	UG/L	TOTAL	U
				34220	ANTHRACENE	UG/L	TOTAL	U
				34341	DIMETHYL PHTHALATE	UG/L	TOTAL	U
				34336	DIETHYL PHTHALATE	UG/L	TOTAL	U
				39112	DI-N-BUTYLPHTHALATE	UG/L	TOTAL	U
				34292	BUTYL BENZYL PHTHALATE	UG/L	TOTAL	U
				34596	DI-N-OCTYL PHTHALATE	UG/L	TOTAL	1.1
				39100	BIS(2-ETHYLHEXYL) PHTHAL.	UG/L	TOTAL	U
				34376	FLUORANTHENE	UG/L	TOTAL	U
				34469	PYRENE	UG/L	TOTAL	U
				34320	CHRYSENE	UG/L	TOTAL	U
				34526	1,2-BENZANTHRACENE	UG/L	TOTAL	U
				34641	4-CHLOROPHENYL PHENYL ET.	UG/L	TOTAL	U
				34403	INDENO(1,2,3-C,D) PYRENE	UG/L	TOTAL	U
				34247	BENZO(A)PYRENE	UG/L	TOTAL	U
				34521	1,12-BENZOPERYLENE	UG/L	TOTAL	U
				34556	1,2:5,6-DIBENZANTHRACENE	UG/L	TOTAL	U
				34631	3,3'-DICHLOROBENZIDENE	UG/L	TOTAL	U
				34626	2,6-DINITROTOLUENE	UG/L	TOTAL	U
				34611	2,4-DINITROTOLUENE	UG/L	TOTAL	U
				34346	1,2-DIPHENYLHYDRAZINE	UG/L	TOTAL	U
				34230	3,4-BENZOFLUORANTHENE	UG/L	TOTAL	U
				34242	11,12-BENZOFLUORANTHENE	UG/L	TOTAL	U
				39330	ALDRIN	UG/L	TOTAL	U
				39360	DIELDRIN	UG/L	TOTAL	U

TUT 001 1219

COMPLETED ANALYSIS REPORT — REPORT DATE: 87/12/22

PROJECT NO: 262 — PROJECT NAME: TURPENTINE RUN

STATION NO	DATE FROM TO	TIME OF DAY	LABNO	PARNO	PARAMETER NAME	UNITS	CHEMISTRY	VALUE & REMARK
			091310	39350	CHLORDANE	UG/L	TOTAL	
				34300	4,4'-DDT	UG/L	TOTAL	
				39370	4,4'-DDE	UG/L	TOTAL	
				39310	4,4'-DDD	UG/L	TOTAL	
				34361	ALPHA ENDOSULFAN	UG/L	TOTAL	
				34356	BETA ENDOSULFAN	UG/L	TOTAL	
				34351	ENDOSULFAN SULFATE	UG/L	TOTAL	
				39340	ENDRIN	UG/L	TOTAL	
				34366	ENDRIN ALDEHYDE	UG/L	TOTAL	
				39410	HEPTACLOR	UG/L	TOTAL	
				39420	HEPTACHLOR EPOXIDE	UG/L	TOTAL	
				39337	ALPHA-BHC	UG/L	TOTAL	
				39338	BETA-BHC	UG/L	TOTAL	
				39346	GAMMA-BHC	UG/L	TOTAL	
				34259	DELTA-BHC	UG/L	TOTAL	
				39400	TOXAPHENE	UG/L	TOTAL	
				34671	PCB-1016	UG/L	TOTAL	
				39488	PCB-1221	UG/L	TOTAL	
				39492	PCB-1232	UG/L	TOTAL	
				39496	PCB-1242	UG/L	TOTAL	
				39500	PCB-1248	UG/L	TOTAL	
				39504	PCB-1254	UG/L	TOTAL	
				39508	PCB-1260	UG/L	TOTAL	
TURP.RUN	87/10/07	0855						
LOCATION CODE: 3700 SUBSTRATE: AQUEOUS								
DESCRIPTION: TRANSPORT BLANK FROM PO BOX								
			091311	34413	METHYL CHLORIDE	UG/L	TOTAL	
				34418	METHYL BROMIDE	UG/L	TOTAL	
				39175	VINYL CHLORIDE	UG/L	TOTAL	
				34311	CHLOROETHANE	UG/L	TOTAL	
				34423	METHYLENE CHLORIDE	UG/L	TOTAL	
				34501	1,1-DICHLOROETHYLENE	UG/L	TOTAL	
				34496	1,1-DICHLOROETHANE	UG/L	TOTAL	
				34546	1,2-TRANS DICHLOROETHYLENE	UG/L	TOTAL	
				32106	CHLOROFORM	UG/L	TOTAL	
				32103	1,2-DICHLOROETHANE	UG/L	TOTAL	
				34506	1,1,1-TRICHLOROETHANE	UG/L	TOTAL	
				32102	CARBON TETRACHLORIDE	UG/L	TOTAL	
				32101	DICHLOROBROMOMETHANE	UG/L	TOTAL	

TUT 001 1220

COMPLETED ANALYSIS REPORT — REPORT DATE: 87/12/22

PROJECT NO: 262 — PROJECT NAME: TURPENTINE RUN

STATION NO	DATE FROM TO	TIME OF DAY	LABNO	PARNO	PARAMETER NAME	UNITS	CHEMISTRY	VALUE	REMARK
			071311	34541	1,2-DICHLOROPROPANE	UG/L	TOTAL		U
				34551	1,3-DICHLOROPROPYLENE	UG/L	TOTAL		U
				99999	HEXANE	UG/L	TOTAL	12	J
				39180	TRICHLOROETHYLENE	UG/L	TOTAL		U
				34030	BENZENE	UG/L	TOTAL		U
				32105	CHLORODIBROMOMETHANE	UG/L	TOTAL		U
				34511	1,1,2-TRICHLOROETHANE	UG/L	TOTAL		U
				32104	BROMOFORM	UG/L	TOTAL		U
				34516	1,1,2,2-TETRACHLOROETHANE	UG/L	TOTAL		U
				34475	TETRACHLOROETHYLENE	UG/L	TOTAL		U
				34010	TOLUENE	UG/L	TOTAL		U
				34301	CHLOROBENZENE	UG/L	TOTAL		U
				34371	ETHYLBENZENE	UG/L	TOTAL		U
				34586	2-CHLOROPHENOL	UG/L	TOTAL		U
				34591	2-NITROPHENOL	UG/L	TOTAL		U
				34694	PHENOL	UG/L	TOTAL		U
				34606	2,4-DIMETHYLPHENOL	UG/L	TOTAL		U
				34601	2,4-DICHLOROPHENOL	UG/L	TOTAL		U
				34621	2,4,6-TRICHLOROPHENOL	UG/L	TOTAL		U
				34652	P-CHLORO-M-CRESOL	UG/L	TOTAL		U
				34611	2,4-DINITROPHENOL	UG/L	TOTAL		U
				34657	4,6-DINITRO-O-CRESOL	UG/L	TOTAL		U
				39032	PENTACHLOROPHENOL	UG/L	TOTAL		U
				34646	4-NITROPHENOL	UG/L	TOTAL		U
				34566	1,3-DICHLOROBENZENE	UG/L	TOTAL		U
				34571	1,4-DICHLOROBENZENE	UG/L	TOTAL	3.2	
				34536	1,2-DICHLOROBENZENE	UG/L	TOTAL		U
				34396	HEXACHLOROETHANE	UG/L	TOTAL		U
				39702	HEXACHLOROBUTADIENE	UG/L	TOTAL		U
				34551	1,2,4-TRICHLOROBENZENE	UG/L	TOTAL		U
				34535	NAPHTHALENE	UG/L	TOTAL		U
				34279	BIS(2-CHLOROETHYL) ET.	UG/L	TOTAL		U
				34278	BIS(2-CHLOROETHOXY) METH.	UG/L	TOTAL		U
				34606	ISOPHORONE	UG/L	TOTAL		U
				34447	NITROBENZENE	UG/L	TOTAL		U
				34428	N-NITROSO-N-PROPYLAMINE	UG/L	TOTAL		U
				34433	N-NITROSODIPHENYLAMIN	UG/L	TOTAL		U
				34283	BIS(2-CHLOROISOPROPYL) ET.	UG/L	TOTAL		U
				34386	HEXACHLOROCYCLOPENTADIENE	UG/L	TOTAL		U
				34581	2-CHLORONAPHTHALENE	UG/L	TOTAL		U
				34203	ACENAPHTHYLENE	UG/L	TOTAL		U

TUT 001 1221

COMPLETED ANALYSIS REPORT — REPORT DATE: 87/12/22

PROJECT NO: 262 — PROJECT NAME: TURPENTINE RUN

STATION NO	DATE FROM TO	TIME OF DAY	LABNO	PARNO	PARAMETER NAME	UNITS	CHEMISTRY	VALUE & REMARK
			031311	34205	ACENAPHTHENE	UG/L	TOTAL	
				34381	FLOURENE	UG/L	TOTAL	
				39700	HEXACHLOROBENZENE	UG/L	TOTAL	
				34636	4-BROMOPHENYL PHENYL ET.	UG/L	TOTAL	
				34461	PHENANTHRENE	UG/L	TOTAL	
				34220	ANTHRACENE	UG/L	TOTAL	
				34341	DIMETHYL PHTHALATE	UG/L	TOTAL	
				34336	DIETHYL PHTHALATE	UG/L	TOTAL	
				39110	DI-N-BUTYLPHTHALATE	UG/L	TOTAL	
				34292	BUTYL BENZYL PHTHALATE	UG/L	TOTAL	
				34596	DI-N-OCTYL PHTHALATE	UG/L	TOTAL	
				39100	BIS(2-ETHYLHEXYL) PHTHAL.	UG/L	TOTAL	
				34376	FLUORANTHENE	UG/L	TOTAL	
				34469	PYRENE	UG/L	TOTAL	
				34321	CHRYSENE	UG/L	TOTAL	
				34526	1,2-BENZANTHRACENE	UG/L	TOTAL	
				34641	4-CHLOROPHENYL PHENYL ET.	UG/L	TOTAL	
				34403	INDENO(1,2,3-C,D) PYRENE	UG/L	TOTAL	
				34247	BENZO(A)PYRENE	UG/L	TOTAL	
				34571	1,12-BENZOPERYLENE	UG/L	TOTAL	
				34656	1,2:5,6-DIBENZANTHRACENE	UG/L	TOTAL	
				34531	3,3'-DICHLOROBENZIDENE	UG/L	TOTAL	
				34126	2,3-DINITROTOLUENE	UG/L	TOTAL	
				34611	2,4-DINITROTOLUENE	UG/L	TOTAL	
				34346	1,2-DIPHENYLHYDRAZINE	UG/L	TOTAL	
				34233	3,4-BENZOFLUORANTHENE	UG/L	TOTAL	
				34242	11,12-BENZOFLUORANTHENE	UG/L	TOTAL	
				39333	ALDRIN	UG/L	TOTAL	
				39360	DIELDRIN	UG/L	TOTAL	
				39350	CHLORDANE	UG/L	TOTAL	
				39300	4,4'-DDT	UG/L	TOTAL	
				39320	4,4'-DDE	UG/L	TOTAL	
				39310	4,4'-DDD	UG/L	TOTAL	
				34361	ALPHA ENDOSULFAN	UG/L	TOTAL	
				34356	BETA ENDOSULFAN	UG/L	TOTAL	
				34351	ENDOSULFAN SULFATE	UG/L	TOTAL	
				39390	ENDRIN	UG/L	TOTAL	
				34366	ENDRIN ALDEHYDE	UG/L	TOTAL	
				39410	HEPTACLOR	UG/L	TOTAL	
				39420	HEPTACHLOR EPOXIDE	UG/L	TOTAL	
				39337	ALPHA-BHC	UG/L	TOTAL	

OUT 001 1222

COMPLETED ANALYSIS REPORT — REPORT DATE: 87/12/22

PROJECT NO: 262 — PROJECT NAME: TURPENTINE RUN

STATION NO	DATE FROM TO	TIME OF DAY	LABNO	PARNO	PARAMETER NAME	UNITS	CHEMISTRY	VALUE	REMARK
			091311	39338	BETA-BHC	UG/L	TOTAL		
				39340	GAMMA-BHC	UG/L	TOTAL		
				34259	DELTA-BHC	UG/L	TOTAL		
				39400	TOXAPHENE	UG/L	TOTAL		
				34671	PCB-1016	UG/L	TOTAL		
				39488	PCB-1221	UG/L	TOTAL		
				39492	PCB-1232	UG/L	TOTAL		
				39496	PCB-1242	UG/L	TOTAL		
				39500	PCB-1248	UG/L	TOTAL		
				39504	PCB-1254	UG/L	TOTAL		
				39508	PCB-1260	UG/L	TOTAL		
TURP.RUN	87/10/07	0955							
LOCATION CODE: 3700 SUBSTRATE: AQUEOUS									
DESCRIPTION: HARTMANN CRUSHER WELL									
			091312	34416	METHYL CHLORIDE	UG/L	TOTAL		
				34413	METHYL BROMIDE	UG/L	TOTAL		
				39175	VINYL CHLORIDE	UG/L	TOTAL		
				34311	CHLOROETHANE	UG/L	TOTAL		
				34423	METHYLENE CHLORIDE	UG/L	TOTAL		
				34501	1,1-DICHLOROETHYLENE	UG/L	TOTAL		
				34496	1,1-DICHLOROETHANE	UG/L	TOTAL		
				34546	1,2-TRANS DICHLOROETHYLEN	UG/L	TOTAL		
				32106	CHLOROFORM	UG/L	TOTAL		
				32103	1,2-DICHLOROETHANE	UG/L	TOTAL		
				34506	1,1,1-TRICHLOROETHANE	UG/L	TOTAL		
				32102	CARBON TETRACHLORIDE	UG/L	TOTAL		
				32101	DICHLOROBROMOMETHANE	UG/L	TOTAL		
				34541	1,2-DICHLOROPROPANE	UG/L	TOTAL		
				34561	1,3-DICHLOROPROPYLENE	UG/L	TOTAL		
				39180	TRICHLOROETHYLENE	UG/L	TOTAL		
				34030	BENZENE	UG/L	TOTAL		
				32105	CHLORODIBROMOMETHANE	UG/L	TOTAL		
				34511	1,1,2-TRICHLOROETHANE	UG/L	TOTAL		
				32104	BROMOFORM	UG/L	TOTAL		
				34516	1,1,2,2-TETRACHLOROETHANE	UG/L	TOTAL		
				34475	TETRACHLOROETHYLENE	UG/L	TOTAL		
				34010	TOLUENE	UG/L	TOTAL		
				34301	CHLOROBENZENE	UG/L	TOTAL		
				34371	ETHYLBENZENE	UG/L	TOTAL		

TUT 001 1225

COMPLETED ANALYSIS REPORT — REPORT DATE: 97/12/22

PROJECT NO: 262 — PROJECT NAME: TURPENTINE RUN

STATION NO	DATE FROM TO	TIME OF DAY	LABNO	PARNO	PARAMETER NAME	UNITS	CHEMISTRY	VALUE & REMARK
			091312	34586	2-CHLOROPHENOL	UG/L	TOTAL	
				34591	2-NITROPHENOL	UG/L	TOTAL	
				34694	PHENOL	UG/L	TOTAL	
				34606	2,4-DIMETHYLPHENOL	UG/L	TOTAL	
				34601	2,4-DICHLOROPHENOL	UG/L	TOTAL	
				34621	2,4,6-TRICHLOROPHENOL	UG/L	TOTAL	
				34452	P-CHLORO-M-CRESOL	UG/L	TOTAL	
				34615	2,4-DINITROPHENOL	UG/L	TOTAL	
				34657	4,6-DINITRO-O-CRESOL	UG/L	TOTAL	
				39032	PENTACHLOROPHENOL	UG/L	TOTAL	
				34646	4-NITROPHENOL	UG/L	TOTAL	
				34566	1,3-DICHLOROBENZENE	UG/L	TOTAL	
				34571	1,4-DICHLOROBENZENE	UG/L	TOTAL	
				34536	1,2-DICHLOROBENZENE	UG/L	TOTAL	
				34396	HEXACHLOROETHANE	UG/L	TOTAL	
				39702	HEXACHLOROBUTADIENE	UG/L	TOTAL	
				34551	1,2,4-TRICHLOROBENZENE	UG/L	TOTAL	
				34696	NAPHTHALENE	UG/L	TOTAL	
				34272	BIS(2-CHLOROETHYL) ET.	UG/L	TOTAL	
				34278	BIS(2-CHLOROETHOXY) METH.	UG/L	TOTAL	
				34409	ISOPHORONE	UG/L	TOTAL	
				34447	NITROBENZENE	UG/L	TOTAL	
				34428	N-NITROSODI-N-PROPYLAMINE	UG/L	TOTAL	
				34433	N-NITROSODIPHENYLAMINE	UG/L	TOTAL	
				34283	BIS(2-CHLOROISOPROPYL) ET.	UG/L	TOTAL	
				34386	HEXACHLOROCYCLOPENTADIENE	UG/L	TOTAL	
				34581	2-CHLORONAPHTHALENE	UG/L	TOTAL	
				34200	ACENAPHTHYLENE	UG/L	TOTAL	
				34205	ACENAPHTHENE	UG/L	TOTAL	
				34381	FLUORENE	UG/L	TOTAL	
				39700	HEXACHLOROBENZENE	UG/L	TOTAL	
				34636	4-BROMOPHENYL PHENYL ET.	UG/L	TOTAL	
				34461	PHENANTHRENE	UG/L	TOTAL	
				34220	ANTHRACENE	UG/L	TOTAL	
				34341	DIMETHYL PHTHALATE	UG/L	TOTAL	
				34336	DIETHYL PHTHALATE	UG/L	TOTAL	
				39110	DI-N-BUTYLPHTHALATE	UG/L	TOTAL	
				34292	BUTYL BENZYL PHTHALATE	UG/L	TOTAL	
				34596	DI-N-OCTYL PHTHALATE	UG/L	TOTAL	
				39100	BIS(2-ETHYLHEXYL) PHTHAL.	UG/L	TOTAL	
				34376	FLUORANTHENE	UG/L	TOTAL	

TUT 001 1224

COMPLETED ANALYSIS REPORT

REPORT DATE: 87/12/22

PROJECT NO: 262

PROJECT NAME: TURPENTINE RUN

STATION NO	DATE FROM TO	TIME OF DAY	LABNO	PARNO	PARAMETER NAME	UNITS	CHEMISTRY	VALUE	REMARKS
			C91312	34469	PYRENE	UG/L	TOTAL		
				34320	CHRYSENE	UG/L	TOTAL		
				34526	1,2-BENZANTHRACENE	UG/L	TOTAL		
				34641	4-CHLOROPHENYL PHENYL ET.	UG/L	TOTAL		
				34403	INDENO(1,2,3-C,D) PYRENE	UG/L	TOTAL		
				34247	BENZO(A)PYRENE	UG/L	TOTAL		
				34521	1,12-BENZOPERYLENE	UG/L	TOTAL		
				34556	1,2:5,6-DIBENZANTHRACENE	UG/L	TOTAL		
				34631	3,3'-DICHLOROBENZIDENE	UG/L	TOTAL		
				34520	2,6-DINITROTOLUENE	UG/L	TOTAL		
				34611	2,4-DINITROTOLUENE	UG/L	TOTAL		
				34346	1,2-DIPHENYLHYDRAZINE	UG/L	TOTAL		
				34230	3,4-BENZOFLUORANTHENE	UG/L	TOTAL		
				34242	11,12-BENZOFLUORANTHENE	UG/L	TOTAL		
				39330	ALDRIN	UG/L	TOTAL		
				39380	DIELDRIN	UG/L	TOTAL		
				39351	CHLORDANE	UG/L	TOTAL		
				39300	4,4'-DDT	UG/L	TOTAL		
				39320	4,4'-DDE	UG/L	TOTAL		
				39310	4,4'-DDD	UG/L	TOTAL		
				34361	ALPHA ENDOSULFAN	UG/L	TOTAL		
				34356	BETA ENDOSULFAN	UG/L	TOTAL		
				34351	ENDOSULFAN SULFATE				
				39390	ENDRIN				
				34366	ENDRIN ALDEHYDE	UG/L	TOTAL		
				39410	HEPTACHLOR	UG/L	TOTAL		
				39420	HEPTACHLOR EPOXIDE	UG/L	TOTAL		
				39337	ALPHA-BHC	UG/L	TOTAL		
				39338	BETA-BHC	UG/L	TOTAL		
				39340	GAMMA-BHC	UG/L	TOTAL		
				34259	DELTA-BHC	UG/L	TOTAL		
				34400	TOXAPHENE	UG/L	TOTAL		
				34671	PCB-1016	UG/L	TOTAL		
				39488	PCB-1221	UG/L	TOTAL		
				39492	PCB-1232	UG/L	TOTAL		
				39496	PCB-1242	UG/L	TOTAL		
				39500	PCB-1248	UG/L	TOTAL		
				39504	PCB-1254	UG/L	TOTAL		
				39508	PCB-1260	UG/L	TOTAL		

TUT 001 1225

COMPLETED ANALYSIS REPORT — REPORT DATE: 87/12/22

PROJECT NO: 262 — PROJECT NAME: TURPENTINE RUN

STATION NO	DATE FROM TO	TIME OF DAY	LABNO	PARNO	PARAMETER NAME	UNITS	CHEMISTRY	VALUE & REMARK
TURP.RUN	87/10/07	1130						
LOCATION CODE: 3700 SUBSTRATE: AQUEOUS								
DESCRIPTION: DEEP WELL								
			091313	34418	METHYL CHLORIDE	UG/L	TOTAL	
				34413	METHYL BROMIDE	UG/L	TOTAL	
				39175	VINYL CHLORIDE	UG/L	TOTAL	
				34311	CHLOROETHANE	UG/L	TOTAL	
				34423	METHYLENE CHLORIDE	UG/L	TOTAL	
				34501	1,1-DICHLOROETHYLENE	UG/L	TOTAL	
				34496	1,1-DICHLOROETHANE	UG/L	TOTAL	
				34546	1,2-TRANS DICHLOROETHYLENE	UG/L	TOTAL	
				32106	CHLOROFORM	UG/L	TOTAL	
				32103	1,2-DICHLOROETHANE	UG/L	TOTAL	
				34506	1,1,1-TRICHLOROETHANE	UG/L	TOTAL	
				32102	CARBON TETRACHLORIDE	UG/L	TOTAL	
				32104	DICHLOROBROMOMETHANE	UG/L	TOTAL	
				34541	1,2-DICHLOROPROPANE	UG/L	TOTAL	
				34551	1,3-DICHLOROPROPYLENE	UG/L	TOTAL	
				39180	TRICHLOROETHYLENE	UG/L	TOTAL	
				34030	BENZENE	UG/L	TOTAL	
				32105	CHLORODIBROMOMETHANE	UG/L	TOTAL	
				34511	1,1,2-TRICHLOROETHANE	UG/L	TOTAL	
				32104	BROMOFORM	UG/L	TOTAL	
				34516	1,1,2,2-TETRACHLOROETHANE	UG/L	TOTAL	
				34475	TETRACHLOROETHYLENE	UG/L	TOTAL	
				34010	TOLUENE	UG/L	TOTAL	
				34301	CHLOROBENZENE	UG/L	TOTAL	
				34371	ETHYLBENZENE	UG/L	TOTAL	
				34586	2-CHLOROPHENOL	UG/L	TOTAL	
				34591	2-NITROPHENOL	UG/L	TOTAL	
				34694	PHENOL	UG/L	TOTAL	
				34606	2,4-DIMETHYLPHENOL	UG/L	TOTAL	
				34601	2,4-DICHLOROPHENOL	UG/L	TOTAL	
				34671	2,4,6-TRICHLOROPHENOL	UG/L	TOTAL	
				34452	P-CHLORO-M-CRESOL	UG/L	TOTAL	
				34616	2,4-DINITROPHENOL	UG/L	TOTAL	
				34657	4,6-DINITRO-2-CRESOL	UG/L	TOTAL	
				39032	PENTACHLOROPHENOL	UG/L	TOTAL	
				34646	4-NITROPHENOL	UG/L	TOTAL	
				34566	1,3-DICHLOROBENZENE	UG/L	TOTAL	
				34571	1,4-DICHLOROBENZENE	UG/L	TOTAL	
				34536	1,2-DICHLOROBENZENE	UG/L	TOTAL	
				34396	HEXACHLOROETHANE	UG/L	TOTAL	
				39702	HEXACHLOROBUTADIENE	UG/L	TOTAL	

TUT 001 1226

COMPLETED ANALYSIS REPORT

REPORT DATE: 87/12/22

PROJECT NO: 262

PROJECT NAME: TURPENTINE RUN

STATION NO	DATE FROM TO	TIME OF DAY	LABNO	PARNO	PARAMETER NAME	UNITS	CHEMISTRY	VALUE
			041313	34551	1,2,4-TRICHLOROBENZENE	UG/L	TOTAL	
				34696	NAPHTHALENE	UG/L	TOTAL	
				34273	BIS(2-CHLOROETHYL) ET.	UG/L	TOTAL	
				34278	BIS(2-CHLOROETHOXY) METH.	UG/L	TOTAL	
				34408	ISOPHORONE	UG/L	TOTAL	
				34447	NITROBENZENE	UG/L	TOTAL	
				34428	N-NITROSODI-N-PROPYLAMINE	UG/L	TOTAL	
				34433	N-NITROSODIPHENYLAMINE	UG/L	TOTAL	
				34283	BIS(2-CHLOROISOPROPYL) ET.	UG/L	TOTAL	
				34386	HEXACHLOROCYCLOPENTADIENE	UG/L	TOTAL	
				34581	2-CHLORONAPHTHALENE	UG/L	TOTAL	
				34200	ACENAPHTHYLENE	UG/L	TOTAL	
				34205	ACENAPHTHENE	UG/L	TOTAL	
				34381	FLUORENE	UG/L	TOTAL	
				39700	HEXACHLOROBENZENE	UG/L	TOTAL	
				34635	4-BROMOPHENYL PHENYL ET.	UG/L	TOTAL	
				34461	PHENANTHRENE	UG/L	TOTAL	
				34220	ANTHRACENE	UG/L	TOTAL	
				34341	DIMETHYL PHTHALATE	UG/L	TOTAL	
				34336	DIETHYL PHTHALATE	UG/L	TOTAL	
				39111	DI-N-BUTYLPHTHALATE	UG/L	TOTAL	
				34292	BUTYL BENZYL PHTHALATE	UG/L	TOTAL	
				34596	DI-N-OCTYL PHTHALATE	UG/L	TOTAL	
				39100	BIS(2-ETHYLHEXYL) PHTHAL.	UG/L	TOTAL	
				34376	FLUORANTHENE	UG/L	TOTAL	
				34469	PYRENE	UG/L	TOTAL	
				34320	CHRYSENE	UG/L	TOTAL	
				34526	1,2-BENZANTHRACENE	UG/L	TOTAL	
				34641	4-CHLOROPHENYL PHENYL ET.	UG/L	TOTAL	
				34403	INDENO(1,2,3-C,D) PYRENE	UG/L	TOTAL	
				34247	BENZO(A)PYRENE	UG/L	TOTAL	
				34521	1,12-BENZOPERYLENE	UG/L	TOTAL	
				34556	1,2,5,6-DIBENZANTHRACENE	UG/L	TOTAL	
				34631	3,3'-DICHLOROBENZIDENE	UG/L	TOTAL	
				34626	2,6-DINITROTOLUENE	UG/L	TOTAL	
				34611	2,4-DINITROTOLUENE	UG/L	TOTAL	
				34346	1,2-DIPHENYLHYDRAZINE	UG/L	TOTAL	
				34220	3,4-BENZOFLUORANTHENE	UG/L	TOTAL	
				34462	11,12-BENZOFLUORANTHENE	UG/L	TOTAL	
				39330	ALDRIN	UG/L	TOTAL	
				39390	DIELDRIN	UG/L	TOTAL	

TUT 001 1227

COMPLETED ANALYSIS REPORT — REPORT DATE: 87/12/22

PROJECT NO: 262 — PROJECT NAME: TURPENTINE RUN

STATION NO	DATE FROM TO	TIME OF DAY	LABNO	PARNO	PARAMETER NAME	UNITS	CHEMISTRY	VALUE & REMARK
			091313	39350	CHLORDANE	UG/L	TOTAL	
				39300	4,4'-DDT	UG/L	TOTAL	
				39320	4,4'-DDE	UG/L	TOTAL	
				39310	4,4'-DDD	UG/L	TOTAL	
				34361	ALPHA ENDOSULFAN	UG/L	TOTAL	
				34356	BETA ENDOSULFAN	UG/L	TOTAL	
				34351	ENDOSULFAN SULFATE	UG/L	TOTAL	
				39390	ENDRIN	UG/L	TOTAL	
				34366	ENDRIN ALDEHYDE	UG/L	TOTAL	
				39413	HEPTACLOR	UG/L	TOTAL	
				39420	HEPTACHLOR EPOXIDE	UG/L	TOTAL	
				39337	ALPHA-BHC	UG/L	TOTAL	
				39338	BETA-BHC	UG/L	TOTAL	
				39340	GAMMA-BHC	UG/L	TOTAL	
				34259	DELTA-BHC	UG/L	TOTAL	
				39400	TOXAPHENE	UG/L	TOTAL	
				34671	PCB-1016	UG/L	TOTAL	
				39488	PCB-1221	UG/L	TOTAL	
				39492	PCB-1232	UG/L	TOTAL	
				39496	PCB-1242	UG/L	TOTAL	
				39500	PCB-1248	UG/L	TOTAL	
				39504	PCB-1254	UG/L	TOTAL	
				39508	PCB-1260	UG/L	TOTAL	
TURP.RUN	87/10/07	1250						
LOCATION CODE: 3700 SUBSTRATE: AQUEOUS								
DESCRIPTION: BENCH WELL								
			091314	34418	METHYL CHLORIDE	UG/L	TOTAL	
				34413	METHYL BROMIDE	UG/L	TOTAL	
				39175	VINYL CHLORIDE	UG/L	TOTAL	
				34311	CHLOROETHANE	UG/L	TOTAL	
				34423	METHYLENE CHLORIDE	UG/L	TOTAL	
				34501	1,1-DICHLOROETHYLENE	UG/L	TOTAL	
				34496	1,1-DICHLOROETHANE	UG/L	TOTAL	
				34546	1,2-TRANS DICHLOROETHYLENE	UG/L	TOTAL	
				32106	CHLOROFORM	UG/L	TOTAL	
				32103	1,2-DICHLOROETHANE	UG/L	TOTAL	
				34506	1,1,1-TRICHLOROETHANE	UG/L	TOTAL	
				32102	CARBON TETRACHLORIDE	UG/L	TOTAL	
				32101	DICHLOROBROMOMETHANE	UG/L	TOTAL	

TUF 001 1228

COMPLETED ANALYSIS REPORT

REPORT DATE: 87/12/22

PROJECT NO: 262

PROJECT NAME: TURPENTINE RUN

STATION NO	DATE FROM TO	TIME OF DAY	LABNO	PARNO	PARAMETER NAME	UNITS	CHEMISTRY	VALUE & REMARK
			091314	34541	1,2-DICHLOROPROPANE	UG/L	TOTAL	
				34561	1,3-DICHLOROPROPYLENE	UG/L	TOTAL	
				39180	TRICHLOROETHYLENE	UG/L	TOTAL	
				34030	BENZENE	UG/L	TOTAL	
				32105	CHLORODIBROMOMETHANE	UG/L	TOTAL	
				34511	1,1,2-TRICHLOROETHANE	UG/L	TOTAL	
				32104	BROMOFORM	UG/L	TOTAL	
				34516	1,1,2,2-TETRACHLOROETHANE	UG/L	TOTAL	
				34475	TETRACHLOROETHYLENE	UG/L	TOTAL	
				34010	TOLUENE	UG/L	TOTAL	
				34301	CHLOROBENZENE	UG/L	TOTAL	
				34371	ETHYLBENZENE	UG/L	TOTAL	
				34586	2-CHLOROPHENOL	UG/L	TOTAL	
				34591	2-NITROPHENOL	UG/L	TOTAL	
				34694	PHENOL	UG/L	TOTAL	
				34606	2,4-DIMETHYLPHENOL	UG/L	TOTAL	
				34601	2,4-DICHLOROPHENOL	UG/L	TOTAL	
				34621	2,4,6-TRICHLOROPHENOL	UG/L	TOTAL	
				34452	P-CHLORO-M-CRESOL	UG/L	TOTAL	
				34616	2,4-DINITROPHENOL	UG/L	TOTAL	
				34657	4,6-DINITRO-O-CRESOL	UG/L	TOTAL	
				39032	PENTACHLOROPHENOL	UG/L	TOTAL	
				34646	4-NITROPHENOL	UG/L	TOTAL	
				34566	1,2-DICHLOROBENZENE	UG/L	TOTAL	
				34571	1,4-DICHLOROBENZENE	UG/L	TOTAL	
				34536	1,2-DICHLOROBENZENE	UG/L	TOTAL	
				34396	HEXACHLOROETHANE	UG/L	TOTAL	
				39702	HEXACHLOROBUTADIENE	UG/L	TOTAL	
				34551	1,2,4-TRICHLOROBENZENE	UG/L	TOTAL	
				34696	NAPHTHALENE	UG/L	TOTAL	
				34273	BIS(2-CHLOROETHYL) ET.	UG/L	TOTAL	
				34278	BIS(2-CHLOROISOPROPYL) ETHER	UG/L	TOTAL	
				34696	ISOPHORONE	UG/L	TOTAL	
				34447	NITROBENZENE	UG/L	TOTAL	
				34631	N-NITROSODI-N-PROPYLAMINE	UG/L	TOTAL	
				34646	4-NITROBIPHENYL ANIS	UG/L	TOTAL	
				34233	BIS(2-CHLOROISOPROPYL) ET.	UG/L	TOTAL	
				34386	HEXACHLOROCYCLOPENTADIENE	UG/L	TOTAL	
				34581	2-CHLORONAPHTHALENE	UG/L	TOTAL	
				34200	ACENAPHTHYLENE	UG/L	TOTAL	
				34205	ACENAPHTHENE	UG/L	TOTAL	

TUT 001 1229

COMPLETED ANALYSIS REPORT

REPORT DATE: 07/12/22

PROJECT NO: 262

PROJECT NAME: TURPENTINE RUN

STATION ID	DATE FROM TO	TIME OF DAY	LAB NO	PARM	PARAMETER NAME	UNITS	CHEMISTRY	VALUE	REMARK
331814			36391		FLUORENE	UG/L	TOTAL		U
			39730		4BROMOCHLOROBENZENE	UG/L	TOTAL		U
			36536		4-BROMOPHENYL PHENYL ET.	UG/L	TOTAL		U
			36551		PHENANTHRENE	UG/L	TOTAL		U
			34270		ANTHRACENE	UG/L	TOTAL		U
			36341		DIMETHYL PHTHALATE	UG/L	TOTAL		U
			36335		DIETHYL PHTHALATE	UG/L	TOTAL	4.0	J
			39180		DI-N-BUTYL PHTHALATE	UG/L	TOTAL		U
			36292		BUTYL BENZYL PHTHALATE	UG/L	TOTAL	1.7	J
			36596		DI-N-OCTYL PHTHALATE	UG/L	TOTAL		U
			39100		BIS(2-ETHYLHEXYL) PHTHAL.	UG/L	TOTAL		U
			34376		FLUORANTHENE	UG/L	TOTAL		U
			34659		PYRENE	UG/L	TOTAL		U
			34320		CHRYSENE	UG/L	TOTAL		U
			34526		1,2-BENZANTHRACENE	UG/L	TOTAL		U
			34561		4-CHLOROPHENYL PHENYL ET.	UG/L	TOTAL		U
			34403		INDENO(1,2,3-CD) PYRENE	UG/L	TOTAL		U
			34247		BENZO(A)PYRENE	UG/L	TOTAL		U
			34521		1,12-BENZOPERYLENE	UG/L	TOTAL		U
			34586		1,2,5,6-DIBENZANTHRACENE	UG/L	TOTAL		U
			34531		3,3'-DICHLOROBENZIDENE	UG/L	TOTAL		U
			34526		2,6-DINITROTOLUENE	UG/L	TOTAL		U
			34611		2,4-DINITROTOLUENE	UG/L	TOTAL		U
			34346		1,2-DIPHENYLHYDRAZINE	UG/L	TOTAL		U
			34285		1,4-BENZOFLUORANTHENE	UG/L	TOTAL		U
			34242		11,12-BENZOFLUORANTHENE	UG/L	TOTAL		U
			39320		ALDRIN	UG/L	TOTAL		U
			39393		DIELDRIN	UG/L	TOTAL		U
			39350		CHLORDANE	UG/L	TOTAL		U
			39300		4,4'-DDT	UG/L	TOTAL		U
			39320		4,4'-DDE	UG/L	TOTAL		U
			39343		4,4'-DDD	UG/L	TOTAL		U
			34361		ALPHA ENDOSULFAN	UG/L	TOTAL		U
			34355		BETA ENDOSULFAN	UG/L	TOTAL		U
			34351		ENDOSULFAN SULFATE	UG/L	TOTAL		U
			39380		ENDRIN	UG/L	TOTAL		U
			34365		ENDRIN ALDEHYDE	UG/L	TOTAL		U
			39410		HEPTACHLOR	UG/L	TOTAL		U
			39420		HEPTACHLOR EPOXIDE	UG/L	TOTAL		U
			39337		ALPHA-BHC	UG/L	TOTAL		U
			39389		BETA-BHC	UG/L	TOTAL		U

TUT 001 1230

COMPLETED ANALYSIS REPORT

REPORT DATE: 07/12/22

PROJECT NAME: TURPENTINE RUN

CAS NO	PARM	PARAMETER NAME	UNITS	CHEMISTRY	VALUE	REMARK
39181	39360	[illegible]	UG/L	TOTAL		J
	34269	DELTA-BHC	UG/L	TOTAL		J
	39633	ENDRIN	UG/L	TOTAL		J
	34671	PCB-1016	UG/L	TOTAL		J
	39488	PCB-1221	UG/L	TOTAL		J
	39492	PCB-1232	UG/L	TOTAL		J
	39496	PCB-1242	UG/L	TOTAL		J
	39500	PCB-1248	UG/L	TOTAL		J
	39504	PCB-1254	UG/L	TOTAL		J
	39508	PCB-1260	UG/L	TOTAL		J

TUT 001 1231

LOCATION CODE: 3700 SUBSTRATE: AQUEOUS

DESCRIPTION: HARTMAN BAKERY WELL

CAS NO	PARM	PARAMETER NAME	UNITS	CHEMISTRY	VALUE	REMARK
39181	34418	METHYL CHLORIDE	UG/L	TOTAL		J
	34413	METHYL BROMIDE	UG/L	TOTAL		J
	32175	VINYL CHLORIDE	UG/L	TOTAL		J
	34311	CHLOROETHANE	UG/L	TOTAL		J
	34423	METHYLENE CHLORIDE	UG/L	TOTAL		J
	34531	1,1-DICHLOROETHYLENE	UG/L	TOTAL		J
	34535	1,1-DICHLOROETHANE	UG/L	TOTAL		J
	34566	1,2-TRANS DICHLOROETHYLENE	UG/L	TOTAL	5.7	J
	32105	CHLOROFORM	UG/L	TOTAL		J
	32103	1,2-DICHLOROETHANE	UG/L	TOTAL		J
	34506	1,1,1-TRICHLOROETHANE	UG/L	TOTAL		J
	32102	CARBON TETRACHLORIDE	UG/L	TOTAL		J
	32101	DICHLOROBROMOMETHANE	UG/L	TOTAL		J
	34541	1,2-DICHLOROPROPANE	UG/L	TOTAL		J
	34551	1,3-DICHLOROPROPYLENE	UG/L	TOTAL		J
	39170	TRICHLOROETHYLENE	UG/L	TOTAL	9.2	J
	34030	BENZENE	UG/L	TOTAL		J
	32106	CHLORODIBROMO [illegible]	UG/L	TOTAL		J
	34511	1,1,2-TRICH[illegible]ETHANE	UG/L	TOTAL		J
	32104	BROMOFORM	UG/L	TOTAL		J
	34516	1,1,2,2-TETRA[illegible]ETHANE	UG/L	TOTAL		J
	34475	TETRACHLOROETHYLENE	UG/L	TOTAL		J
	34010	TOLUENE	UG/L	TOTAL		J
	34301	CHLOROBENZENE	UG/L	TOTAL		J
	34371	ETHYLBENZENE	UG/L	TOTAL		J
	34595	2-CHLOROPHENOL	UG/L	TOTAL		J

COMPLETED ANALYSIS REPORT

REPORT DATE: 97/12/22

PROJECT NO: 252

PROJECT NAME: TURPENTINE RUN

STATION ID	DATE FROM TO	TIME OF DAY	LABNO	PARM	PARAMETER NAME	UNITS	CHEMISTRY	VALUE	REMARK
091815				34591	2-NITROPHENOL	UG/L	TOTAL		
				34594	PHENOL	UG/L	TOTAL		
				34606	2,4-DIMETHYLPHENOL	UG/L	TOTAL		
				34601	2,4-DICHLOROPHENOL	UG/L	TOTAL		
				34621	2,4,6-TRICHLOROPHENOL	UG/L	TOTAL		
				34652	P-CHLORO-M-CRESOL	UG/L	TOTAL		
				34616	2,4-DINITROPHENOL	UG/L	TOTAL		
				34657	4,6-DINITRO-O-CRESOL	UG/L	TOTAL		
				39032	PENTACHLOROPHENOL	UG/L	TOTAL		
				34586	4-NITROPHENOL	UG/L	TOTAL		
				34566	1,3-DICHLOROBENZENE	UG/L	TOTAL		
				34571	1,4-DICHLOROBENZENE	UG/L	TOTAL	0.0	
				34536	1,2-DICHLOROBENZENE	UG/L	TOTAL		
				34396	HEXACHLOROETHANE	UG/L	TOTAL		
				39702	HEXACHLOROBUTADIENE	UG/L	TOTAL		
				34551	1,2,4-TRICHLOROBENZENE	UG/L	TOTAL		
				34696	NAPHTHALENE	UG/L	TOTAL		
				34273	BIS(2-CHLOROETHYL) ET.	UG/L	TOTAL		
				34278	BIS(2-CHLOROETHOXY) METH.	UG/L	TOTAL		
				34638	ISOPHORONE	UG/L	TOTAL		
				34447	NITROBENZENE	UG/L	TOTAL		
				34428	N-NITROSODI-N-PROPYLAMINE	UG/L	TOTAL		
				34433	N-NITROSODIPHENYLAMINE	UG/L	TOTAL		
				34283	BIS(2-CHLOROISOPROPYL) ET.	UG/L	TOTAL		
				34396	HEXACHLOROCYCLOPENTADIENE	UG/L	TOTAL		
				34581	2-CHLORONAPHTHALENE	UG/L	TOTAL		
				34200	ACENAPHTHYLENE	UG/L	TOTAL		
				34205	ACENAPHTHENE	UG/L	TOTAL		
				34381	FLUORENE	UG/L	TOTAL		
				39700	HEXACHLOROBENZENE	UG/L	TOTAL		
				34536	4-BROMOPHENYL-PHENYL ET.	UG/L	TOTAL		
				34681	PHENANTHRENE	UG/L	TOTAL		
				34220	ANTHRACENE	UG/L	TOTAL		
				34341	DIMETHYL PHTHALATE	UG/L	TOTAL		
				34336	DIETHYL PHTHALATE	UG/L	TOTAL	0.0	
				39110	DI-N-BUTYLPHTHALATE	UG/L	TOTAL	0.0	
				34292	BUTYL BENZYL PHTHALATE	UG/L	TOTAL		
				34626	DI-N-OCTYLPHTHALATE	UG/L	TOTAL	0.1	
				39100	BIS(2-ETHYLHEXYL) PHTHAL.	UG/L	TOTAL		
				34376	FLUORANTHENE	UG/L	TOTAL		
				34469	PYRENE	UG/L	TOTAL		

TUT 001 1232

COMPLETED ANALYSIS REPORT

REPORT DATED 07/12/92

PROJECT NO: 252

PROJECT NAME: TURPENTINE PJT

STATION NO	DATE FROM DD YR	TIME DD DAY

LABNO	PARAM	PARAMETER NAME	UNITS	CHEMISTRY	VALUE
001815	34370	CHRYSENE	UG/L	TOTAL	
	34526	1,2-BENZANTHRACENE	UG/L	TOTAL	
	34541	4-CHLOROPHENYL PHENYL ET.	UG/L	TOTAL	
	34403	INDENO(1,2,3-CD) PYRENE	UG/L	TOTAL	
	34247	BENZO(A)PYRENE	UG/L	TOTAL	
	34521	1,12-BENZOPERYLENE	UG/L	TOTAL	
	34555	1,2,5,6-DIBENZANTHRACENE	UG/L	TOTAL	
	34571	3,3'-DICHLOROBENZIDENE	UG/L	TOTAL	
	99999	BENZOIC ACID	UG/L	TOTAL	
	34526	2,6-DINITROTOLUENE	UG/L	TOTAL	
	34611	2,6-DINITROTOLUENE	UG/L	TOTAL	
	34366	1,2-DIPHENYLHYDRAZINE	UG/L	TOTAL	
	34230	3,4-BENZOFLUORANTHENE	UG/L	TOTAL	
	34242	11,12-BENZOFLUORANTHENE	UG/L	TOTAL	
	39390	ALDRIN	UG/L	TOTAL	
	39380	DIELDRIN	UG/L	TOTAL	
	39350	CHLORDANE	UG/L	TOTAL	
	39300	4,4'-DDT	UG/L	TOTAL	
	39320	4,4'-DDE	UG/L	TOTAL	
	39310	4,4'-DDD	UG/L	TOTAL	
	34351	ALPHA ENDOSULFAN	UG/L	TOTAL	
	34356	BETA ENDOSULFAN	UG/L	TOTAL	
	34361	ENDOSULFAN SULFATE	UG/L	TOTAL	
	39410	ENDRIN	UG/L	TOTAL	
	34355	ENDRIN ALDEHYDE	UG/L	TOTAL	
	39410	HEPTACHLOR	UG/L	TOTAL	
	39397	ALPHA-BHC	UG/L	TOTAL	
	39338	BETA-BHC	UG/L	TOTAL	
	39340	GAMMA-BHC	UG/L	TOTAL	
	34259	DELTA-BHC	UG/L	TOTAL	
	39400	TOXAPHENE	UG/L	TOTAL	
	39671	PCB-1016	UG/L	TOTAL	
	39496	PCB-1221	UG/L	TOTAL	
	39492	PCB-1232	UG/L	TOTAL	
	39486	PCB-1242	UG/L	TOTAL	
	39500	PCB-1248	UG/L	TOTAL	
	39504	PCB-1254	UG/L	TOTAL	
	39508	PCB-1260	UG/L	TOTAL	

***** END OF PROJECT *****

TUT 001 1233

COMPLETED ANALYSIS REPORT — REPORT DATE: 87/11/25

PROJECT NO: 265 — PROJECT NAME: TURPENTINE RUN

STATION NO	DATE FROM TO	TIME OF DAY	LABNO	PARNO	PARAMETER NAME	UNITS	CHEMISTRY	VALUE & REMARK
TURP.RUN	87/10/05	1000						
DEPTH: 0000 SUBSTRATE: AQUEOUS								
DESCRIPTION: FIELD BLANK								
			090776	01077	SILVER	UG/L	TOTAL	20 U
				01002	ARSENIC	UG/L	TOTAL	1 U
				01012	BERYLLIUM	UG/L	TOTAL	1 U
				01027	CADMIUM	UG/L	TOTAL	6 U
				01034	CHROMIUM	UG/L	TOTAL	4 U
				01042	COPPER	UG/L	TOTAL	4 U
				71900	MERCURY	UG/L	TOTAL	.2 U
				01051	LEAD	UG/L	TOTAL	30 U
				01067	NICKEL	UG/L	TOTAL	20 U
				01097	ANTIMONY	UG/L	TOTAL	1 U
				01147	SELENIUM	UG/L	TOTAL	1 U
				01059	THALLIUM	UG/L	TOTAL	1 U
				01092	ZINC	UG/L	TOTAL	10 M
				00720	CYANIDE	MG/L	TOTAL	0.010 M
URP.RUN	87/10/05	1120						
EPTH: 0000 SUBSTRATE: AQUEOUS								
ESCRIPTION: BRYAN WELL #1 FROM STANDPIPE								
			090777	01077	SILVER	UG/L	TOTAL	20 U
				01002	ARSENIC	UG/L	TOTAL	1 U
				01012	BERYLLIUM	UG/L	TOTAL	1 U
				01027	CADMIUM	UG/L	TOTAL	6 U
				01034	CHROMIUM	UG/L	TOTAL	4 U
				01042	COPPER	UG/L	TOTAL	4 U
				71900	MERCURY	UG/L	TOTAL	.2 U
				01051	LEAD	UG/L	TOTAL	30 U
				01067	NICKEL	UG/L	TOTAL	20 U
				01097	ANTIMONY	UG/L	TOTAL	1 U
				01147	SELENIUM	UG/L	TOTAL	1 U
				01059	THALLIUM	UG/L	TOTAL	1 U
				01092	ZINC	UG/L	TOTAL	30 M
				00720	CYANIDE	MG/L	TOTAL	0.010 U
URP.RUN	87/10/06	1225						
EPTH: 0000 SUBSTRATE: AQUEOUS								
ESCRIPTION: TILLET WELL								
			090778	01077	SILVER	UG/L	TOTAL	20 U
				01002	ARSENIC	UG/L	TOTAL	1 U
				01012	BERYLLIUM	UG/L	TOTAL	1 U

TUT 001 1234

COMPLETED ANALYSIS REPORT — REPORT DATE: 87/11/25

OJECT NO: 269 — PROJECT NAME: TURPENTINE RUN

N NO	DATE FROM TO	TIME OF DAY	LABNO	PARNO	PARAMETER NAME	UNITS	CHEMISTRY	VALUE & REMARK	
			090778	01027	CADMIUM	UG/L	TOTAL	6	U
				01034	CHROMIUM	UG/L	TOTAL	8	M
				01042	COPPER	UG/L	TOTAL	12	M
				71900	MERCURY	UG/L	TOTAL	.2	U
				01051	LEAD	UG/L	TOTAL	30	U
				01067	NICKEL	UG/L	TOTAL	40	U
				01097	ANTIMONY	UG/L	TOTAL	1	U
				01147	SELENIUM	UG/L	TOTAL	1	U
				01059	THALLIUM	UG/L	TOTAL	1	U
				01092	ZINC	UG/L	TOTAL	10	M
				00720	CYANIDE	MG/L	TOTAL	0.015	M
REP. RUN	87/10/06	1340							
PTH: 0000	SUBSTRATE: AQUEOUS								
SCRIPTION:	FOUR WINDS PLAZA - WELL #1								
			090779	01077	SILVER	UG/L	TOTAL	20	U
				01002	ARSENIC	UG/L	TOTAL	1	U
				01012	BERYLLIUM	UG/L	TOTAL	1	U
				01027	CADMIUM	UG/L	TOTAL	5	U
				01034	CHROMIUM	UG/L	TOTAL	5	M
				01042	COPPER	UG/L	TOTAL	5	M
				71900	MERCURY	UG/L	TOTAL	.2	U
				01051	LEAD	UG/L	TOTAL	30	U
				01067	NICKEL	UG/L	TOTAL	20	U
				01097	ANTIMONY	UG/L	TOTAL	1	U
				01147	SELENIUM	UG/L	TOTAL	1	U
				01059	THALLIUM	UG/L	TOTAL	1	U
				01092	ZINC	UG/L	TOTAL	51	
				00720	CYANIDE	MG/L	TOTAL	0.014	U
REP. RUN	87/10/06	1500							
PTH: 0000	SUBSTRATE: AQUEOUS								
SCRIPTION:	ELSIN WELL #3								
			090780	01077	SILVER	UG/L	TOTAL	20	U
				01002	ARSENIC	UG/L	TOTAL	1	U
				01012	BERYLLIUM	UG/L	TOTAL	1	U
				01027	CADMIUM	UG/L	TOTAL	6	U
				01034	CHROMIUM	UG/L	TOTAL	5	M
				01042	COPPER	UG/L	TOTAL	5	M

TUT 001 1235

COMPLETED ANALYSIS REPORT — REPORT DATE: 87/11/25

PROJECT NO: 263 — PROJECT NAME: TURPENTINE RUN

STATION NO	DATE FROM TO	TIME OF DAY	LABNO	PARNO	PARAMETER NAME	UNITS	CHEMISTRY	VALUE & REMARK	
			090700	71900	MERCURY	UG/L	TOTAL	.2	U
				01051	LEAD	UG/L	TOTAL	30	U
				01067	NICKEL	UG/L	TOTAL	20	U
				01097	ANTIMONY	UG/L	TOTAL	1	U
				01147	SELENIUM	UG/L	TOTAL	1	U
				01059	THALLIUM	UG/L	TOTAL	3	M
				01092	ZINC	UG/L	TOTAL	90	
				00720	CYANIDE	MG/L	TOTAL	0.014	U
TURP. RUN	87/10/06	1525							
DEPTH: 0000 SUBSTRATE: AQUEOUS									
DESCRIPTION: ELGIN WELL #2									
			090701	01077	SILVER	UG/L	TOTAL	20	U
				01002	ARSENIC	UG/L	TOTAL	1	U
				01012	BERYLLIUM	UG/L	TOTAL	1	U
				01027	CADMIUM	UG/L	TOTAL	6	U
				01034	CHROMIUM	UG/L	TOTAL	5	U
				01042	COPPER	UG/L	TOTAL	8	M
				71900	MERCURY	UG/L	TOTAL	.2	U
				01051	LEAD	UG/L	TOTAL	30	U
				01067	NICKEL	UG/L	TOTAL	20	U
				01097	ANTIMONY	UG/L	TOTAL	1	U
				01147	SELENIUM	UG/L	TOTAL	1	U
				01059	THALLIUM	UG/L	TOTAL	1	U
				01092	ZINC	UG/L	TOTAL	200	
				00720	CYANIDE	MG/L	TOTAL	0.014	U
URP. RUN	87/10/06	1530							
EPTH: 0000 SUBSTRATE: AQUEOUS									
ESCRIPTION: ELGIN WELL #1									
			090702	01077	SILVER	UG/L	TOTAL	20	U
				01002	ARSENIC	UG/L	TOTAL	1	U
				01012	BERYLLIUM	UG/L	TOTAL	1	U
				01027	CADMIUM	UG/L	TOTAL	6	U
				01034	CHROMIUM	UG/L	TOTAL	5	U
				01042	COPPER	UG/L	TOTAL	9	M
				71900	MERCURY	UG/L	TOTAL	.2	U
				01051	LEAD	UG/L	TOTAL	30	U
				01067	NICKEL	UG/L	TOTAL	20	U

COMPLETED ANALYSIS REPORT — REPORT DATE: 97/11/25

PROJECT NO: 269 — PROJECT NAME: TURPENTINE RUN

STATION NO	DATE FROM / TO	TIME OF DAY	LABNO	PARNO	PARAMETER NAME	UNITS	CHEMISTRY	VALUE	C	REMARK
			090782	01097	ANTIMONY	UG/L	TOTAL	1		U
				01147	SELENIUM	UG/L	TOTAL	1		U
				01059	THALLIUM	UG/L	TOTAL	1		U
				01092	ZINC	UG/L	TOTAL	82		
				00720	CYANIDE	MG/L	TOTAL	0.056		
URP. RUN 87/10/08 1755										
EPTH: 0000 SUBSTRATE: AQUEOUS										
ESCRIPTION: FRANCOIS WELL										
			090783	01077	SILVER	UG/L	TOTAL	20		U
				01002	ARSENIC	UG/L	TOTAL	1		U
				01012	BERYLLIUM	UG/L	TOTAL	1		U
				01027	CADMIUM	UG/L	TOTAL	6		U
				01034	CHROMIUM	UG/L	TOTAL	9		M
				01042	COPPER	UG/L	TOTAL	4		U
				71900	MERCURY	UG/L	TOTAL	.2		U
				01051	LEAD	UG/L	TOTAL	30		U
				01067	NICKEL	UG/L	TOTAL	20		U
				01097	ANTIMONY	UG/L	TOTAL	1		U
				01147	SELENIUM	UG/L	TOTAL	1		U
				01059	THALLIUM	UG/L	TOTAL	1		U
				01092	ZINC	UG/L	TOTAL	108		
				00720	CYANIDE	MG/L	TOTAL	0.018		M
RUN 87/10/07 0855										
: 0000 SUBSTRATE: AQUEOUS										
PTION: VINA HOUSING WELL #1										
			090786	01077	SILVER	UG/L	TOTAL	20		U
				01002	ARSENIC	UG/L	TOTAL	1		U
				01012	BERYLLIUM	UG/L	TOTAL	1		U
				01027	CADMIUM	UG/L	TOTAL	6		U
				01034	CHROMIUM	UG/L	TOTAL	5		U
				01042	COPPER	UG/L	TOTAL	10		M
				71900	MERCURY	UG/L	TOTAL	.2		U
				01051	LEAD	UG/L	TOTAL	30		U
				01067	NICKEL	UG/L	TOTAL	20		U
				01097	ANTIMONY	UG/L	TOTAL	1		U
				01147	SELENIUM	UG/L	TOTAL	13		
				01059	THALLIUM	UG/L	TOTAL	1		U

COMPLETED ANALYSIS REPORT — REPORT DATE: 97/11/25

PROJECT NO: 269 — PROJECT NAME: TURPENTINE RUN

STATION NO	DATE FROM / TO	TIME OF DAY	LABNO	PARNO	PARAMETER NAME	UNITS	CHEMISTRY	VALUE	C	REMARK
			090784	01092	ZINC	UG/L	TOTAL	30		M
				00720	CYANIDE	MG/L	TOTAL	0.023		
RUN 87/10/07 0910										
E 0000 SUBSTRATE: AQUEOUS										
IPTION: VIMA HOUSING WELL #3										
			090785	01077	SILVER	UG/L	TOTAL	20		U
				01002	ARSENIC	UG/L	TOTAL	1		U
				01012	BERYLLIUM	UG/L	TOTAL	1		U
				01027	CADMIUM	UG/L	TOTAL	6		U
				01034	CHROMIUM	UG/L	TOTAL	5		U
				01042	COPPER	UG/L	TOTAL	22		M
				71900	MERCURY	UG/L	TOTAL	.2		U
				01051	LEAD	UG/L	TOTAL	30		U
				01067	NICKEL	UG/L	TOTAL	20		U
				01097	ANTIMONY	UG/L	TOTAL	1		U
				01147	SELENIUM	UG/L	TOTAL	3		M
				01059	THALLIUM	UG/L	TOTAL	1		U
				01092	ZINC	UG/L	TOTAL	30		M
				00720	CYANIDE	MG/L	TOTAL	0.019		M
RUN 87/10/07 1045										
ATION CODE: 3700 SUBSTRATE: AQUEOUS										
CRIPTION: HARTMAN ESTATE WELL										
			090786	01077	SILVER	UG/L	TOTAL	20		U
				01002	ARSENIC	UG/L	TOTAL	1		U
				01012	BERYLLIUM	UG/L	TOTAL	1		U
				01027	CADMIUM	UG/L	TOTAL	5		U
				01034	CHROMIUM	UG/L	TOTAL	5		U
				01042	COPPER	UG/L	TOTAL	6		U
				71900	MERCURY	UG/L	TOTAL	.2		U
				01051	LEAD	UG/L	TOTAL	30		U
				01067	NICKEL	UG/L	TOTAL	20		U
				01097	ANTIMONY	UG/L	TOTAL	1		U
				01147	SELENIUM	UG/L	TOTAL	4		M
				01059	THALLIUM	UG/L	TOTAL	1		U
				01092	ZINC	UG/L	TOTAL	20		M
				00720	CYANIDE	MG/L	TOTAL	0.017		U

COMPLETED ANALYSIS REPORT — REPORT DATE: 87/11/25

PROJECT NO: 263 — PROJECT NAME: TURPENTINE RUN

STATION NO	DATE FROM TO	TIME OF DAY	LABNO	PARNO	PARAMETER NAME	UNITS	CHEMISTRY	VALUE & REMARK	
URP.RUN	87/10/07	1300							
CATION CODE: 3700 SUBSTRATE: AQUEOUS									
DESCRIPTION: DEMITEIS WELL									
			090787	01077	SILVER	UG/L	TOTAL	30	U
				01002	ARSENIC	UG/L	TOTAL	1	U
				01012	BERYLLIUM	UG/L	TOTAL	20	U
				01027	CADMIUM	UG/L	TOTAL	30	U
				01034	CHROMIUM	UG/L	TOTAL	70	U
				01042	COPPER	UG/L	TOTAL	20	J
				71900	MERCURY	UG/L	TOTAL	.2	U
				01051	LEAD	UG/L	TOTAL	100	U
				01067	NICKEL	UG/L	TOTAL	50	U
				01097	ANTIMONY	UG/L	TOTAL	1	U
				01147	SELENIUM	UG/L	TOTAL	3	W
				01059	THALLIUM	UG/L	TOTAL	1	U
				01092	ZINC	UG/L	TOTAL	40	J
				00720	CYANIDE	MG/L	TOTAL	0.017	U
ON	87/10/05	1021							
0000 SUBSTRATE: AQUEOUS									
RIPTION: RODRIGUEZ AUTO PARTS									
WELL # 3									
			091302	01077	SILVER	UG/L	TOTAL	20	U
				01002	ARSENIC	UG/L	TOTAL	1	U
				01012	BERYLLIUM	UG/L	TOTAL	1	U
				01027	CADMIUM	UG/L	TOTAL	5	U
				01034	CHROMIUM	UG/L	TOTAL	5	U
				01042	COPPER	UG/L	TOTAL	5	W
				71900	MERCURY	UG/L	TOTAL	.2	U
				01051	LEAD	UG/L	TOTAL	30	U
				01067	NICKEL	UG/L	TOTAL	20	U
				01097	ANTIMONY	UG/L	TOTAL	1	U
				01147	SELENIUM	UG/L	TOTAL	1	U
				01059	THALLIUM	UG/L	TOTAL	1	U
				01092	ZINC	UG/L	TOTAL	30	W
				00720	CYANIDE	MG/L	TOTAL	0.017	U
URP.RUN	87/10/06	1130							
EPTH: 0000 SUBSTRATE: AQUEOUS									
ESCRIPTION: RAMSEY MOTORS WELL LOCATED NEAR									
AUTO REPAIR WORKS									
			091309	01077	SILVER	UG/L	TOTAL	20	U
				01002	ARSENIC	UG/L	TOTAL	1	U
				01012	BERYLLIUM	UG/L	TOTAL	1	U

COMPLETED ANALYSIS REPORT — REPORT DATE: 87/11/25

PROJECT NO: 269 — PROJECT NAME: TURPENTINE RUN

STATION NO	DATE FROM TO	TIME OF DAY	LABNO	PARNO	PARAMETER NAME	UNITS	CHEMISTRY	VALUE & REMARK
			091303	01027	CADMIUM	UG/L	TOTAL	6 U
				01034	CHROMIUM	UG/L	TOTAL	5 U
				01042	COPPER	UG/L	TOTAL	6 U
				71900	MERCURY	UG/L	TOTAL	.2 U
				01051	LEAD	UG/L	TOTAL	30 U
				01067	NICKEL	UG/L	TOTAL	20 U
				01097	ANTIMONY	UG/L	TOTAL	2 M
				01147	SELENIUM	UG/L	TOTAL	1 U
				01059	THALLIUM	UG/L	TOTAL	1 U
				01092	ZINC	UG/L	TOTAL	10 M
				00720	CYANIDE	MG/L	TOTAL	0.013 M
TURP.RUN 87/10/05 1230								
DEPTH: 0000 SUBSTRATE: AQUEOUS								
DESCRIPTION: STEELE FROM SPIGOT AT WELL HEAD								
			091304	01077	SILVER	UG/L	TOTAL	20 U
				01002	ARSENIC	UG/L	TOTAL	1 U
				01012	BERYLLIUM	UG/L	TOTAL	1 U
				01027	CADMIUM	UG/L	TOTAL	6 U
				01034	CHROMIUM	UG/L	TOTAL	20 M
				01042	COPPER	UG/L	TOTAL	20 M
				71900	MERCURY	UG/L	TOTAL	.2 U
				01051	LEAD	UG/L	TOTAL	30 U
				01067	NICKEL	UG/L	TOTAL	20 U
				01097	ANTIMONY	UG/L	TOTAL	2 M
				01147	SELENIUM	UG/L	TOTAL	15
				01059	THALLIUM	UG/L	TOTAL	1 U
				01092	ZINC	UG/L	TOTAL	20 M
				00720	CYANIDE	MG/L	TOTAL	0.017 U
TURP.RUN 87/10/05 1310								
DEPTH: 0000 SUBSTRATE: AQUEOUS								
DESCRIPTION: HARVEY WELL BEHIND O'HENRY DRY CLEANERS IN WOODS								
			091305	01077	SILVER	UG/L	TOTAL	20 U
				01002	ARSENIC	UG/L	TOTAL	1 U
				01012	BERYLLIUM	UG/L	TOTAL	1 U
				01027	CADMIUM	UG/L	TOTAL	6 U
				01034	CHROMIUM	UG/L	TOTAL	10 M
				01042	COPPER	UG/L	TOTAL	8 M

COMPLETED ANALYSIS REPORT REPORT DATE: 87/11/23

PROJECT NO: 263 PROJECT NAME: TURPENTINE RUN

STATION NO	DATE FROM YR	TIME OF DAY	LABNO	PARNO	PARAMETER NAME	UNITS	CHEMISTRY	VALUE & REMARK	
			091305	71900	MERCURY	UG/L	TOTAL	.2	U
				01051	LEAD	UG/L	TOTAL	30	U
				01067	NICKEL	UG/L	TOTAL	20	U
				01097	ANTIMONY	UG/L	TOTAL	1	U
				01147	SELENIUM	UG/L	TOTAL	1	U
				01059	THALLIUM	UG/L	TOTAL	1	U
				01092	ZINC	UG/L	TOTAL	340	
				00720	CYANIDE	MG/L	TOTAL	0.017	U
TURP.RUN	87/10/06	1445							
DEPTH: 0000 SUBSTRATE: AQUEOUS									
DESCRIPTION: MATHIAS WELL PUMP NOT OPERATING									
			091306	01077	SILVER	UG/L	TOTAL	20	U
				01002	ARSENIC	UG/L	TOTAL	1	U
				01012	BERYLLIUM	UG/L	TOTAL	1	U
				01027	CADMIUM	UG/L	TOTAL	5	U
				01034	CHROMIUM	UG/L	TOTAL	5	U
				01042	COPPER	UG/L	TOTAL	9	M
				71900	MERCURY	UG/L	TOTAL	.2	U
				01051	LEAD	UG/L	TOTAL	30	U
				01067	NICKEL	UG/L	TOTAL	20	U
				01097	ANTIMONY	UG/L	TOTAL	1	U
				01147	SELENIUM	UG/L	TOTAL	5.6	
				01059	THALLIUM	UG/L	TOTAL	1	U
				01092	ZINC	UG/L	TOTAL	13	M
				00720	CYANIDE	MG/L	TOTAL	0.017	U
TURP.RUN	87/10/06	1600							
DEPTH: 0000 SUBSTRATE: AQUEOUS									
DESCRIPTION: SMITH									
			091307	01077	SILVER	UG/L	TOTAL	20	U
				01002	ARSENIC	UG/L	TOTAL	1	U
				01012	BERYLLIUM	UG/L	TOTAL	1	U
				01027	CADMIUM	UG/L	TOTAL	5	U
				01034	CHROMIUM	UG/L	TOTAL	5	U
				01042	COPPER	UG/L	TOTAL	7	M
				71900	MERCURY	UG/L	TOTAL	.2	U
				01051	LEAD	UG/L	TOTAL	30	U
				01067	NICKEL	UG/L	TOTAL	20	U

COMPLETED ANALYSIS REPORT — REPORT DATE: 87/11/25

PROJECT NO: 203 — PROJECT NAME: TURPENTINE RUN

STATION NO	DATE FROM TO	TIME OF DAY	LABNO	PARNO	PARAMETER NAME	UNITS	CHEMISTRY	VALUE	REMA
			091307	01097	ANTIMONY	UG/L	TOTAL	1	U
				01147	SELENIUM	UG/L	TOTAL	3	M
				01059	THALLIUM	UG/L	TOTAL	1	U
				01092	ZINC	UG/L	TOTAL	460	
				00720	CYANIDE	MG/L	TOTAL	0.017	U
TURP.RUN 87/10/05 1645									
DEPTH: 0000 SUBSTRATE: AQUEOUS									
DESCRIPTION: VEVCON WELL #1									
			091306	01077	SILVER	UG/L	TOTAL	20	U
				01002	ARSENIC	UG/L	TOTAL	1	U
				01012	BERYLLIUM	UG/L	TOTAL	1	U
				01027	CADMIUM	UG/L	TOTAL	6	U
				01034	CHROMIUM	UG/L	TOTAL	5	U
				01042	COPPER	UG/L	TOTAL	4	U
				71900	MERCURY	UG/L	TOTAL	.2	U
				01051	LEAD	UG/L	TOTAL	30	U
				01067	NICKEL	UG/L	TOTAL	20	U
				01097	ANTIMONY	UG/L	TOTAL	1	U
				01147	SELENIUM	UG/L	TOTAL	1	U
				01059	THALLIUM	UG/L	TOTAL	1	U
				01092	ZINC	UG/L	TOTAL	10	U
				00720	CYANIDE	MG/L	TOTAL	0.017	U
TURP.RUN 87/10/05 1715									
DEPTH: 0000 SUBSTRATE: AQUEOUS									
DESCRIPTION: VEVCON WELL #3 WATER FROM SPIGOT VERY AERATED									
			091309	01077	SILVER	UG/L	TOTAL	20	U
				01002	ARSENIC	UG/L	TOTAL	1	U
				01012	BERYLLIUM	UG/L	TOTAL	1	U
				01027	CADMIUM	UG/L	TOTAL	5	U
				01034	CHROMIUM	UG/L	TOTAL	10	M
				01042	COPPER	UG/L	TOTAL	4	U
				71900	MERCURY	UG/L	TOTAL	.2	U
				01051	LEAD	UG/L	TOTAL	30	U
				01067	NICKEL	UG/L	TOTAL	20	U
				01097	ANTIMONY	UG/L	TOTAL	1	U
				01147	SELENIUM	UG/L	TOTAL	7.1	
				01059	THALLIUM	UG/L	TOTAL	1	U

COMPLETED ANALYSIS REPORT REPORT DATE: 87/11/25

PROJECT NO: 263 PROJECT NAME: TURPENTINE RUN

STATION NO	DATE FROM TO	TIME OF DAY	LABNO	PARNO	PARAMETER NAME	UNITS	CHEMISTRY	VALUE & REMARK
			091309	01092	ZINC	UG/L	TOTAL	20 M
				00720	CYANIDE	MG/L	TOTAL	0.017 U
TURP.RUN	87/10/05	1420						
OFFSHR 0300 SUBSTRATE: AQUEOUS								
DESCRIPTION: ALPHA LEONARD WELL HEAD								
			091310	01077	SILVER	UG/L	TOTAL	20 U
				01002	ARSENIC	UG/L	TOTAL	1 U
				01012	BERYLLIUM	UG/L	TOTAL	1 U
				01027	CADMIUM	UG/L	TOTAL	6 U
				01034	CHROMIUM	UG/L	TOTAL	5 U
				01042	COPPER	UG/L	TOTAL	4 U
				71900	MERCURY	UG/L	TOTAL	.2 U
				01051	LEAD	UG/L	TOTAL	30 U
				01067	NICKEL	UG/L	TOTAL	20 U
				01097	ANTIMONY	UG/L	TOTAL	1 U
				01147	SELENIUM	UG/L	TOTAL	8.5
				01059	THALLIUM	UG/L	TOTAL	1 U
				01092	ZINC	UG/L	TOTAL	10 M
				00720	CYANIDE	MG/L	TOTAL	0.017 U
TURP.RUN	87/10/07	0859						
LOCATION CODE: 3700 SUBSTRATE: AQUEOUS								
DESCRIPTION: TRANSPORT BLANK FROM RD UNIT								
			091311	01077	SILVER	UG/L	TOTAL	20 U
				01002	ARSENIC	UG/L	TOTAL	1 U
				01012	BERYLLIUM	UG/L	TOTAL	1 U
				01027	CADMIUM	UG/L	TOTAL	5 U
				01034	CHROMIUM	UG/L	TOTAL	5 U
				01042	COPPER	UG/L	TOTAL	4 U
				71900	MERCURY	UG/L	TOTAL	.2 U
				01051	LEAD	UG/L	TOTAL	30 U
				01067	NICKEL	UG/L	TOTAL	20 U
				01097	ANTIMONY	UG/L	TOTAL	1 U
				01147	SELENIUM	UG/L	TOTAL	1 U
				01059	THALLIUM	UG/L	TOTAL	1 U
				01092	ZINC	UG/L	TOTAL	9 U
				00720	CYANIDE	MG/L	TOTAL	0.017 U

COMPLETED ANALYSIS REPORT — REPORT DATE: 87/11/25

PROJECT NO: 269 — PROJECT NAME: TURPENTINE RUN

STATION NO	DATE FROM YR	TIME OF DAY	LABNO	PARNO	PARAMETER NAME	UNITS	CHEMISTRY	VALUE & REMARK
TURP.RUN	87/10/07	0955						
LOCATION CODE: 3700 SUBSTRATE: AQUEOUS								
DESCRIPTION: HARTMANN CRUSHER WELL								
			091312	01077	SILVER	UG/L	TOTAL	20 U
				01002	ARSENIC	UG/L	TOTAL	15
				01012	BERYLLIUM	UG/L	TOTAL	1 U
				01027	CADMIUM	UG/L	TOTAL	5 U
				01034	CHROMIUM	UG/L	TOTAL	5 U
				01042	COPPER	UG/L	TOTAL	5 U
				71900	MERCURY	UG/L	TOTAL	.2 U
				01051	LEAD	UG/L	TOTAL	30 U
				01067	NICKEL	UG/L	TOTAL	20 U
				01097	ANTIMONY	UG/L	TOTAL	1 U
				01147	SELENIUM	UG/L	TOTAL	1 U
				01059	THALLIUM	UG/L	TOTAL	1 U
				01092	ZINC	UG/L	TOTAL	10 M
				00720	CYANIDE	MG/L	TOTAL	0.017 U
TURP.RUN	87/10/07	1130						
LOCATION CODE: 3700 SUBSTRATE: AQUEOUS								
DESCRIPTION: DEDE WELL								
			091313	01077	SILVER	UG/L	TOTAL	20 U
				01002	ARSENIC	UG/L	TOTAL	1 U
				01012	BERYLLIUM	UG/L	TOTAL	1 U
				01027	CADMIUM	UG/L	TOTAL	5 U
				01034	CHROMIUM	UG/L	TOTAL	5 U
				01042	COPPER	UG/L	TOTAL	10 U
				71900	MERCURY	UG/L	TOTAL	.2 U
				01051	LEAD	UG/L	TOTAL	30 U
				01067	NICKEL	UG/L	TOTAL	20 U
				01097	ANTIMONY	UG/L	TOTAL	1 U
				01147	SELENIUM	UG/L	TOTAL	1 U
				01059	THALLIUM	UG/L	TOTAL	1 U
				01092	ZINC	UG/L	TOTAL	30 M
				00720	CYANIDE	MG/L	TOTAL	0.017 U
TURP.RUN	87/10/07	1250						
LOCATION CODE: 3700 SUBSTRATE: AQUEOUS								
DESCRIPTION: DENCH WELL								
			091314	01077	SILVER	UG/L	TOTAL	20 U
				01002	ARSENIC	UG/L	TOTAL	1 U
				01012	BERYLLIUM	UG/L	TOTAL	1 U

U.S. GOVT. 1245

COMPLETED ANALYSIS REPORT — REPORT DATE: 87/11/25

PROJECT NO: 263 — PROJECT NAME: TURPENTINE RUN

STATION NO	DATE FROM TO	TIME OF DAY	LABNO	PARNO	PARAMETER NAME	UNITS	CHEMISTRY	VALUE	REMARKS
			091314	01027	CADMIUM	UG/L	TOTAL	5	U
				01034	CHROMIUM	UG/L	TOTAL	5	U
				01042	COPPER	UG/L	TOTAL	10	M
				71900	MERCURY	UG/L	TOTAL	.2	U
				01051	LEAD	UG/L	TOTAL	30	U
				01067	NICKEL	UG/L	TOTAL	20	U
				01097	ANTIMONY	UG/L	TOTAL	4	M
				01147	SELENIUM	UG/L	TOTAL	1	U
				01059	THALLIUM	UG/L	TOTAL	12	
				01092	ZINC	UG/L	TOTAL	68	
				00720	CYANIDE	MG/L	TOTAL	0.017	U

URP.RUN 87/10/08 1205
LOCATION CODE: 3700 SUBSTRATE: AQUEOUS
DESCRIPTION: HARTMAN BAKERY WELL

			091315	01077	SILVER	UG/L	TOTAL	20	U
				01004	ARSENIC	UG/L	TOTAL	1	U
				01012	BERYLLIUM	UG/L	TOTAL	1	U
				01027	CADMIUM	UG/L	TOTAL	5	U
				01034	CHROMIUM	UG/L	TOTAL	5	U
				01042	COPPER	UG/L	TOTAL	6	M
				71900	MERCURY	UG/L	TOTAL	.2	U
				01051	LEAD	UG/L	TOTAL	30	U
				01067	NICKEL	UG/L	TOTAL	20	U
				01097	ANTIMONY	UG/L	TOTAL	1	M
				01147	SELENIUM	UG/L	TOTAL	1	U
				01059	THALLIUM	UG/L	TOTAL	1	U
				01092	ZINC	UG/L	TOTAL	20	M
				00720	CYANIDE	MG/L	TOTAL	0.017	U

***** END OF PROJECT *****

REFERENCE NO. 31

TUT 001 1246

COMPLETED ANALYSIS REPORT

REPORT DATE: 87/12/22

PROJECT NO: 262 PROJECT NAME: TURPENTINE RUN

EXPLANATIONS OF REMARK CODES

REMARK CODE	EXPLANATION
B	RESULTS BASED UPON COLONY COUNTS OUTSIDE ACCEPTABLE RANGE
J	ESTIMATED VALUE
K	ACTUAL VALUE KNOWN TO BE LESS THAN VALUE GIVEN
L	ACTUAL VALUE KNOWN TO BE GREATER THAN VALUE GIVEN
N	PRESENCE OF MATERIAL VERIFIED BUT NOT QUANTIFIED
O	SAMPLED BUT NOT ANALYZED DUE TO LAB ACCIDENT
T	REPORTED VALUE LESS THAN CRITERIA OF DETECTION
U	MATERIAL ANALYZED FOR, BUT NOT DETECTED

LOCATION CODES FOR IDENTIFICATION OF SAMPLING POINTS AT INDUSTRIAL / SANITARY FACILITIES, LANDFILLS, HAZARDOUS WASTE SITES.

CODE NUMBERS	SAMPLING POINTS
1001 - 1050	EFFLUENT PIPE NUMBER 001 TO 050
1051 - 1099	OTHER EFFLUENTS SUCH AS COOLING TOWER DISCHARGE, DISCHARGE FROM HOLDING PONDS, ETC...
1100 - 1249	IN PLANT SAMPLES - DURING PROCESS
1250 - 1274	IN PLANT SAMPLES AFTER PROCESS AND BEFORE TREATMENT OR DISCHARGE
1275 - 1424	IN PLANT SAMPLES - DURING TREATMENT
1425 - 1434	SEPARATE INFLUENT POINTS/WATER SOURCES
15XX	INFLUENT ASSOCIATED WITH EFFLUENT 10XX
2000	BLANK FOR VOLATILE ORGANICS
2XXX	AUTO SAMPLER BLANK AT SAMPLE POSITION 1XXX
3000 - 3099	GROUND WATER FROM WELL 01 TO 99
3100 - 3199	SEDIMENT SAMPLE (WATER BOTTOM)
3200 - 3299	SOIL SAMPLE
3300 - 3399	STREAM WATER SAMPLE
3400 - 3499	LAGOON SAMPLE
3500 - 3599	STORAGE TANK SAMPLE
3600 - 3699	LEACHATE SAMPLE
3700 - 3799	OTHER TYPE SAMPLE

TUT 001 1297

COMPLETED ANALYSIS REPORT — REPORT DATE: 87/12/22

PROJECT NO: 262 — PROJECT NAME: TURPENTINE RUN

STATION NO	DATE FROM TO	TIME OF DAY	LABNO	PARNO	PARAMETER NAME	UNITS	CHEMISTRY	VALUE & REMARK
TURP.RUN	87/10/09	1200						
DEPTH: 0000	SUBSTRATE: AQUEOUS							
DESCRIPTION: LAB BLANK FIRST BATCH								
	EXTRACTION DATE 10/9/87							
			000312	34586	2-CHLOROPHENOL	UG/L	TOTAL	U
				34591	2-NITROPHENOL	UG/L	TOTAL	U
				36696	PHENOL	UG/L	TOTAL	U
				34606	2,4-DIMETHYLPHENOL	UG/L	TOTAL	U
				34601	2,4-DICHLOROPHENOL	UG/L	TOTAL	U
				34621	2,4,6-TRICHLOROPHENOL	UG/L	TOTAL	U
				34652	P-CHLORO-M-CRESOL	UG/L	TOTAL	U
				34616	2,4-DINITROPHENOL	UG/L	TOTAL	U
				34657	4,6-DINITRO-O-CRESOL	UG/L	TOTAL	U
				39032	PENTACHLOROPHENOL	UG/L	TOTAL	U
				34646	4-NITROPHENOL	UG/L	TOTAL	U
				34566	1,3-DICHLOROBENZENE	UG/L	TOTAL	U
				34571	1,4-DICHLOROBENZENE	UG/L	TOTAL	U
				34536	1,2-DICHLOROBENZENE	UG/L	TOTAL	U
				34396	HEXACHLOROETHANE	UG/L	TOTAL	U
				39702	HEXACHLOROBUTADIENE	UG/L	TOTAL	U
				34551	1,2,4-TRICHLOROBENZENE	UG/L	TOTAL	U
				34696	NAPHTHALENE	UG/L	TOTAL	U
				34673	BIS(2-CHLOROETHYL) ET.	UG/L	TOTAL	U
				34278	BIS(2-CHLOROETHOXY) METH.	UG/L	TOTAL	U
				34406	ISOPHORONE	UG/L	TOTAL	U
				34447	NITROBENZENE	UG/L	TOTAL	U
				34428	N-NITROSODI-N-PROPYLAMINE	UG/L	TOTAL	U
				34433	N-NITROSODIPHENYLAMINE	UG/L	TOTAL	U
				34284	BIS(2-CHLOROISOPROPYL) ET.	UG/L	TOTAL	U
				34396	HEXACHLOROCYCLOPENTADIENE	UG/L	TOTAL	U
				34581	2-CHLORONAPHTHALENE	UG/L	TOTAL	U
				34200	ACENAPHTHYLENE	UG/L	TOTAL	U
				34205	ACENAPHTHENE	UG/L	TOTAL	U
				34381	FLOURENE	UG/L	TOTAL	U
				39700	HEXACHLOROBENZENE	UG/L	TOTAL	U
				34636	4-BROMOPHENYL PHENYL ET.	UG/L	TOTAL	U
				34461	PHENANTHRENE	UG/L	TOTAL	U
				34220	ANTHRACENE	UG/L	TOTAL	U
				34341	DIMETHYL PHTHALATE	UG/L	TOTAL	U
				34336	DIETHYL PHTHALATE	UG/L	TOTAL	U
				39110	DI-N-BUTYLPHTHALATE	UG/L	TOTAL	0.6 U
				34292	BUTYL BENZYL PHTHALATE	UG/L	TOTAL	0.1 U
				34596	DI-N-OCTYL PHTHALATE	UG/L	TOTAL	U
				39100	BIS(2-ETHYLHEXYL) PHTHAL.	UG/L	TOTAL	4.1 U
				34376	FLUORANTHENE	UG/L	TOTAL	U

COMPLETED ANALYSIS REPORT REPORT DATE: 87/12/22

PROJECT NO: 262 PROJECT NAME: TURPENTINE RUN

STATION NO	DATE FROM TO	TIME OF DAY	LABNO	PARNO	PARAMETER NAME	UNITS	CHEMISTRY	VALUE & REMARK
			000012	34469	PYRENE	UG/L	TOTAL	U
				34320	CHRYSENE	UG/L	TOTAL	U
				34526	1,2-BENZANTHRACENE	UG/L	TOTAL	U
				34641	4-CHLOROPHENYL PHENYL ET.	UG/L	TOTAL	U
				34403	INDENO(1,2,3-C,D) PYRENE	UG/L	TOTAL	U
				34247	BENZO(A)PYRENE	UG/L	TOTAL	U
				34521	1,12-BENZOPERYLENE	UG/L	TOTAL	U
				34556	1,2:5,6-DIBENZANTHRACENE	UG/L	TOTAL	U
				34631	3,3'-DICHLOROBENZIDENE	UG/L	TOTAL	U
				34626	2,6-DINITROTOLUENE	UG/L	TOTAL	U
				34611	2,4-DINITROTOLUENE	UG/L	TOTAL	U
				34346	1,2-DIPHENYLHYDRAZINE	UG/L	TOTAL	U
				34230	3,4-BENZOFLUORANTHENE	UG/L	TOTAL	U
				34242	11,12-BENZOFLUORANTHENE	UG/L	TOTAL	U
TURP.RUN	87/10/09	1200						
DEPTH: 0000 SUBSTRATE: AQUEOUS								
DESCRIPTION: LAB BLANK SECOND BATCH								
	EXTRACTION DATE 10/9/87							
			000022	34586	2-CHLOROPHENOL	UG/L	TOTAL	U
				34591	2-NITROPHENOL	UG/L	TOTAL	U
				34694	PHENOL	UG/L	TOTAL	U
				34696	2,4-DIMETHYLPHENOL	UG/L	TOTAL	U
				34601	2,4-DICHLOROPHENOL	UG/L	TOTAL	U
				34621	2,4,6-TRICHLOROPHENOL	UG/L	TOTAL	U
				34452	P-CHLORO-M-CRESOL	UG/L	TOTAL	U
				34616	2,4-DINITROPHENOL	UG/L	TOTAL	U
				34657	4,6-DINITRO-O-CRESOL	UG/L	TOTAL	U
				39032	PENTACHLOROPHENOL	UG/L	TOTAL	U
				34646	4-NITROPHENOL	UG/L	TOTAL	U
				34566	1,3-DICHLOROBENZENE	UG/L	TOTAL	U
				34571	1,4-DICHLOROBENZENE	UG/L	TOTAL	U
				34536	1,2-DICHLOROBENZENE	UG/L	TOTAL	U
				34396	HEXACHLOROETHANE	UG/L	TOTAL	U
				39702	HEXACHLOROBUTADIENE	UG/L	TOTAL	U
				34551	1,2,4-TRICHLOROBENZENE	UG/L	TOTAL	U
				34696	NAPHTHALENE	UG/L	TOTAL	U
				34273	BIS(2-CHLOROETHYL) ET.	UG/L	TOTAL	U
				34278	BIS(2-CHLOROETHOXY) METH.	UG/L	TOTAL	U
				34408	ISOPHORONE	UG/L	TOTAL	U
				34447	NITROBENZENE	UG/L	TOTAL	U

COMPLETED ANALYSIS REPORT — REPORT DATE: 97/12/22

PROJECT NO: 261 — PROJECT NAME: TURPENTINE RUN

STATION NO	DATE FROM TO	TIME OF DAY	LABNO	PARNO	PARAMETER NAME	UNITS	CHEMISTRY	VALUE & REMARK
			000022	34428	N-NITROSODI-N-PROPYLAMINE	UG/L	TOTAL	U
				34433	N-NITROSODIPHENYLAMINE	UG/L	TOTAL	U
				34283	BIS(2-CHLOROISOPROPYL) ET.	UG/L	TOTAL	U
				34386	HEXACHLOROCYCLOPENTADIENE	UG/L	TOTAL	U
				34581	2-CHLORONAPHTHALENE	UG/L	TOTAL	U
				34200	ACENAPHTHYLENE	UG/L	TOTAL	U
				34205	ACENAPHTHENE	UG/L	TOTAL	U
				34381	FLUORENE	UG/L	TOTAL	U
				39700	HEXACHLOROBENZENE	UG/L	TOTAL	U
				34636	4-BROMOPHENYL PHENYL ET.	UG/L	TOTAL	U
				34461	PHENANTHRENE	UG/L	TOTAL	0.1 M
				34220	ANTHRACENE	UG/L	TOTAL	U
				34341	DIMETHYL PHTHALATE	UG/L	TOTAL	U
				34336	DIETHYL PHTHALATE	UG/L	TOTAL	0.1 M
				39110	DI-N-BUTYLPHTHALATE	UG/L	TOTAL	0.5 M
				34292	BUTYL BENZYL PHTHALATE	UG/L	TOTAL	0.1 M
				34596	DI-N-OCTYL PHTHALATE	UG/L	TOTAL	U
				39100	BIS(2-ETHYLHEXYL) PHTHAL.	UG/L	TOTAL	0.6 M
				34376	FLUORANTHENE	UG/L	TOTAL	U
				34469	PYRENE	UG/L	TOTAL	U
				34320	CHRYSENE	UG/L	TOTAL	U
				34526	1,2-BENZANTHRACENE	UG/L	TOTAL	U
				34641	4-CHLOROPHENYL PHENYL ET.	UG/L	TOTAL	U
				34403	INDENO(1,2,3-C,D) PYRENE	UG/L	TOTAL	U
				34247	BENZO(A)PYRENE	UG/L	TOTAL	U
				34521	1,12-BENZOPERYLENE	UG/L	TOTAL	U
				34556	1,2:5,6-DIBENZANTHRACENE	UG/L	TOTAL	U
				34631	3,3'-DICHLOROBENZIDENE	UG/L	TOTAL	U
				34626	2,6-DINITROTOLUENE	UG/L	TOTAL	U
				34611	2,4-DINITROTOLUENE	UG/L	TOTAL	U
				34346	1,2-DIPHENYLHYDRAZINE	UG/L	TOTAL	U
				34230	3,4-BENZOFLUORANTHENE	UG/L	TOTAL	U
				34242	11,12-BENZOFLUORANTHENE	UG/L	TOTAL	U

TURP.RUN — 97/10/19 1200
DEPTH: 0000 SUBSTRATE: AQUEOUS
DESCRIPTION: LAB BLANK
EXTRACTION DATE 10/10/97

			000032	34586	2-CHLOROPHENOL	UG/L	TOTAL	U
				34591	2-NITROPHENOL	UG/L	TOTAL	U
				34694	PHENOL	UG/L	TOTAL	U

COMPLETED ANALYSIS REPORT

REPORT DATE: 87/12/22

PROJECT NO: 262

PROJECT NAME: TURPENTINE RUN

STATION NO	DATE FROM TO	TIME OF DAY	LABNO	PARNO	PARAMETER NAME	UNITS	CHEMISTRY	VALUE & REMARK
			000032	34606	2,4-DIMETHYLPHENOL	UG/L	TOTAL	U
				34601	2,4-DICHLOROPHENOL	UG/L	TOTAL	U
				34621	2,4,6-TRICHLOROPHENOL	UG/L	TOTAL	U
				34452	P-CHLORO-M-CRESOL	UG/L	TOTAL	U
				34616	2,4-DINITROPHENOL	UG/L	TOTAL	U
				34657	4,6-DINITRO-O-CRESOL	UG/L	TOTAL	U
				39032	PENTACHLOROPHENOL	UG/L	TOTAL	U
				34646	4-NITROPHENOL	UG/L	TOTAL	U
				34566	1,3-DICHLOROBENZENE	UG/L	TOTAL	U
				34571	1,4-DICHLOROBENZENE	UG/L	TOTAL	U
				34536	1,2-DICHLOROBENZENE	UG/L	TOTAL	U
				34396	HEXACHLOROETHANE	UG/L	TOTAL	U
				39702	HEXACHLOROBUTADIENE	UG/L	TOTAL	U
				34551	1,2,4-TRICHLOROBENZENE	UG/L	TOTAL	U
				34695	NAPHTHALENE	UG/L	TOTAL	U
				34273	BIS(2-CHLOROETHYL) ET.	UG/L	TOTAL	U
				34278	BIS(2-CHLOROETHOXY) METH.	UG/L	TOTAL	U
				34408	ISOPHORONE	UG/L	TOTAL	U
				34447	NITROBENZENE	UG/L	TOTAL	U
				34428	N-NITROSODI-N-PROPYLAMINE	UG/L	TOTAL	U
				34433	N-NITROSODIPHENYLAMINE	UG/L	TOTAL	U
				34283	BIS(2-CHLOROISOPROPYL) ET.	UG/L	TOTAL	U
				34386	HEXACHLOROCYCLOPENTADIENE	UG/L	TOTAL	U
				34591	2-CHLORONAPHTHALENE	UG/L	TOTAL	U
				34200	ACENAPHTHYLENE	UG/L	TOTAL	U
				34205	ACENAPHTHENE	UG/L	TOTAL	U
				34381	FLUORENE	UG/L	TOTAL	U
				39700	HEXACHLOROBENZENE	UG/L	TOTAL	U
				34636	4-BROMOPHENYL PHENYL ET.	UG/L	TOTAL	U
				34461	PHENANTHRENE	UG/L	TOTAL	U
				34220	ANTHRACENE	UG/L	TOTAL	U
				34341	DIMETHYL PHTHALATE	UG/L	TOTAL	U
				34336	DIETHYL PHTHALATE	UG/L	TOTAL	U
				39110	DI-N-BUTYLPHTHALATE	UG/L	TOTAL	0.4
				34292	BUTYL BENZYL PHTHALATE	UG/L	TOTAL	U
				34596	DI-N-OCTYL PHTHALATE	UG/L	TOTAL	U
				39100	BIS(2-ETHYLHEXYL) PHTHAL.	UG/L	TOTAL	0.4
				34376	FLUORANTHENE	UG/L	TOTAL	U
				34469	PYRENE	UG/L	TOTAL	U
				34320	CHRYSENE	UG/L	TOTAL	U
				34526	1,2-BENZANTHRACENE	UG/L	TOTAL	U

TUT 001 1251

COMPLETED ANALYSIS REPORT — REPORT DATE: 87/12/22

PROJECT NO: 262 — PROJECT NAME: TURPENTINE RUN

STATION NO	DATE FROM TO	TIME OF DAY	LABNO	PARNO	PARAMETER NAME	UNITS	CHEMISTRY	VALUE & REMARK
			000032	34641	4-CHLOROPHENYL PHENYL ET.	UG/L	TOTAL	U
				34403	INDENO(1,2,3-C,D) PYRENE	UG/L	TOTAL	U
				34247	BENZO(A)PYRENE	UG/L	TOTAL	U
				34521	1,12-BENZOPERYLENE	UG/L	TOTAL	U
				34556	1,2:5,6-DIBENZANTHRACENE	UG/L	TOTAL	U
				34631	3,3'-DICHLOROBENZIDENE	UG/L	TOTAL	U
				34626	2,6-DINITROTOLUENE	UG/L	TOTAL	U
				34611	2,4-DINITROTOLUENE	UG/L	TOTAL	U
				34346	1,2-DIPHENYLHYDRAZINE	UG/L	TOTAL	U
				34230	3,4-BENZOFLUORANTHENE	UG/L	TOTAL	U
				34242	11,12-BENZOFLUORANTHENE	UG/L	TOTAL	U
TURP.RUN	87/10/13	1200						
DEPTH: 0000	SUBSTRATE: AQUEOUS							
DESCRIPTION: LAB BLANK								
	EXTRACTION DATE 10/13/87							
			000042	34586	2-CHLOROPHENOL	UG/L	TOTAL	U
				34591	2-NITROPHENOL	UG/L	TOTAL	U
				34694	PHENOL	UG/L	TOTAL	U
				34606	2,4-DIMETHYLPHENOL	UG/L	TOTAL	U
				34601	2,4-DICHLOROPHENOL	UG/L	TOTAL	U
				34621	2,4,6-TRICHLOROPHENOL	UG/L	TOTAL	U
				34452	P-CHLORO-M-CRESOL	UG/L	TOTAL	U
				34616	2,4-DINITROPHENOL	UG/L	TOTAL	U
				34657	4,6-DINITRO-O-CRESOL	UG/L	TOTAL	U
				39032	PENTACHLOROPHENOL	UG/L	TOTAL	U
				34646	4-NITROPHENOL	UG/L	TOTAL	U
				34566	1,3-DICHLOROBENZENE	UG/L	TOTAL	U
				34571	1,4-DICHLOROBENZENE	UG/L	TOTAL	U
				34536	1,2-DICHLOROBENZENE	UG/L	TOTAL	U
				34396	HEXACHLOROETHANE	UG/L	TOTAL	U
				39702	HEXACHLOROBUTADIENE	UG/L	TOTAL	U
				34551	1,2,4-TRICHLOROBENZENE	UG/L	TOTAL	U
				34696	NAPHTHALENE	UG/L	TOTAL	U
				34273	BIS(2-CHLOROETHYL) ET.	UG/L	TOTAL	U
				34279	BIS(2-CHLOROETHOXY) METH.	UG/L	TOTAL	U
				34408	ISOPHORONE	UG/L	TOTAL	U
				34447	NITROBENZENE	UG/L	TOTAL	U
				34428	N-NITROSODI-N-PROPYLAMINE	UG/L	TOTAL	U
				34433	N-NITROSODIPHENYLAMINE	UG/L	TOTAL	U
				34283	BIS(2-CHLOROISOPROPYL) ET.	UG/L	TOTAL	U

TUT 001 1252

COMPLETED ANALYSIS REPORT

REPORT DATE: 87/12/22

PROJECT NO: 262

PROJECT NAME: TURPENTINE RUN

STATION NO	DATE FROM TO	TIME OF DAY	LABNO	PARNO	PARAMETER NAME	UNITS	CHEMISTRY	VALUE & REMARK
			000042	34386	HEXACHLOROCYCLOPENTADIENE	UG/L	TOTAL	U
				34591	2-CHLORONAPHTHALENE	UG/L	TOTAL	U
				34200	ACENAPHTHYLENE	UG/L	TOTAL	U
				34205	ACENAPHTHENE	UG/L	TOTAL	U
				34381	FLUORENE	UG/L	TOTAL	U
				39700	HEXACHLOROBENZENE	UG/L	TOTAL	U
				34636	4-BROMOPHENYL PHENYL ET.	UG/L	TOTAL	U
				34461	PHENANTHRENE	UG/L	TOTAL	U
				34220	ANTHRACENE	UG/L	TOTAL	U
				34341	DIMETHYL PHTHALATE	UG/L	TOTAL	U
				34336	DIETHYL PHTHALATE	UG/L	TOTAL	U
				35110	DI-N-BUTYLPHTHALATE	UG/L	TOTAL	0.5 M
				34292	BUTYL BENZYL PHTHALATE	UG/L	TOTAL	U
				34596	DI-N-OCTYL PHTHALATE	UG/L	TOTAL	U
				39100	BIS(2-ETHYLHEXYL) PHTHAL.	UG/L	TOTAL	0.5 M
				34376	FLUORANTHENE	UG/L	TOTAL	U
				34469	PYRENE	UG/L	TOTAL	U
				34320	CHRYSENE	UG/L	TOTAL	U
				34526	1,2-BENZANTHRACENE	UG/L	TOTAL	U
				34641	4-CHLOROPHENYL PHENYL ET.	UG/L	TOTAL	U
				34403	INDENO(1,2,3-C,D) PYRENE	UG/L	TOTAL	U
				34247	BENZO(A)PYRENE	UG/L	TOTAL	U
				34521	1,12-BENZOPERYLENE	UG/L	TOTAL	U
				34556	1,2:5,6-DIBENZANTHRACENE	UG/L	TOTAL	U
				34631	3,3'-DICHLOROBENZIDENE	UG/L	TOTAL	U
				34626	2,6-DINITROTOLUENE	UG/L	TOTAL	U
				34611	2,4-DINITROTOLUENE	UG/L	TOTAL	U
				34346	1,2-DIPHENYLHYDRAZINE	UG/L	TOTAL	U
				34230	3,4-BENZOFLUORANTHENE	UG/L	TOTAL	U
				34242	11,12-BENZOFLUORANTHENE	UG/L	TOTAL	U

URP.RUN 87/10/14 1200
DEPTH: 0000 SUBSTRATE: AQUEOUS
DESCRIPTION: LAB BLANK
EXTRACTION DATE 10/14/87

			000052	34586	2-CHLOROPHENOL	UG/L	TOTAL	U
				34591	2-NITROPHENOL	UG/L	TOTAL	U
				34694	PHENOL	UG/L	TOTAL	U
				34606	2,4-DIMETHYLPHENOL	UG/L	TOTAL	U
				34601	2,4-DICHLOROPHENOL	UG/L	TOTAL	U
				34621	2,4,6-TRICHLOROPHENOL	UG/L	TOTAL	U

TUT 001

1252

COMPLETED ANALYSIS REPORT

REPORT DATE: 87/12/22

PROJECT NO: 262

PROJECT NAME: TURPENTINE RUN

STATION NO	DATE FROM TO	TIME OF DAY	LABNO	PARNO	PARAMETER NAME	UNITS	CHEMISTRY	VALUE & REMARK
			000052	34452	P-CHLORO-M-CRESOL	UG/L	TOTAL	U
				34616	2,4-DINITROPHENOL	UG/L	TOTAL	U
				34657	4,6-DINITRO-2-CRESOL	UG/L	TOTAL	U
				39032	PENTACHLOROPHENOL	UG/L	TOTAL	U
				34646	4-NITROPHENOL	UG/L	TOTAL	U
				34566	1,3-DICHLOROBENZENE	UG/L	TOTAL	U
				34571	1,4-DICHLOROBENZENE	UG/L	TOTAL	U
				34536	1,2-DICHLOROBENZENE	UG/L	TOTAL	U
				34396	HEXACHLOROETHANE	UG/L	TOTAL	U
				39702	HEXACHLOROBUTADIENE	UG/L	TOTAL	U
				34551	1,2,4-TRICHLOROBENZENE	UG/L	TOTAL	U
				34696	NAPHTHALENE	UG/L	TOTAL	U
				34273	BIS(2-CHLOROETHYL) ET.	UG/L	TOTAL	U
				34278	BIS(2-CHLOROETHOXY) METH.	UG/L	TOTAL	U
				34408	ISOPHORONE	UG/L	TOTAL	U
				34447	NITROBENZENE	UG/L	TOTAL	U
				34428	N-NITROSODI-N-PROPYLAMINE	UG/L	TOTAL	U
				34433	N-NITROSODIPHENYLAMINE	UG/L	TOTAL	U
				34283	BIS(2-CHLOROISOPROPYL) ET.	UG/L	TOTAL	U
				34386	HEXACHLOROCYCLOPENTADIENE	UG/L	TOTAL	U
				34581	2-CHLORONAPHTHALENE	UG/L	TOTAL	U
				34200	ACENAPHTHYLENE	UG/L	TOTAL	U
				34205	ACENAPHTHENE	UG/L	TOTAL	U
				34381	FLOURENE	UG/L	TOTAL	U
				39700	HEXACHLOROBENZENE	UG/L	TOTAL	U
				34636	4-BROMOPHENYL PHENYL ET.	UG/L	TOTAL	U
				34461	PHENANTHRENE	UG/L	TOTAL	U
				34220	ANTHRACENE	UG/L	TOTAL	U
				34341	DIMETHYL PHTHALATE	UG/L	TOTAL	U
				34336	DIETHYL PHTHALATE	UG/L	TOTAL	U
				39110	DI-N-BUTYLPHTHALATE	UG/L	TOTAL	0.6
				34292	BUTYL BENZYL PHTHALATE	UG/L	TOTAL	U
				34596	DI-N-OCTYL PHTHALATE	UG/L	TOTAL	U
				39100	BIS(2-ETHYLHEXYL) PHTHAL.	UG/L	TOTAL	0.3
				34376	FLUORANTHENE	UG/L	TOTAL	U
				34469	PYRENE	UG/L	TOTAL	U
				34320	CHRYSENE	UG/L	TOTAL	U
				34526	1,2-BENZANTHRACENE	UG/L	TOTAL	U
				34641	4-CHLOROPHENYL PHENYL ET.	UG/L	TOTAL	U
				34403	INDENO(1,2,3-C,D) PYRENE	UG/L	TOTAL	U
				34247	BENZO(A)PYRENE	UG/L	TOTAL	U

TOT 001 1254

COMPLETE ANALYSIS REPORT — REPORT DATE: 87/12/04

PROJECT NO: 262 — PROJECT NAME: TURBENTINE RUN

STATION NO	DATE FROM TO	TIME OF DAY	LABNO	PARNO	PARAMETER NAME	UNITS	CHEMISTRY	VALUE & REMARK
			000052	34521	1,12-BENZOPERYLENE	UG/L	TOTAL	U
				34556	1,2,5,6-DIBENZANTHRACENE	UG/L	TOTAL	U
				34631	3,3'-DICHLOROBENZIDENE	UG/L	TOTAL	U
				34626	2,6-DINITROTOLUENE	UG/L	TOTAL	U
				34611	2,4-DINITROTOLUENE	UG/L	TOTAL	U
				34346	1,2-DIPHENYLHYDRAZINE	UG/L	TOTAL	U
				34230	3,4-BENZOFLUORANTHENE	UG/L	TOTAL	U
				34242	11,12-BENZOFLUORANTHENE	UG/L	TOTAL	U
TURP.RUN	87/10/05	1000						
DEPTH: 0000 SUBSTRATE: AQUEOUS								
DESCRIPTION: FIELD BLANK								
			099776	34416	METHYL CHLORIDE	UG/L	TOTAL	U
				34413	METHYL BROMIDE	UG/L	TOTAL	U
				39175	VINYL CHLORIDE	UG/L	TOTAL	U
				34311	CHLOROETHANE	UG/L	TOTAL	U
				34423	METHYLENE CHLORIDE	UG/L	TOTAL	U
				34501	1,1-DICHLOROETHYLENE	UG/L	TOTAL	U
				34496	1,1-DICHLOROETHANE	UG/L	TOTAL	U
				34546	1,2-TRANS DICHLOROETHYLENE	UG/L	TOTAL	U
				32106	CHLOROFORM	UG/L	TOTAL	U
				32103	1,2-DICHLOROETHANE	UG/L	TOTAL	U
				34506	1,1,1-TRICHLOROETHANE	UG/L	TOTAL	U
				32102	CARBON TETRACHLORIDE	UG/L	TOTAL	U
				32101	DICHLOROBROMOMETHANE	UG/L	TOTAL	U
				34541	1,2-DICHLOROPROPANE	UG/L	TOTAL	U
				34561	1,3-DICHLOROPROPYLENE	UG/L	TOTAL	U
				39180	TRICHLOROETHYLENE	UG/L	TOTAL	U
				34030	BENZENE	UG/L	TOTAL	U
				32105	CHLORODIBROMOMETHANE	UG/L	TOTAL	U
				34511	1,1,2-TRICHLOROETHANE	UG/L	TOTAL	U
				32104	BROMOFORM	UG/L	TOTAL	U
				34516	1,1,2,2-TETRACHLOROETHANE	UG/L	TOTAL	U
				34475	TETRACHLOROETHYLENE	UG/L	TOTAL	U
				34010	TOLUENE	UG/L	TOTAL	U
				34301	CHLOROBENZENE	UG/L	TOTAL	U
				34371	ETHYLBENZENE	UG/L	TOTAL	U
				34586	2-CHLOROPHENOL	UG/L	TOTAL	U
				34591	2-NITROPHENOL	UG/L	TOTAL	U
				34696	PHENOL	UG/L	TOTAL	U

TUT 001 1255

COMPLETED ANALYSIS REPORT — REPORT DATE: 07/12/88

PROJECT NO: 262 — PROJECT NAME: TURPENTINE RUN

STATION NO	DATE FROM TO	TIME OF DAY	LABNO	PARNO	PARAMETER NAME	UNITS	CHEMISTRY	VALUE & REMARK
			090776	34606	2,6-DIMETHYLPHENOL	UG/L	TOTAL	U
				34601	2,4-DICHLOROPHENOL	UG/L	TOTAL	U
				34671	2,4,6-TRICHLOROPHENOL	UG/L	TOTAL	U
				34452	P-CHLORO-M-CRESOL	UG/L	TOTAL	U
				34616	2,4-DINITROPHENOL	UG/L	TOTAL	U
				34657	4,6-DINITRO-O-CRESOL	UG/L	TOTAL	U
				39032	PENTACHLOROPHENOL	UG/L	TOTAL	U
				34646	4-NITROPHENOL	UG/L	TOTAL	U
				34566	1,3-DICHLOROBENZENE	UG/L	TOTAL	U
				34571	1,4-DICHLOROBENZENE	UG/L	TOTAL	2.0 U
				34536	1,2-DICHLOROBENZENE	UG/L	TOTAL	U
				34396	HEXACHLOROETHANE	UG/L	TOTAL	U
				39702	HEXACHLOROBUTADIENE	UG/L	TOTAL	U
				34551	1,2,4-TRICHLOROBENZENE	UG/L	TOTAL	U
				34696	NAPHTHALENE	UG/L	TOTAL	U
				34274	BIS(2-CHLOROETHYL) ET.	UG/L	TOTAL	U
				34278	BIS(2-CHLOROETHOXY) METH.	UG/L	TOTAL	U
				34408	ISOPHORONE	UG/L	TOTAL	U
				34447	NITROBENZENE	UG/L	TOTAL	U
				34428	N-NITROSODI-N-PROPYLAMINE	UG/L	TOTAL	U
				34433	N-NITROSODIPHENYLAMINE	UG/L	TOTAL	U
				34283	BIS(2-CHLOROISOPROPYL) ET.	UG/L	TOTAL	U
				34396	HEXACHLOROCYCLOPENTADIENE	UG/L	TOTAL	U
				34581	2-CHLORONAPHTHALENE	UG/L	TOTAL	U
				34200	ACENAPHTHYLEN-	UG/L	TOTAL	U
				34205	ACENAPHTHENE	UG/L	TOTAL	U
				34381	FLOURENE	UG/L	TOTAL	U
				39700	HEXACHLOROBENZENE	UG/L	TOTAL	U
				34629	4-BROMOPHENYL PHENYL ET.	UG/L	TOTAL	U
				34461	PHENANTHRENE	UG/L	TOTAL	U
				34220	ANTHRACENE	UG/L	TOTAL	U
				34341	DIMETHYL PHTHALATE	UG/L	TOTAL	U
				34336	DIETHYL PHTHALATE	UG/L	TOTAL	U
				39110	DI-N-BUTYLPHTHALATE	UG/L	TOTAL	U
				34292	BUTYL BENZYL PHTHALATE	UG/L	TOTAL	U
				34596	DI-N-OCTYL PHTHALATE	UG/L	TOTAL	12
				39100	BIS(2-ETHYLHEXYL) PHTHAL.	UG/L	TOTAL	540 J
				34376	FLUORANTHENE	UG/L	TOTAL	U
				34469	PYRENE	UG/L	TOTAL	U
				34320	CHRYSENE	UG/L	TOTAL	U
				34526	1,2-BENZANTHRACENE	UG/L	TOTAL	U

TUT 001 1256

COMPLETED ANALYSIS REPORT — REPORT DATE: 87/12/

PROJECT NO: 262 — PROJECT NAME: URPENTINE RUN

STATION NO	DATE FROM TO	TIME OF DAY	LABNO	PARNO	PARAMETER NAME	UNITS	CHEMISTRY	VALUE & REMARK
			090775	34641	4-CHLOROPHENYL PHENYL ET.	UG/L	TOTAL	U
				34403	INDENO(1,2,3-C,D) PYRENE	UG/L	TOTAL	U
				34247	BENZO(A)PYRENE	UG/L	TOTAL	U
				34521	1,12-BENZOPERYLENE	UG/L	TOTAL	U
				34556	1,2:5,6-DIBENZANTHRACENE	UG/L	TOTAL	U
				34631	3,3'-DICHLOROBENZIDENE	UG/L	TOTAL	U
				34626	2,6-DINITROTOLUENE	UG/L	TOTAL	U
				34611	2,4-DINITROTOLUENE	UG/L	TOTAL	U
				34346	1,2-DIPHENYLHYDRAZINE	UG/L	TOTAL	U
				34230	3,4-BENZOFLUORANTHENE	UG/L	TOTAL	U
				34242	11,12-BENZOFLUORANTHENE	UG/L	TOTAL	U
				39330	ALDRIN	UG/L	TOTAL	U
				39380	DIELDRIN	UG/L	TOTAL	U
				39350	CHLORDANE	UG/L	TOTAL	U
				39300	4,4'-DDT	UG/L	TOTAL	U
				39320	4,4'-DDE	UG/L	TOTAL	U
				39310	4,4'-DDD	UG/L	TOTAL	U
				34351	ALPHA ENDOSULFAN	UG/L	TOTAL	U
				34356	BETA ENDOSULFAN	UG/L	TOTAL	U
				34351	ENDOSULFAN SULFATE	UG/L	TOTAL	U
				39390	ENDRIN	UG/L	TOTAL	U
				34366	ENDRIN ALDEHYDE	UG/L	TOTAL	U
				39410	HEPTACLOR	UG/L	TOTAL	U
				39420	HEPTACHLOR EPOXIDE	UG/L	TOTAL	U
				39337	ALPHA-BHC	UG/L	TOTAL	U
				39338	BETA-BHC	UG/L	TOTAL	U
				39340	GAMMA-BHC	UG/L	TOTAL	U
				34259	DELTA-BHC	UG/L	TOTAL	U
				39400	TOXAPHENE	UG/L	TOTAL	U
				34671	PCB-1016	UG/L	TOTAL	U
				39488	PCB-1221	UG/L	TOTAL	U
				39492	PCB-1232	UG/L	TOTAL	U
				39496	PCB-1242	UG/L	TOTAL	U
				39500	PCB-1248	UG/L	TOTAL	U
				39504	PCB-1254	UG/L	TOTAL	U
				39508	PCB-1260	UG/L	TOTAL	U

TURP.RUN 87/10/06 1120
DEPTH: 0000 SUBSTRATE: AQUEOUS
DESCRIPTION: BRYAN WELL #1 FROM STANDPIPE

COMPLETED ANALYSIS REPORT — REPORT DATE: 87/12/22

PROJECT NO: 262 — PROJECT NAME: TURPENTINE RUN

STATION NO	DATE FROM TO	TIME OF DAY	LABNO	PARNO	PARAMETER NAME	UNITS	CHEMISTRY	VALUE & REMARK
			090777	34416	METHYL CHLORIDE	UG/L	TOTAL	U
			090777	34413	METHYL BROMIDE	UG/L	TOTAL	U
				39175	VINYL CHLORIDE	UG/L	TOTAL	U
				34311	CHLOROETHANE	UG/L	TOTAL	U
				34423	METHYLENE CHLORIDE	UG/L	TOTAL	U
				34501	1,1-DICHLOROETHYLENE	UG/L	TOTAL	U
				34496	1,1-DICHLOROETHANE	UG/L	TOTAL	U
				34566	1,2-TRANS DICHLOROETHYLENE	UG/L	TOTAL	U
				32106	CHLOROFORM	UG/L	TOTAL	U
				32103	1,2-DICHLOROETHANE	UG/L	TOTAL	U
				34506	1,1,1-TRICHLOROETHANE	UG/L	TOTAL	U
				32102	CARBON TETRACHLORIDE	UG/L	TOTAL	U
				32101	DICHLOROBROMOMETHANE	UG/L	TOTAL	U
				34541	1,2-DICHLOROPROPANE	UG/L	TOTAL	U
				34561	1,3-DICHLOROPROPYLENE	UG/L	TOTAL	U
				39180	TRICHLOROETHYLENE	UG/L	TOTAL	U
				34030	BENZENE	UG/L	TOTAL	U
				32105	CHLORODIBROMOMETHANE	UG/L	TOTAL	U
				34511	1,1,2-TRICHLOROETHANE	UG/L	TOTAL	U
				32104	BROMOFORM	UG/L	TOTAL	U
				34516	1,1,2,2-TETRACHLOROETHANE	UG/L	TOTAL	U
				34475	TETRACHLOROETHYLENE	UG/L	TOTAL	U
				34010	TOLUENE	UG/L	TOTAL	2.4 M
				34301	CHLOROBENZENE	UG/L	TOTAL	U
				34371	ETHYLBENZENE	UG/L	TOTAL	U
				34586	2-CHLOROPHENOL	UG/L	TOTAL	U
				34591	2-NITROPHENOL	UG/L	TOTAL	U
				34694	PHENOL	UG/L	TOTAL	U
				34606	2,4-DIMETHYLPHENOL	UG/L	TOTAL	U
				34601	2,4-DICHLOROPHENOL	UG/L	TOTAL	U
				34621	2,4,6-TRICHLOROPHENOL	UG/L	TOTAL	U
				34452	P-CHLORO-M-CRESOL	UG/L	TOTAL	U
				34616	2,4-DINITROPHENOL	UG/L	TOTAL	U
				34657	4,6-DINITRO-O-CRESOL	UG/L	TOTAL	U
				39032	PENTACHLOROPHENOL	UG/L	TOTAL	U
				34646	4-NITROPHENOL	UG/L	TOTAL	U
				34566	1,3-DICHLOROBENZENE	UG/L	TOTAL	U
				34571	1,4-DICHLOROBENZENE	UG/L	TOTAL	U
				34536	1,2-DICHLOROBENZENE	UG/L	TOTAL	U
				34396	HEXACHLOROETHANE	UG/L	TOTAL	U
				39702	HEXACHLOROBUTADIENE	UG/L	TOTAL	U

COMPLETED ANALYSIS REPORT

REPORT DATE: 87/12/??

PROJECT NO: 262 PROJECT NAM /URPENTINE RUN

STATION NO	DATE FROM TO	TIME OF DAY	LABNO	PARNO	PARAMETER NAME	UNITS	CHEMISTRY	VALUE & REMARK
			093777	34551	1,2,4-TRICHLOROBENZENE	UG/L	TOTAL	U
				34696	NAPHTHALENE	UG/L	TOTAL	U
				34273	BIS(2-CHLOROETHYL) ET.	UG/L	TOTAL	U
				34278	BIS(2-CHLOROETHOXY) METH.	UG/L	TOTAL	U
				34408	ISOPHORONE	UG/L	TOTAL	U
				34447	NITROBENZENE	UG/L	TOTAL	U
				34428	N-NITROSODI-N-PROPYLAMINE	UG/L	TOTAL	U
				34433	N-NITROSODIPHENYLAMINE	UG/L	TOTAL	U
				34283	BIS(2-CHLOROISOPROPYL) ET.	UG/L	TOTAL	U
				34386	HEXACHLOROCYCLOPENTADIENE	UG/L	TOTAL	U
				34581	2-CHLORONAPHTHALENE	UG/L	TOTAL	U
				34200	ACENAPHTHYLENE	UG/L	TOTAL	U
				34205	ACENAPHTHENE	UG/L	TOTAL	U
				34381	FLOURENE	UG/L	TOTAL	U
				39700	HEXACHLOROBENZENE	UG/L	TOTAL	U
				34636	4-BROMOPHENYL PHENYL ET.	UG/L	TOTAL	U
				34461	PHENANTHRENE	UG/L	TOTAL	U
				34220	ANTHRACENE	UG/L	TOTAL	U
				34341	DIMETHYL PHTHALATE	UG/L	TOTAL	U
				34336	DIETHYL PHTHALATE	UG/L	TOTAL	U
				39110	DI-N-BUTYLPHTHALATE	UG/L	TOTAL	U
				34292	BUTYL BENZYL PHTHALATE	UG/L	TOTAL	U
				34596	DI-N-OCTYL PHTHALATE	UG/L	TOTAL	0.1 M
				39100	BIS(2-ETHYLHEXYL) PHTHAL.	UG/L	TOTAL	U
				34376	FLUORANTHENE	UG/L	TOTAL	U
				34469	PYRENE	UG/L	TOTAL	J
				34320	CHRYSENE	UG/L	TOTAL	U
				34526	1,2-BENZANTHRACENE	UG/L	TOTAL	U
				34641	4-CHLOROPHENYL PHENYL ET.	UG/L	TOTAL	U
				34403	INDENO(1,2,3-C,D) PYRENE	UG/L	TOTAL	U
				34247	BENZO(A)PYRENE	UG/L	TOTAL	U
				34521	1,12-BENZOPERYLENE	UG/L	TOTAL	U
				34556	1,2:5,6-DIBENZANTHRACENE	UG/L	TOTAL	U
				34631	3,3'-DICHLOROBENZIDENE	UG/L	TOTAL	U
				34626	2,6-DINITROTOLUENE	UG/L	TOTAL	U
				34611	2,4-DINITROTOLUENE	UG/L	TOTAL	U
				34346	1,2-DIPHENYLHYDRAZINE	UG/L	TOTAL	U
				34230	3,4-BENZOFLUORANTHENE	UG/L	TOTAL	U
				34242	11,12-BENZOFLUORANTHENE	UG/L	TOTAL	U
				39330	ALDRIN	UG/L	TOTAL	U
				39380	DIELDRIN	UG/L	TOTAL	U

TUT 001

1259

PROJECT NO: 262 PROJECT NAME: TURPENTINE RUN

STATION NO	DATE FROM TO	TIME OF DAY	LABNO	PARNO	PARAMETER NAME	UNITS	CHEMISTRY	VALUE	C	REMARK
			090777	39350	CHLORDANE	UG/L	TOTAL			U
				39300	4,4'-DDT	UG/L	TOTAL			U
				39320	4,4'-DDE	UG/L	TOTAL			U
				39310	4,4'-DDD	UG/L	TOTAL			U
				34361	ALPHA ENDOSULFAN	UG/L	TOTAL			U
				34356	BETA ENDOSULFAN	UG/L	TOTAL			U
				34351	ENDOSULFAN SULFATE	UG/L	TOTAL			U
				39390	ENDRIN	UG/L	TOTAL			U
				34366	ENDRIN ALDEHYDE	UG/L	TOTAL			U
				39410	HEPTACLOR	UG/L	TOTAL			U
				39420	HEPTACHLOR EPOXIDE	UG/L	TOTAL			U
				39337	ALPHA-BHC	UG/L	TOTAL			U
				39338	BETA-BHC	UG/L	TOTAL			U
				39340	GAMMA-BHC	UG/L	TOTAL			U
				34259	DELTA-BHC	UG/L	TOTAL			U
				39400	TOXAPHENE	UG/L	TOTAL			U
				34671	PCB-1016	UG/L	TOTAL			U
				39488	PCB-1221	UG/L	TOTAL			U
				39492	PCB-1232	UG/L	TOTAL			U
				39496	PCB-1242	UG/L	TOTAL			U
				39500	PCB-1248	UG/L	TOTAL			U
				39504	PCB-1254	UG/L	TOTAL			U
				39508	PCB-1260	UG/L	TOTAL			U
TURP.RUN	87/10/06	1225								
DEPTH: 0000 SUBSTRATE: AQUEOUS										
DESCRIPTION: TILLET WELL										
			090778	34418	METHYL CHLORIDE	UG/L	TOTAL			U
				34413	METHYL BROMIDE	UG/L	TOTAL			U
				39175	VINYL CHLORIDE	UG/L	TOTAL			U
				34311	CHLOROETHANE	UG/L	TOTAL			U
				34423	METHYLENE CHLORIDE	UG/L	TOTAL			U
				34501	1,1-DICHLOROETHYLENE	UG/L	TOTAL			U
				34496	1,1-DICHLOROETHANE	UG/L	TOTAL			U
				34546	1,2-TRANS DICHLOROETHYLENE	UG/L	TOTAL	400		
				32106	CHLOROFORM	UG/L	TOTAL			U
				32104	1,2-DICHLOROETHANE	UG/L	TOTAL			U
				34506	1,1,1-TRICHLOROETHANE	UG/L	TOTAL			U
				32102	CARBON TETRACHLORIDE	UG/L	TOTAL			U
				32101	DICHLOROBROMOMETHANE	UG/L	TOTAL			U

TUT 001 1260

PROJECT NO: 262 PROJECT NAME: TURPENTINE RUN

STATION NO	DATE FROM TO	TIME OF DAY	LABNO	PARNO	PARAMETER NAME	UNITS	CHEMISTRY	VALUE & REMARK
			093773	34541	1,2-DICHLOROPROPANE	UG/L	TOTAL	U
				34561	1,3-DICHLOROPROPYLENE	UG/L	TOTAL	U
				39180	TRICHLOROETHYLENE	UG/L	TOTAL	25
				34030	BENZENE	UG/L	TOTAL	U
				32105	CHLORODIBROMOMETHANE	UG/L	TOTAL	U
				34511	1,1,2-TRICHLOROETHANE	UG/L	TOTAL	U
				32104	BROMOFORM	UG/L	TOTAL	U
				34516	1,1,2,2-TETRACHLOROETHANE	UG/L	TOTAL	U
				34475	TETRACHLOROETHYLENE	UG/L	TOTAL	160
				34010	TOLUENE	UG/L	TOTAL	U
				34301	CHLOROBENZENE	UG/L	TOTAL	U
				34371	ETHYLBENZENE	UG/L	TOTAL	U
				99999	TERT-BUTYLMETHYLETHER	UG/L	TOTAL	470 J
				34586	2-CHLOROPHENOL	UG/L	TOTAL	U
				34591	2-NITROPHENOL	UG/L	TOTAL	U
				34694	PHENOL	UG/L	TOTAL	U
				34606	2,4-DIMETHYLPHENOL	UG/L	TOTAL	U
				34601	2,4-DICHLOROPHENOL	UG/L	TOTAL	U
				34621	2,4,6-TRICHLOROPHENOL	UG/L	TOTAL	U
				34454	P-CHLORO-M-CRESOL	UG/L	TOTAL	U
				34616	2,4-DINITROPHENOL	UG/L	TOTAL	U
				34657	4,6-DINITRO-O-CRESOL	UG/L	TOTAL	U
				39032	PENTACHLOROPHENOL	UG/L	TOTAL	U
				34646	4-NITROPHENOL	UG/L	TOTAL	U
				34566	1,3-DICHLOROBENZENE	UG/L	TOTAL	U
				34571	1,4-DICHLOROBENZENE	UG/L	TOTAL	U
				34536	1,2-DICHLOROBENZENE	UG/L	TOTAL	0.3
				34396	HEXACHLOROETHANE	UG/L	TOTAL	U
				39702	HEXACHLOROBUTADIENE	UG/L	TOTAL	U
				34551	1,2,4-TRICHLOROBENZENE	UG/L	TOTAL	0.2
				34696	NAPHTHALENE	UG/L	TOTAL	U
				34273	BIS(2-CHLOROETHYL) ET.	UG/L	TOTAL	U
				34278	BIS(2-CHLOROETHOXY) METH.	UG/L	TOTAL	U
				34409	ISOPHORONE	UG/L	TOTAL	U
				34447	NITROBENZENE	UG/L	TOTAL	U
				34428	N-NITROSODI-N-PROPYLAMINE	UG/L	TOTAL	U
				34433	N-NITROSODIPHENYLAMINE	UG/L	TOTAL	U
				34283	BIS(2-CHLOROISOPROPYL) ET.	UG/L	TOTAL	U
				34386	HEXACHLOROCYCLOPENTADIENE	UG/L	TOTAL	U
				34581	2-CHLORONAPHTHALENE	UG/L	TOTAL	U
				34200	ACENAPHTHYLENE	UG/L	TOTAL	U

TUT 001 1261

PROJECT NO: 264 PROJECT NAME: TURPENTINE RUN 16 of 69

STATION NO	DATE FROM TO	TIME OF DAY	LABNO	PARNO	PARAMETER NAME	UNITS	CHEMISTRY	VALUE & REMARK
			093778	34205	ACENAPHTHENE	UG/L	TOTAL	U
				34381	FLOURENE	UG/L	TOTAL	U
				39750	HEXACHLOROBENZENE	UG/L	TOTAL	U
				34636	4-BROMOPHENYL PHENYL ET.	UG/L	TOTAL	U
				34461	PHENANTHRENE	UG/L	TOTAL	U
				34220	ANTHRACENE	UG/L	TOTAL	U
				34341	DIMETHYL PHTHALATE	UG/L	TOTAL	U
				34336	DIETHYL PHTHALATE	UG/L	TOTAL	U
				39110	DI-N-BUTYLPHTHALATE	UG/L	TOTAL	U
				34292	BUTYL BENZYL PHTHALATE	UG/L	TOTAL	U
				34596	DI-N-OCTYL PHTHALATE	UG/L	TOTAL	U
				39100	BIS(2-ETHYLHEXYL) PHTHAL.	UG/L	TOTAL	U
				34376	FLUORANTHENE	UG/L	TOTAL	U
				34469	PYRENE	UG/L	TOTAL	U
				34320	CHRYSENE	UG/L	TOTAL	U
				34526	1,2-BENZANTHRACENE	UG/L	TOTAL	U
				34641	4-CHLOROPHENYL PHENYL ET.	UG/L	TOTAL	U
				34403	INDENO(1,2,3-C,D) PYRENE	UG/L	TOTAL	U
				34247	BENZO(A)PYRENE	UG/L	TOTAL	U
				34521	1,12-BENZOPERYLENE	UG/L	TOTAL	U
				34556	1,2:5,6-DIBENZANTHRACENE	UG/L	TOTAL	U
				34631	3,3'-DICHLOROBENZIDENE	UG/L	TOTAL	U
				99995	2-METHYL NAPHTHALENE	UG/L	TOTAL	0.4
				34626	2,6-DINITROTOLUENE	UG/L	TOTAL	U
				34611	2,4-DINITROTOLUENE	UG/L	TOTAL	U
				34346	1,2-DIPHENYLHYDRAZINE	UG/L	TOTAL	U
				34230	3,4-BENZOFLUORANTHENE	UG/L	TOTAL	U
				34242	11,12-BENZOFLUORANTHENE	UG/L	TOTAL	U
				39330	ALDRIN	UG/L	TOTAL	U
				39390	DIELDRIN	UG/L	TOTAL	U
				39350	CHLORDANE	UG/L	TOTAL	U
				39300	4,4'-DDT	UG/L	TOTAL	U
				39320	4,4'-DDE	UG/L	TOTAL	U
				39310	4,4'-DDD	UG/L	TOTAL	U
				34351	ALPHA ENDOSULFAN	UG/L	TOTAL	U
				34356	BETA ENDOSULFAN	UG/L	TOTAL	U
				34351	ENDOSULFAN SULFATE	UG/L	TOTAL	U
				39390	ENDRIN	UG/L	TOTAL	U
				34361	ENDRIN ALDEHYDE	UG/L	TOTAL	U
				39410	HEPTACLOR	UG/L	TOTAL	U
				39420	HEPTACHLOR EPOXIDE	UG/L	TOTAL	U

JUL 001 1262

STATION NO	DATE FROM TO	TIME OF DAY	LABNO	PAR	PARAMETER NAME	UNITS	CHEMISTRY	VALUE & REMA
			090778	39337	ALPHA-BHC	UG/L	TOTAL	U
				39338	BETA-BHC	UG/L	TOTAL	U
				39340	GAMMA-BHC	UG/L	TOTAL	U
				34259	DELTA-BHC	UG/L	TOTAL	U
				39400	TOXAPHENE	UG/L	TOTAL	U
				34671	PCB-1016	UG/L	TOTAL	U
				39488	PCB-1221	UG/L	TOTAL	U
				39492	PCB-1232	UG/L	TOTAL	U
				39496	PCB-1242	UG/L	TOTAL	U
				39500	PCB-1248	UG/L	TOTAL	U
				39504	PCB-1254	UG/L	TOTAL	U
				39508	PCB-1260	UG/L	TOTAL	U
URP. RUN 87/10/06 1360								
DEPTH: 0000 SUBSTRATE: AQUEOUS								
DESCRIPTION: FOUR WINDS PLAZA - WELL #1								
			090779	34418	METHYL CHLORIDE	UG/L	TOTAL	U
				34413	METHYL BROMIDE	UG/L	TOTAL	U
				39175	VINYL CHLORIDE	UG/L	TOTAL	U
				34311	CHLOROETHANE	UG/L	TOTAL	U
				34423	METHYLENE CHLORIDE	UG/L	TOTAL	U
				34501	1,1-DICHLOROETHYLENE	UG/L	TOTAL	U
				34496	1,1-DICHLOROETHANE	UG/L	TOTAL	U
				34546	1,2-TRANS DICHLOROETHYLENE	UG/L	TOTAL	2.0
				32106	CHLOROFORM	UG/L	TOTAL	U
				32103	1,2-DICHLOROETHANE	UG/L	TOTAL	U
				34506	1,1,1-TRICHLOROETHANE	UG/L	TOTAL	U
				32102	CARBON TETRACHLORIDE	UG/L	TOTAL	U
				32101	DICHLOROBROMOMETHANE	UG/L	TOTAL	U
				34541	1,2-DICHLOROPROPANE	UG/L	TOTAL	U
				34551	1,3-DICHLOROPROPYLENE	UG/L	TOTAL	U
				39180	TRICHLOROETHYLENE	UG/L	TOTAL	1.0
				34030	BENZENE	UG/L	TOTAL	U
				32105	CHLORODIBROMOMETHANE	UG/L	TOTAL	U
				34511	1,1,2-TRICHLOROETHANE	UG/L	TOTAL	U
				32104	BROMOFORM	UG/L	TOTAL	U
				34516	1,1,2,2-TETRACHLOROETHANE	UG/L	TOTAL	U
				34475	TETRACHLOROETHYLENE	UG/L	TOTAL	1.0
				34010	TOLUENE	UG/L	TOTAL	U
				34301	CHLOROBENZENE	UG/L	TOTAL	U

TUT 001 1265

STATION NO	DATE FROM TO	TIME OF DAY	LABNO	PARNO	PARAMETER NAME	UNITS	CHEMISTRY	VALUE & REMARK
			090779	34371	ETHYLBENZENE	UG/L	TOTAL	U
				99999	TERT-BUTYLMETHYLETHER	UG/L	TOTAL	470 J
				34586	2-CHLOROPHENOL	UG/L	TOTAL	U
				34591	2-NITROPHENOL	UG/L	TOTAL	U
				34694	PHENOL	UG/L	TOTAL	U
				34606	2,4-DIMETHYLPHENOL	UG/L	TOTAL	U
				34601	2,4-DICHLOROPHENOL	UG/L	TOTAL	U
				34621	2,4,6-TRICHLOROPHENOL	UG/L	TOTAL	U
				34452	P-CHLORO-M-CRESOL	UG/L	TOTAL	U
				34616	2,4-DINITROPHENOL	UG/L	TOTAL	U
				34657	4,6-DINITRO-2-CRESOL	UG/L	TOTAL	U
				39032	PENTACHLOROPHENOL	UG/L	TOTAL	U
				34649	4-NITROPHENOL	UG/L	TOTAL	U
				34566	1,3-DICHLOROBENZENE	UG/L	TOTAL	U
				34571	1,4-DICHLOROBENZENE	UG/L	TOTAL	U
				34536	1,2-DICHLOROBENZENE	UG/L	TOTAL	U
				34396	HEXACHLOROETHANE	UG/L	TOTAL	U
				39702	HEXACHLOROBUTADIENE	UG/L	TOTAL	U
				34551	1,2,4-TRICHLOROBENZENE	UG/L	TOTAL	U
				34696	NAPHTHALENE	UG/L	TOTAL	U
				34273	BIS(2-CHLOROETHYL) ET.	UG/L	TOTAL	U
				34278	BIS(2-CHLOROETHOXY) METH.	UG/L	TOTAL	U
				34409	ISOPHORONE	UG/L	TOTAL	U
				34447	NITROBENZENE	UG/L	TOTAL	U
				34428	N-NITROSODI-N-PROPYLAMINE	UG/L	TOTAL	U
				34433	N-NITROSODIPHENYLAMINE	UG/L	TOTAL	U
				34283	BIS(2-CHLOROISOPROPYL) ET.	UG/L	TOTAL	U
				34386	HEXACHLOROCYCLOPENTADIENE	UG/L	TOTAL	U
				34581	2-CHLORONAPHTHALENE	UG/L	TOTAL	U
				34200	ACENAPHTHYLENE	UG/L	TOTAL	U
				34205	ACENAPHTHENE	UG/L	TOTAL	U
				34381	FLOURENE	UG/L	TOTAL	U
				39700	HEXACHLOROBENZENE	UG/L	TOTAL	U
				34636	4-BROMOPHENYL PHENYL ET.	UG/L	TOTAL	U
				34641	PHENANTHRENE	UG/L	TOTAL	U
				34220	ANTHRACENE	UG/L	TOTAL	U
				34341	DIMETHYL PHTHALATE	UG/L	TOTAL	U
				34336	DIETHYL PHTHALATE	UG/L	TOTAL	U
				39110	DI-N-BUTYLPHTHALATE	UG/L	TOTAL	U
				34292	BUTYL BENZYL PHTHALATE	UG/L	TOTAL	U
				34596	DI-N-OCTYL PHTHALATE	UG/L	TOTAL	U

TUT 001 1264

STATION NO	DATE FROM TO	TIME OF DAY	LABNO	PARNO	PARAMETER NAME	UNITS	CHEMISTRY	VALUE & REMARK
			093779	39100	BIS(2-ETHYLHEXYL) PHTHAL.	UG/L	TOTAL	U
				34376	FLUORANTHENE	UG/L	TOTAL	U
				34469	PYRENE	UG/L	TOTAL	U
				34320	CHRYSENE	UG/L	TOTAL	U
				34526	1,2-BENZANTHRACENE	UG/L	TOTAL	U
				34641	4-CHLOROPHENYL PHENYL ET.	UG/L	TOTAL	U
				34403	INDENO(1,2,3-C,D) PYRENE	UG/L	TOTAL	U
				34247	BENZO(A)PYRENE	UG/L	TOTAL	U
				34521	1,12-BENZOPERYLENE	UG/L	TOTAL	U
				34556	1,2,5,6-DIBENZANTHRACENE	UG/L	TOTAL	U
				34631	3,3'-DICHLOROBENZIDENE	UG/L	TOTAL	U
				34626	2,6-DINITROTOLUENE	UG/L	TOTAL	U
				34611	2,4-DINITROTOLUENE	UG/L	TOTAL	U
				34346	1,2-DIPHENYLHYDRAZINE	UG/L	TOTAL	U
				34230	3,4-BENZOFLUORANTHENE	UG/L	TOTAL	U
				34242	11,12-BENZOFLUORANTHENE	UG/L	TOTAL	U
				39330	ALDRIN	UG/L	TOTAL	U
				39380	DIELDRIN	UG/L	TOTAL	U
				39350	CHLORDANE	UG/L	TOTAL	U
				39300	4,4'-DDT	UG/L	TOTAL	U
				39320	4,4'-DDE	UG/L	TOTAL	U
				39310	4,4'-DDD	UG/L	TOTAL	U
				34361	ALPHA ENDOSULFAN	UG/L	TOTAL	U
				34356	BETA ENDOSULFAN	UG/L	TOTAL	U
				34351	ENDOSULFAN SULFATE	UG/L	TOTAL	U
				39390	ENDRIN	UG/L	TOTAL	U
				34366	ENDRIN ALDEHYDE	UG/L	TOTAL	U
				39413	HEPTACLOR	UG/L	TOTAL	U
				39420	HEPTACHLOR EPOXIDE	UG/L	TOTAL	U
				39337	ALPHA-BHC	UG/L	TOTAL	U
				39338	BETA-BHC	UG/L	TOTAL	U
				39340	GAMMA-BHC	UG/L	TOTAL	U
				34259	DELTA-BHC	UG/L	TOTAL	U
				39400	TOXAPHENE	UG/L	TOTAL	U
				34671	PCB-1016	UG/L	TOTAL	U
				39488	PCB-1221	UG/L	TOTAL	U
				39492	PCB-1232	UG/L	TOTAL	U
				34496	PCB-1242	UG/L	TOTAL	U
				39500	PCB-1248	UG/L	TOTAL	U
				39504	PCB-1254	UG/L	TOTAL	U
				39506	PCB-1260	UG/L	TOTAL	U

TUT 001 1295

PRO. [illegible] PS MAJ JRPS RUN

20 of 29

STATION NO	DATE FROM TO	TIME OF DAY	LABNO	PARNO	PARAMETER NAME	UNITS	CHEMISTRY	VALUE & REMARK
SURP. RUN 87/10/06 1500								
DEPTH: 0000 SUBSTRATE: AQUEOUS								
DESCRIPTION: ELGIN WELL #3								
			090780	34418	METHYL CHLORIDE	UG/L	TOTAL	U
				34413	METHYL BROMIDE	UG/L	TOTAL	U
				39175	VINYL CHLORIDE	UG/L	TOTAL	U
				34311	CHLOROETHANE	UG/L	TOTAL	U
				34423	METHYLENE CHLORIDE	UG/L	TOTAL	U
				34501	1,1-DICHLOROETHYLENE	UG/L	TOTAL	U
				34496	1,1-DICHLOROETHANE	UG/L	TOTAL	U
				34546	1,2-TRANS DICHLOROETHYLENE	UG/L	TOTAL	78
				32106	CHLOROFORM	UG/L	TOTAL	U
				32103	1,2-DICHLOROETHANE	UG/L	TOTAL	U
				34506	1,1,1-TRICHLOROETHANE	UG/L	TOTAL	U
				32102	CARBON TETRACHLORIDE	UG/L	TOTAL	U
				32101	DICHLOROBROMOMETHANE	UG/L	TOTAL	U
				34541	1,2-DICHLOROPROPANE	UG/L	TOTAL	U
				34561	1,3-DICHLOROPROPYLENE	UG/L	TOTAL	U
				39180	TRICHLOROETHYLENE	UG/L	TOTAL	8.4
				34030	BENZENE	UG/L	TOTAL	U
				32105	CHLORODIBROMOMETHANE	UG/L	TOTAL	U
				34511	1,1,2-TRICHLOROETHANE	UG/L	TOTAL	U
				32104	BROMOFORM	UG/L	TOTAL	U
				34516	1,1,2,2-TETRACHLOROETHANE	UG/L	TOTAL	U
				34475	TETRACHLOROETHYLENE	UG/L	TOTAL	40
				34010	TOLUENE	UG/L	TOTAL	U
				34301	CHLOROBENZENE	UG/L	TOTAL	U
				34371	ETHYLBENZENE	UG/L	TOTAL	U
				99999	TERT-BUTYLMETHYLETHER	UG/L	TOTAL	220
				34586	2-CHLOROPHENOL	UG/L	TOTAL	U
				34591	2-NITROPHENOL	UG/L	TOTAL	U
				34694	PHENOL	UG/L	TOTAL	U
				34606	2,4-DIMETHYLPHENOL	UG/L	TOTAL	U
				34601	2,4-DICHLOROPHENOL	UG/L	TOTAL	U
				34621	2,4,6-TRICHLOROPHENOL	UG/L	TOTAL	U
				34452	P-CHLORO-M-CRESOL	UG/L	TOTAL	U
				34616	2,4-DINITROPHENOL	UG/L	TOTAL	U
				34657	4,6-DINITRO-O-CRESOL	UG/L	TOTAL	U
				39032	PENTACHLOROPHENOL	UG/L	TOTAL	U
				34646	4-NITROPHENOL	UG/L	TOTAL	U
				34566	1,3-DICHLOROBENZENE	UG/L	TOTAL	U
				34571	1,4-DICHLOROBENZENE	UG/L	TOTAL	U
				34536	1,2-DICHLOROBENZENE	UG/L	TOTAL	U
				34395	HEXACHLOROETHANE	UG/L	TOTAL	U

TUT 001 1266

COMPLETED ANALYSIS REPORT — REPORT DATE: 87/12/22

PROJECT NO: 262 — PROJECT NAME: PENTINE RUN

STATION NO	DATE FROM TO	TIME OF DAY	LABNO	PARNO	PARAMETER NAME	UNITS	CHEMISTRY	VALUE & REMARK
			090780	39702	HEXACHLOROBUTADIENE	UG/L	TOTAL	U
				34551	1,2,4-TRICHLOROBENZENE	UG/L	TOTAL	U
				34696	NAPHTHALENE	UG/L	TOTAL	U
				34273	BIS(2-CHLOROETHYL) ET.	UG/L	TOTAL	U
				34278	BIS(2-CHLOROETHOXY) METH.	UG/L	TOTAL	U
				34408	ISOPHORONE	UG/L	TOTAL	U
				34447	NITROBENZENE	UG/L	TOTAL	U
				34423	N-NITROSODI-N-PROPYLAMINE	UG/L	TOTAL	U
				34433	N-NITROSODIPHENYLAMINE	UG/L	TOTAL	U
				34283	BIS(2-CHLORDISOPROPYL) ET.	UG/L	TOTAL	U
				34386	HEXACHLOROCYCLOPENTADIENE	UG/L	TOTAL	U
				34581	2-CHLORONAPHTHALENE	UG/L	TOTAL	U
				34200	ACENAPHTHYLENE	UG/L	TOTAL	U
				34205	ACENAPHTHENE	UG/L	TOTAL	U
				34381	FLOURENE	UG/L	TOTAL	U
				39700	HEXACHLOROBENZENE	UG/L	TOTAL	U
				34636	4-BROMOPHENYL PHENYL ET.	UG/L	TOTAL	U
				34461	PHENANTHRENE	UG/L	TOTAL	U
				34220	ANTHRACENE	UG/L	TOTAL	U
				34341	DIMETHYL PHTHALATE	UG/L	TOTAL	U
				34336	DIETHYL PHTHALATE	UG/L	TOTAL	U
				39110	DI-N-BUTYLPHTHALATE	UG/L	TOTAL	U
				34292	BUTYL BENZYL PHTHALATE	UG/L	TOTAL	U
				34596	DI-N-OCTYL PHTHALATE	UG/L	TOTAL	U
				39100	BIS(2-ETHYLHEXYL) PHTHAL.	UG/L	TOTAL	U
				34376	FLUORANTHENE	UG/L	TOTAL	U
				34469	PYRENE	UG/L	TOTAL	U
				34320	CHRYSENE	UG/L	TOTAL	U
				34526	1,2-BENZANTHRACENE	UG/L	TOTAL	U
				34641	4-CHLOROPHENYL PHENYL ET.	UG/L	TOTAL	U
				34403	INDENO(1,2,3-C,D) PYRENE	UG/L	TOTAL	U
				34247	BENZO(A)PYRENE	UG/L	TOTAL	U
				34521	1,12-BENZOPERYLENE	UG/L	TOTAL	U
				34556	1,2,5,6-DIBENZANTHRACENE	UG/L	TOTAL	U
				34631	3,3'-DICHLOROBENZIDENE	UG/L	TOTAL	U
				34626	2,6-DINITROTOLUENE	UG/L	TOTAL	U
				34611	2,4-DINITROTOLUENE	UG/L	TOTAL	U
				34346	1,2-DIPHENYLHYDRAZINE	UG/L	TOTAL	U
				34230	3,4-BENZOFLUORANTHENE	UG/L	TOTAL	U
				34242	11,12-BENZOFLUORANTHENE	UG/L	TOTAL	U
				39330	ALDRIN	UG/L	TOTAL	U

TUT 001 1267

COMPLETED ANALYSIS REPORT — REPORT DATE: 87/12/22

PROJECT NO: 262 — PROJECT NAME: TURPENTINE RUN

STATION NO	DATE FROM TO	TIME OF DAY	LABNO	PARNO	PARAMETER NAME	UNITS	CHEMISTRY	VALUE & REMARK
			090780	39380	DIELDRIN	UG/L	TOTAL	U
				39350	CHLORDANE	UG/L	TOTAL	U
				39300	4,4'-DDT	UG/L	TOTAL	U
				39320	4,4'-DDE	UG/L	TOTAL	U
				39310	4,4'-DDD	UG/L	TOTAL	U
				34361	ALPHA ENDOSULFAN	UG/L	TOTAL	U
				34356	BETA ENDOSULFAN	UG/L	TOTAL	U
				34351	ENDOSULFAN SULFATE	UG/L	TOTAL	U
				39390	ENDRIN	UG/L	TOTAL	U
				34366	ENDRIN ALDEHYDE	UG/L	TOTAL	U
				39410	HEPTACLOR	UG/L	TOTAL	U
				39420	HEPTACHLOR EPOXIDE	UG/L	TOTAL	U
				39337	ALPHA-BHC	UG/L	TOTAL	U
				39338	BETA-BHC	UG/L	TOTAL	U
				39340	GAMMA-BHC	UG/L	TOTAL	U
				34259	DELTA-BHC	UG/L	TOTAL	U
				39400	TOXAPHENE	UG/L	TOTAL	U
				34671	PCB-1016	UG/L	TOTAL	U
				39488	PCB-1221	UG/L	TOTAL	U
				39492	PCB-1232	UG/L	TOTAL	U
				39496	PCB-1242	UG/L	TOTAL	U
				39500	PCB-1248	UG/L	TOTAL	U
				39504	PCB-1254	UG/L	TOTAL	U
				39508	PCB-1260	UG/L	TOTAL	U
TURP. RUN 87/10/06 1525 DEPTH: 0000 SUBSTRATE: AQUEOUS DESCRIPTION: ELGIN WELL #2								
			090781	34418	METHYL CHLORIDE	UG/L	TOTAL	U
				34413	METHYL BROMIDE	UG/L	TOTAL	U
				39175	VINYL CHLORIDE	UG/L	TOTAL	U
				34311	CHLOROETHANE	UG/L	TOTAL	U
				34423	METHYLENE CHLORIDE	UG/L	TOTAL	U
				34501	1,1-DICHLOROETHYLENE	UG/L	TOTAL	U
				34496	1,1-DICHLOROETHANE	UG/L	TOTAL	U
				34546	1,2-TRANS DICHLOROETHYLENE	UG/L	TOTAL	.7
				32106	CHLOROFORM	UG/L	TOTAL	U
				32103	1,2-DICHLOROETHANE	UG/L	TOTAL	U
				34506	1,1,1-TRICHLOROETHANE	UG/L	TOTAL	U
				32102	CARBON TETRACHLORIDE	UG/L	TOTAL	U

TUT 001 1268

PROJECT NO: 262 PROJECT NAME: TURPENTINE RUN

STATION NO	DATE FROM TO	TIME OF DAY	LABNO	PAR	PARAMETER NAME	UNITS	CHEMISTRY	VALUE & REMA
			090791	32101	DICHLOROBROMOMETHANE	UG/L	TOTAL	U
				34561	1,2-DICHLOROPROPANE	UG/L	TOTAL	U
				34541	1,3-DICHLOROPROPYLENE	UG/L	TOTAL	U
				39180	TRICHLOROETHYLENE	UG/L	TOTAL	7.5
				34030	BENZENE	UG/L	TOTAL	U
				32105	CHLORODIBROMOMETHANE	UG/L	TOTAL	U
				34511	1,1,2-TRICHLOROETHANE	UG/L	TOTAL	U
				32104	BROMOFORM	UG/L	TOTAL	U
				34516	1,1,2,2-TETRACHLOROETHANE	UG/L	TOTAL	U
				34475	TETRACHLOROETHYLENE	UG/L	TOTAL	33
				34010	TOLUENE	UG/L	TOTAL	U
				34301	CHLOROBENZENE	UG/L	TOTAL	U
				34371	ETHYLBENZENE	UG/L	TOTAL	U
				99999	TERT-BUTYLMETHYLETHER	UG/L	TOTAL	390 J
				34586	2-CHLOROPHENOL	UG/L	TOTAL	U
				34591	2-NITROPHENOL	UG/L	TOTAL	U
				34694	PHENOL	UG/L	TOTAL	U
				34606	2,4-DIMETHYLPHENOL	UG/L	TOTAL	U
				34601	2,4-DICHLOROPHENOL	UG/L	TOTAL	U
				34621	2,4,6-TRICHLOROPHENOL	UG/L	TOTAL	U
				34452	P-CHLORO-M-CRESOL	UG/L	TOTAL	U
				34616	2,4-DINITROPHENOL	UG/L	TOTAL	U
				34657	4,6-DINITRO-O-CRESOL	UG/L	TOTAL	U
				39032	PENTACHLOROPHENOL	UG/L	TOTAL	U
				34646	4-NITROPHENOL	UG/L	TOTAL	U
				34566	1,3-DICHLOROBENZENE	UG/L	TOTAL	U
				34571	1,4-DICHLOROBENZENE	UG/L	TOTAL	U
				34536	1,2-DICHLOROBENZENE	UG/L	TOTAL	U
				34396	HEXACHLOROETHANE	UG/L	TOTAL	U
				39702	HEXACHLOROBUTADIENE	UG/L	TOTAL	U
				34551	1,2,4-TRICHLOROBENZENE	UG/L	TOTAL	U
				34696	NAPHTHALENE	UG/L	TOTAL	U
				34273	BIS(2-CHLOROETHYL) ET.	UG/L	TOTAL	U
				34278	BIS(2-CHLOROETHOXY) METH.	UG/L	TOTAL	U
				34406	ISOPHORONE	UG/L	TOTAL	U
				34447	NITROBENZENE	UG/L	TOTAL	U
				34428	N-NITROSODI-N-PROPYLAMINE	UG/L	TOTAL	U
				34433	N-NITROSODIPHENYLAMINE	UG/L	TOTAL	U
				34283	BIS(2-CHLOROISOPROPYL) ET.	UG/L	TOTAL	U
				34386	HEXACHLOROCYCLOPENTADIENE	UG/L	TOTAL	U
				34581	2-CHLORONAPHTHALENE	UG/L	TOTAL	U

TUT 001 1269

STATION NO	DATE PROR TO	TIME OF DAY	LABNO	PARNO	PARAMETER NAME	UNITS	CHEMISTRY	VALUE & REMARK
			090781	34200	ACENAPHTHYLENE	UG/L	TOTAL	U
				34205	ACENAPHTHENE	UG/L	TOTAL	U
				34381	FLOURENE	UG/L	TOTAL	U
				39700	HEXACHLOROBENZENE	UG/L	TOTAL	U
				34636	4-BROMOPHENYL PHENYL ET.	UG/L	TOTAL	U
				34461	PHENANTHRENE	UG/L	TOTAL	U
				34220	ANTHRACENE	UG/L	TOTAL	U
				34341	DIMETHYL PHTHALATE	UG/L	TOTAL	U
				34336	DIETHYL PHTHALATE	UG/L	TOTAL	U
				39110	DI-N-BUTYLPHTHALATE	UG/L	TOTAL	U
				34292	BUTYL BENZYL PHTHALATE	UG/L	TOTAL	U
				34596	DI-N-OCTYL PHTHALATE	UG/L	TOTAL	U
				39100	BIS(2-ETHYLHEXYL) PHTHAL.	UG/L	TOTAL	U
				34376	FLUORANTHENE	UG/L	TOTAL	U
				34469	PYRENE	UG/L	TOTAL	U
				34320	CHRYSENE	UG/L	TOTAL	U
				34526	1,2-BENZANTHRACENE	UG/L	TOTAL	U
				34641	4-CHLOROPHENYL PHENYL ET.	UG/L	TOTAL	U
				34403	INDENO(1,2,3-C,D) PYRENE	UG/L	TOTAL	U
				34247	BENZO(A)PYRENE	UG/L	TOTAL	U
				34521	1,12-BENZOPERYLENE	UG/L	TOTAL	U
				34556	1,2:5,6-DIBENZANTHRACENE	UG/L	TOTAL	U
				34631	3,3'-DICHLOROBENZIDENE	UG/L	TOTAL	U
				34626	2,6-DINITROTOLUENE	UG/L	TOTAL	U
				34611	2,4-DINITROTOLUENE	UG/L	TOTAL	U
				34346	1,2-DIPHENYLHYDRAZINE	UG/L	TOTAL	U
				34230	3,4-BENZOFLUORANTHENE	UG/L	TOTAL	U
				34242	11,12-BENZOFLUORANTHENE	UG/L	TOTAL	U
				39330	ALDRIN	UG/L	TOTAL	U
				39390	DIELDRIN	UG/L	TOTAL	U
				39350	CHLORDANE	UG/L	TOTAL	U
				39300	4,4'-DDT	UG/L	TOTAL	U
				39320	4,4'-DDE	UG/L	TOTAL	U
				39310	4,4'-DDD	UG/L	TOTAL	U
				34391	ALPHA ENDOSULFAN	UG/L	TOTAL	U
				34356	BETA ENDOSULFAN	UG/L	TOTAL	U
				34351	ENDOSULFAN SULFATE	UG/L	TOTAL	U
				39390	ENDRIN	UG/L	TOTAL	U
				34366	ENDRIN ALDEHYDE	UG/L	TOTAL	U
				39410	HEPTACLOR	UG/L	TOTAL	U
				39420	HEPTACHLOR EPOXIDE	UG/L	TOTAL	U

TUT 001 1270

STATION NO	DATE FROM TO	TIME OF DAY	LABNO	PAR	PARAMETER NAME	UNITS	CHEMISTRY	VALUE	REM
			090781	39337	ALPHA-BHC	UG/L	TOTAL		U
				39338	BETA-BHC	UG/L	TOTAL		U
				39340	GAMMA-BHC	UG/L	TOTAL		U
				34259	DELTA-BHC	UG/L	TOTAL		U
				39400	TOXAPHENE	UG/L	TOTAL		U
				34671	PCB-1016	UG/L	TOTAL		U
				39488	PCB-1221	UG/L	TOTAL		U
				39492	PCB-1232	UG/L	TOTAL		U
				39496	PCB-1242	UG/L	TOTAL		U
				39500	PCB-1248	UG/L	TOTAL		U
				39504	PCB-1254	UG/L	TOTAL		U
				39508	PCB-1260	UG/L	TOTAL		U
SURP. RUN 87/10/06 1530									
DEPTH: 0000 SUBSTRATE: AQUEOUS									
DESCRIPTION: ELGIN WELL #1									
			090782	34413	METHYL CHLORIDE	UG/L	TOTAL		U
				34413	METHYL BROMIDE	UG/L	TOTAL		U
				39175	VINYL CHLORIDE	UG/L	TOTAL		U
				34311	CHLOROETHANE	UG/L	TOTAL		U
				34423	METHYLENE CHLORIDE	UG/L	TOTAL		U
				34501	1,1-DICHLOROETHYLENE	UG/L	TOTAL		U
				34496	1,1-DICHLOROETHANE	UG/L	TOTAL		U
				34546	1,2-TRANS DICHLOROETHYLENE	UG/L	TOTAL	58	
				32106	CHLOROFORM	UG/L	TOTAL		U
				32103	1,2-DICHLOROETHANE	UG/L	TOTAL		U
				34506	1,1,1-TRICHLOROETHANE	UG/L	TOTAL		U
				32102	CARBON TETRACHLORIDE	UG/L	TOTAL		U
				32101	DICHLOROBROMOMETHANE	UG/L	TOTAL		U
				34541	1,2-DICHLOROPROPANE	UG/L	TOTAL		U
				34561	1,3-DICHLOROPROPYLENE	UG/L	TOTAL		U
				39180	TRICHLOROETHYLENE	UG/L	TOTAL	19	
				34030	BENZENE	UG/L	TOTAL		U
				32109	CHLORODIBROMOMETHANE	UG/L	TOTAL		U
				34511	1,1,2-TRICHLOROETHANE	UG/L	TOTAL		U
				32104	BROMOFORM	UG/L	TOTAL		U
				34516	1,1,2,2-TETRACHLOROETHANE	UG/L	TOTAL		U
				34475	TETRACHLOROETHYLENE	UG/L	TOTAL	130	
				34010	TOLUENE	UG/L	TOTAL		U
				34301	CHLOROBENZENE	UG/L	TOTAL		U

STATION NO	DATE FROM TO	TIME OF DAY	LABNO	PARNO	PARAMETER NAME	UNITS	CHEMISTRY	VALUE & REMARK
			030782	34371	ETHYLBENZENE	UG/L	TOTAL	U
				99999	TERT-BUTYLMETHYLETHER	UG/L	TOTAL	270 J
				34586	2-CHLOROPHENOL	UG/L	TOTAL	U
				34591	2-NITROPHENOL	UG/L	TOTAL	U
				34694	PHENOL	UG/L	TOTAL	U
				34606	2,6-DIMETHYLPHENOL	UG/L	TOTAL	U
				34601	2,4-DICHLOROPHENOL	UG/L	TOTAL	U
				34621	2,4,6-TRICHLOROPHENOL	UG/L	TOTAL	U
				34452	P-CHLORO-M-CRESOL	UG/L	TOTAL	U
				34616	2,4-DINITROPHENOL	UG/L	TOTAL	U
				34657	4,6-DINITRO-O-CRESOL	UG/L	TOTAL	U
				39032	PENTACHLOROPHENOL	UG/L	TOTAL	U
				34646	4-NITROPHENOL	UG/L	TOTAL	U
				34566	1,3-DICHLOROBENZENE	UG/L	TOTAL	U
				34571	1,4-DICHLOROBENZENE	UG/L	TOTAL	U
				34536	1,2-DICHLOROBENZENE	UG/L	TOTAL	U
				34396	HEXACHLOROETHANE	UG/L	TOTAL	U
				39702	HEXACHLOROBUTADIENE	UG/L	TOTAL	U
				34551	1,2,4-TRICHLOROBENZENE	UG/L	TOTAL	U
				34696	NAPHTHALENE	UG/L	TOTAL	U
				34273	BIS(2-CHLOROETHYL) ET.	UG/L	TOTAL	U
				34278	BIS(2-CHLOROETHOXY) METH.	UG/L	TOTAL	U
				34409	ISOPHORONE	UG/L	TOTAL	U
				34447	NITROBENZENE	UG/L	TOTAL	U
				34426	N-NITROSODI-N-PROPYLAMINE	UG/L	TOTAL	U
				34433	N-NITROSODIPHENYLAMINE	UG/L	TOTAL	U
				34283	BIS(2-CHLOROISOPROPYL) ET.	UG/L	TOTAL	U
				34386	HEXACHLOROCYCLOPENTADIENE	UG/L	TOTAL	U
				34581	2-CHLORONAPHTHALENE	UG/L	TOTAL	U
				34200	ACENAPHTHYLENE	UG/L	TOTAL	U
				34205	ACENAPHTHENE	UG/L	TOTAL	U
				34381	FLOURENE	UG/L	TOTAL	U
				39700	HEXACHLOROBENZENE	UG/L	TOTAL	U
				34636	4-BROMOPHENYL PHENYL ET.	UG/L	TOTAL	U
				34461	PHENANTHRENE	UG/L	TOTAL	U
				34220	ANTHRACENE	UG/L	TOTAL	U
				34341	DIMETHYL PHTHALATE	UG/L	TOTAL	U
				34336	DIETHYL PHTHALATE	UG/L	TOTAL	0.1 M
				39110	DI-N-BUTYLPHTHALATE	UG/L	TOTAL	U
				34292	BUTYL BENZYL PHTHALATE	UG/L	TOTAL	U
				34596	DI-N-OCTYL PHTHALATE	UG/L	TOTAL	U

COMPLETED LYSIS REPORT REPORT DATE: 87/12/1

PROJECT NO: 262 PROJECT NAME: TURPENTINE RUN

STATION NO	DATE FROM TO	TIME OF DAY	LABNO	PARNO	PARAMETER NAME	UNITS	CHEMISTRY	VALUE & REMARK
			890782	39100	BIS(2-ETHYLHEXYL) PHTHAL.	UG/L	TOTAL	U
				34376	FLUORANTHENE	UG/L	TOTAL	U
				34469	PYRENE	UG/L	TOTAL	U
				34320	CHRYSENE	UG/L	TOTAL	U
				34526	1,2-BENZANTHRACENE	UG/L	TOTAL	U
				34641	4-CHLOROPHENYL PHENYL ET.	UG/L	TOTAL	U
				34403	INDENO(1,2,3-C,D) PYRENE	UG/L	TOTAL	U
				34247	BENZO(A)PYRENE	UG/L	TOTAL	U
				34521	1,12-BENZOPERYLENE	UG/L	TOTAL	U
				34556	1,2:5,6-DIBENZANTHRACENE	UG/L	TOTAL	U
				34691	3,3'-DICHLOROBENZIDENE	UG/L	TOTAL	U
				34626	2,6-DINITROTOLUENE	UG/L	TOTAL	U
				34611	2,4-DINITROTOLUENE	UG/L	TOTAL	U
				34346	1,2-DIPHENYLHYDRAZINE	UG/L	TOTAL	U
				34230	3,4-BENZOFLUORANTHENE	UG/L	TOTAL	U
				34242	11,12-BENZOFLUORANTHENE	UG/L	TOTAL	U
				39390	ALDRIN	UG/L	TOTAL	U
				39380	DIELDRIN	UG/L	TOTAL	U
				39350	CHLORDANE	UG/L	TOTAL	U
				39300	4,4'-DDT	UG/L	TOTAL	U
				39320	4,4'-DDE	UG/L	TOTAL	U
				39310	4,4'-DDD	UG/L	TOTAL	U
				34361	ALPHA-ENDOSULFAN	UG/L	TOTAL	U
				34356	BETA ENDOSULFAN	UG/L	TOTAL	U
				34391	ENDOSULFAN SULFATE	UG/L	TOTAL	U
				39390	ENDRIN	UG/L	TOTAL	U
				34366	ENDRIN ALDEHYDE	UG/L	TOTAL	U
				39410	HEPTACLOR	UG/L	TOTAL	U
				39420	HEPTACHLOR EPOXIDE	UG/L	TOTAL	U
				39337	ALPHA-BHC	UG/L	TOTAL	U
				39338	BETA-BHC	UG/L	TOTAL	U
				39340	GAMMA-BHC	UG/L	TOTAL	U
				34259	DELTA-BHC	UG/L	TOTAL	U
				39400	TOXAPHENE	UG/L	TOTAL	U
				39671	PCB-1016	UG/L	TOTAL	U
				39488	PCB-1221	UG/L	TOTAL	U
				39492	PCB-1232	UG/L	TOTAL	U
				39496	PCB-1242	UG/L	TOTAL	U
				39500	PCB-1248	UG/L	TOTAL	U
				39504	PCB-1254	UG/L	TOTAL	U
				39508	PCB-1260	UG/L	TOTAL	U

COMPLETED ANALYSIS REPORT — REPORT DATE: 87/12/22

PROJECT NO: 262 — PROJECT NAME: TURPENTINE RUN

STATION NO	DATE FROM TO	TIME OF DAY	LABNO	PARNO	PARAMETER NAME	UNITS	CHEMISTRY	VALUE & REMARK
TURP. RUN 87/10/06 175>								
DEPTH: 0000 SUBSTRATE: AQUEOUS								
DESCRIPTION: FRANCOIS WELL								
			090783	34418	METHYL CHLORIDE	UG/L	TOTAL	U
				34413	METHYL BROMIDE	UG/L	TOTAL	U
				39175	VINYL CHLORIDE	UG/L	TOTAL	U
				34311	CHLOROETHANE	UG/L	TOTAL	U
				34423	METHYLENE CHLORIDE	UG/L	TOTAL	U
				34501	1,1-DICHLOROETHYLENE	UG/L	TOTAL	U
				34496	1,1-DICHLOROETHANE	UG/L	TOTAL	U
				34546	1,2-TRANS DICHLOROETHYLENE	UG/L	TOTAL	100
				32106	CHLOROFORM	UG/L	TOTAL	U
				32103	1,2-DICHLOROETHANE	UG/L	TOTAL	U
				34506	1,1,1-TRICHLOROETHANE	UG/L	TOTAL	U
				32102	CARBON TETRACHLORIDE	UG/L	TOTAL	U
				32101	DICHLOROBROMOMETHENE	UG/L	TOTAL	U
				34541	1,2-DICHLOROPROPANE	UG/L	TOTAL	U
				34561	1,3-DICHLOROPROPYLENE	UG/L	TOTAL	U
				39180	TRICHLOROETHYLENE	UG/L	TOTAL	1[illegible]
				34030	BENZENE	UG/L	TOTAL	U
				32105	CHLORODIBROMOMETHANE	UG/L	TOTAL	U
				34511	1,1,2-TRICHLOROETHANE	UG/L	TOTAL	U
				32104	BROMOFORM	UG/L	TOTAL	U
				34516	1,1,2,2-TETRACHLOROETHANE	UG/L	TOTAL	U
				34475	TETRACHLOROETHYLENE	UG/L	TOTAL	130
				34010	TOLUENE	UG/L	TOTAL	U
				34301	CHLOROBENZENE	UG/L	TOTAL	U
				34371	ETHYLBENZENE	UG/L	TOTAL	U
				99599	TERT-BUTYLMETHYLETHER	UG/L	TOTAL	130 U
				34586	2-CHLOROPHENOL	UG/L	TOTAL	U
				34591	2-NITROPHENOL	UG/L	TOTAL	U
				34694	PHENOL	UG/L	TOTAL	U
				34606	2,4-DIMETHYLPHENOL	UG/L	TOTAL	U
				34601	2,4-DICHLOROPHENOL	UG/L	TOTAL	U
				34621	2,4,6-TRICHLOROPHENOL	UG/L	TOTAL	U
				34452	P-CHLORO-M-CRESOL	UG/L	TOTAL	U
				34616	2,4-DINITROPHENOL	UG/L	TOTAL	U
				34657	4,6-DINITRO-O-CRESOL	UG/L	TOTAL	U
				39032	PENTACHLOROPHENOL	UG/L	TOTAL	U
				34646	4-NITROPHENOL	UG/L	TOTAL	U
				34566	1,3-DICHLOROBENZENE	UG/L	TOTAL	U
				34571	1,4-DICHLOROBENZENE	UG/L	TOTAL	U
				34536	1,2-DICHLOROBENZENE	UG/L	TOTAL	U
				34396	HEXACHLOROETHANE	UG/L	TOTAL	U

TLT 001 1274

COMPLETED ANALYSIS REPORT — REPORT DATE: 87/12/22

PROJECT NO: 262 — PROJECT NAME: TURPENTINE RUN

STATION NO	DATE FROM TO	TIME OF DAY	LABNO	PARNO	PARAMETER NAME	UNITS	CHEMISTRY	VALUE & REMARK
			090783	39702	HEXACHLOROBUTADIENE	UG/L	TOTAL	U
				34551	1,2,4-TRICHLOROBENZENE	UG/L	TOTAL	U
				34696	NAPHTHALENE	UG/L	TOTAL	U
				34273	BIS(2-CHLOROETHYL) ET.	UG/L	TOTAL	U
				34278	BIS(2-CHLOROETHOXY) METH.	UG/L	TOTAL	U
				34408	ISOPHORONE	UG/L	TOTAL	U
				34447	NITROBENZENE	UG/L	TOTAL	U
				34428	N-NITROSODI-N-PROPYLAMINE	UG/L	TOTAL	U
				34433	N-NITROSODIPHENYLAMINE	UG/L	TOTAL	U
				34283	BIS(2-CHLOROISOPROPYL) ET.	UG/L	TOTAL	U
				34296	HEXACHLOROCYCLOPENTADIENE	UG/L	TOTAL	U
				34581	2-CHLORONAPHTHALENE	UG/L	TOTAL	U
				34200	ACENAPHTHYLENE	UG/L	TOTAL	U
				34205	ACENAPHTHENE	UG/L	TOTAL	U
				34391	FLOURENE	UG/L	TOTAL	U
				39700	HEXACHLOROBENZENE	UG/L	TOTAL	U
				34536	4-BROMOPHENYL PHENYL ET.	UG/L	TOTAL	U
				34461	PHENANTHRENE	UG/L	TOTAL	U
				34226	ANTHRACENE	UG/L	TOTAL	U
				34341	DIMETHYL PHTHALATE	UG/L	TOTAL	U
				34336	DIETHYL PHTHALATE	UG/L	TOTAL	U
				39110	DI-N-BUTYLPHTHALATE	UG/L	TOTAL	U
				34292	BUTYL BENZYL PHTHALATE	UG/L	TOTAL	U
				34596	DI-N-OCTYL PHTHALATE	UG/L	TOTAL	U
				39100	BIS(2-ETHYLHEXYL) PHTHAL.	UG/L	TOTAL	U
				34376	FLUORANTHENE	UG/L	TOTAL	U
				34469	PYRENE	UG/L	TOTAL	U
				34320	CHRYSENE	UG/L	TOTAL	U
				34526	1,2-BENZANTHRACENE	UG/L	TOTAL	U
				34641	4-CHLOROPHENYL PHENYL ET.	UG/L	TOTAL	U
				34403	INDENO(1,2,3-C,D) PYRENE	UG/L	TOTAL	U
				34247	BENZO(A)PYRENE	UG/L	TOTAL	U
				34521	1,12-BENZOPERYLENE	UG/L	TOTAL	U
				34556	1,2:5,6-DIBENZANTHRACENE	UG/L	TOTAL	U
				34631	3,3'-DICHLOROBENZIDINE	UG/L	TOTAL	U
				34626	2,6-DINITROTOLUENE	UG/L	TOTAL	U
				34611	2,4-DINITROTOLUENE	UG/L	TOTAL	U
				34346	1,2-DIPHENYLHYDRAZINE	UG/L	TOTAL	U
				34230	3,4-BENZOFLUORANTHENE	UG/L	TOTAL	U
				34242	11,12-BENZOFLUORANTHENE	UG/L	TOTAL	U
				39390	ALDRIN	UG/L	TOTAL	U

TUT 001 1275

COMPLETED ANALYSIS REPORT — REPORT DATE: 87/12/22

PROJECT NO: 262 — PROJECT NAME: TURPENTINE RUN

STATION NO	DATE FROM TO	TIME OF DAY	LABNO	PARNO	PARAMETER NAME	UNITS	CHEMISTRY	VALUE & REMARK
			090783	39380	DIELDRIN	UG/L	TOTAL	U
				39350	CHLORDANE	UG/L	TOTAL	U
				39300	4,4'-DDT	UG/L	TOTAL	U
				39320	4,4'-DDE	UG/L	TOTAL	U
				39310	4,4'-DDD	UG/L	TOTAL	U
				34361	ALPHA ENDOSULFAN	UG/L	TOTAL	U
				34356	BETA ENDOSULFAN	UG/L	TOTAL	U
				34351	ENDOSULFAN SULFATE	UG/L	TOTAL	U
				39390	ENDRIN	UG/L	TOTAL	U
				34366	ENDRIN ALDEHYDE	UG/L	TOTAL	U
				39410	HEPTACLOR	UG/L	TOTAL	U
				39420	HEPTACHLOR EPOXIDE	UG/L	TOTAL	U
				39337	ALPHA-BHC	UG/L	TOTAL	U
				39338	BETA-BHC	UG/L	TOTAL	U
				39340	GAMMA-BHC	UG/L	TOTAL	U
				34259	DELTA-BHC	UG/L	TOTAL	U
				39400	TOXAPHENE	UG/L	TOTAL	U
				34671	PCB-1016	UG/L	TOTAL	U
				39488	PCB-1221	UG/L	TOTAL	U
				39492	PCB-1232	UG/L	TOTAL	U
				39498	PCB-1242	UG/L	TOTAL	U
				39500	PCB-1248	UG/L	TOTAL	U
				39504	PCB-1254	UG/L	TOTAL	U
				39508	PCB-1260	UG/L	TOTAL	U
TURP-RUN	87/10/07	0855						
LOCATION CODE: 3700 SUBSTRATE: AQUEOUS								
DESCRIPTION: VINA HOUSING WELL #1								
			090784	34418	METHYL CHLORIDE	UG/L	TOTAL	U
				34413	METHYL BROMIDE	UG/L	TOTAL	U
				39175	VINYL CHLORIDE	UG/L	TOTAL	U
				34311	CHLOROETHANE	UG/L	TOTAL	U
				34423	METHYLENE CHLORIDE	UG/L	TOTAL	U
				34501	1,1-DICHLOROETHYLENE	UG/L	TOTAL	U
				34496	1,1-DICHLOROETHANE	UG/L	TOTAL	U
				34546	1,2-TRANS DICHLOROETHYLENE	UG/L	TOTAL	[illegible]
				32106	CHLOROFORM	UG/L	TOTAL	U
				32103	1,2-DICHLOROETHANE	UG/L	TOTAL	U
				34506	1,1,1-TRICHLOROETHANE	UG/L	TOTAL	[illegible]
				32102	CARBON TETRACHLORIDE	UG/L	TOTAL	U

TUT 001 1276

COMPLETED ANALYSIS REPORT

REPORT DATE: 87/12/22

PROJECT NO: 262

PROJECT NAME: TURPENTINE RUN

STATION NO	DATE FROM TO	TIME OF DAY	L-SNO	PARNO	PARAMETER NAME	UNITS	CHEMISTRY	VALUE	REMARK
			090784	32101	DICHLOROBROMOMETHANE	UG/L	TOTAL		U
				34561	1,2-DICHLOROPROPANE	UG/L	TOTAL		U
				34561	1,3-DICHLOROPROPYLENE	UG/L	TOTAL		U
				39180	TRICHLOROETHYLENE	UG/L	TOTAL	0.4	M
				34030	BENZENE	UG/L	TOTAL		U
				32105	CHLORODIBROMOMETHANE	UG/L	TOTAL		U
				34511	1,1,2-TRICHLOROETHANE	UG/L	TOTAL		U
				32104	BROMOFORM	UG/L	TOTAL		U
				34516	1,1,2,2-TETRACHLOROETHANE	UG/L	TOTAL		U
				34475	TETRACHLOROETHYLENE	UG/L	TOTAL	5.7	
				34010	TOLUENE	UG/L	TOTAL		U
				34301	CHLOROBENZENE	UG/L	TOTAL		U
				34371	ETHYLBENZENE	UG/L	TOTAL		U
				34586	2-CHLOROPHENOL	UG/L	TOTAL		U
				34591	2-NITROPHENOL	UG/L	TOTAL		U
				34694	PHENOL	UG/L	TOTAL		U
				34609	2,4-DIMETHYLPHENOL	UG/L	TOTAL		U
				34601	2,4-DICHLOROPHENOL	UG/L	TOTAL		U
				34621	2,4,6-TRICHLOROPHENOL	UG/L	TOTAL		U
				34452	P-CHLORO-M-CRESOL	UG/L	TOTAL		U
				34616	2,4-DINITROPHENOL	UG/L	TOTAL		U
				34657	4,6-DINITRO-O-CRESOL	UG/L	TOTAL		U
				39032	PENTACHLOROPHENOL	UG/L	TOTAL		U
				34646	4-NITROPHENOL	UG/L	TOTAL		U
				34566	1,3-DICHLOROBENZENE	UG/L	TOTAL		U
				34571	1,4-DICHLOROBENZENE	UG/L	TOTAL		U
				34536	1,2-DICHLOROBENZENE	UG/L	TOTAL		U
				34396	HEXACHLOROETHANE	UG/L	TOTAL		U
				39702	HEXACHLOROBUTADIENE	UG/L	TOTAL		U
				34551	1,2,4-TRICHLOROBENZENE	UG/L	TOTAL		U
				34696	NAPHTHALENE	UG/L	TOTAL		U
				34273	BIS(2-CHLOROETHYL) ET.	UG/L	TOTAL		U
				34278	BIS(2-CHLOROETHOXY) METH.	UG/L	TOTAL		U
				34408	ISOPHORONE	UG/L	TOTAL		U
				34447	NITROBENZENE	UG/L	TOTAL		U
				34428	N-NITROSODI-N-PROPYLAMINE	UG/L	TOTAL		U
				34433	N-NITROSODIPHENYLAMINE	UG/L	TOTAL		U
				34283	BIS(2-CHLOROISOPROPYL) ET.	UG/L	TOTAL		U
				34386	HEXACHLOROCYCLOPENTADIENE	UG/L	TOTAL		U
				34581	2-CHLORONAPHTHALENE	UG/L	TOTAL		U
				34200	ACENAPHTHYLENE	UG/L	TOTAL		U

TLT 001 1277

COMPLETED ANALYSIS REPORT — REPORT DATE: 87/12/22

PROJECT NO: 262 — PROJECT NAME: TURPENTINE RUN

STATION NO	DATE FROM TO	TIME OF DAY	LABNO	PARMO	PARAMETER NAME	UNITS	CHEMISTRY	VALUE & REMARK
			090784	34205	ACENAPHTHENE	UG/L	TOTAL	U
				34381	FLOURENE	UG/L	TOTAL	U
				39700	HEXACHLOROBENZENE	UG/L	TOTAL	U
				34636	4-BROMOPHENYL PHENYL ET.	UG/L	TOTAL	U
				34461	PHENANTHRENE	UG/L	TOTAL	U
				34220	ANTHRACENE	UG/L	TOTAL	U
				34341	DIMETHYL PHTHALATE	UG/L	TOTAL	U
				34336	DIETHYL PHTHALATE	UG/L	TOTAL	U
				39110	DI-N-BUTYLPHTHALATE	UG/L	TOTAL	U
				34292	BUTYL BENZYL PHTHALATE	UG/L	TOTAL	U
				34596	DI-N-OCTYL PHTHALATE	UG/L	TOTAL	U
				39100	BIS(2-ETHYLHEXYL) PHTHAL.	UG/L	TOTAL	U
				34376	FLUORANTHENE	UG/L	TOTAL	U
				34469	PYRENE	UG/L	TOTAL	U
				34320	CHRYSENE	UG/L	TOTAL	U
				34526	1,2-BENZANTHRACENE	UG/L	TOTAL	U
				34641	4-CHLOROPHENYL PHENYL ET.	UG/L	TOTAL	U
				34403	INDENO(1,2,3-C,D) PYRENE	UG/L	TOTAL	U
				34247	BENZO(A)PYRENE	UG/L	TOTAL	U
				34521	1,12-BENZOPERYLENE	UG/L	TOTAL	U
				34556	1,2:5,6-DIBENZANTHRACENE	UG/L	TOTAL	U
				34631	3,3'-DICHLOROBENZIDENE	UG/L	TOTAL	U
				34626	2,6-DINITROTOLUENE	UG/L	TOTAL	U
				34611	2,4-DINITROTOLUENE	UG/L	TOTAL	U
				34346	1,2-DIPHENYLHYDRAZINE	UG/L	TOTAL	U
				34230	3,4-BENZOFLUORANTHENE	UG/L	TOTAL	U
				34242	11,12-BENZOFLUORANTHENE	UG/L	TOTAL	U
				99999	BENZOIC ACID	UG/L	TOTAL	3.*
				39330	ALDRIN	UG/L	TOTAL	U
				39390	DIELDRIN	UG/L	TOTAL	U
				39350	CHLORDANE	UG/L	TOTAL	U
				39300	4,4'-DDT	UG/L	TOTAL	U
				39320	4,4'-DDE	UG/L	TOTAL	U
				39310	4,4'-DDD	UG/L	TOTAL	U
				34361	ALPHA ENDOSULFAN	UG/L	TOTAL	U
				34356	BETA ENDOSULFAN	UG/L	TOTAL	U
				34351	ENDOSULFAN SULFATE	UG/L	TOTAL	U
				39390	ENDRIN	UG/L	TOTAL	U
				34366	ENDRIN ALDEHYDE	UG/L	TOTAL	U
				39410	HEPTACLOR	UG/L	TOTAL	U
				39420	HEPTACHLOR EPOXIDE	UG/L	TOTAL	U

COMPLETED (ISIS REPORT REPORT DATE: 87/12/22

PROJECT NO: 262 PROJECT NAME: TURPENTINE RUN

STATION NO	DATE FROM TO	TIME OF DAY	LABNO	PARNO	PARAMETER NAME	UNITS	CHEMISTRY	VALUE & REMARK
			091784	39337	ALPHA-BHC	UG/L	TOTAL	U
				39338	BETA-BHC	UG/L	TOTAL	U
				39340	GAMMA-BHC	UG/L	TOTAL	U
				34259	DELTA-BHC	UG/L	TOTAL	U
				39400	TOXAPHENE	UG/L	TOTAL	U
				34671	PCB-1016	UG/L	TOTAL	U
				39488	PCB-1221	UG/L	TOTAL	U
				39492	PCB-1232	UG/L	TOTAL	U
				39496	PCB-1242	UG/L	TOTAL	U
				39500	PCB-1248	UG/L	TOTAL	U
				39504	PCB-1254	UG/L	TOTAL	U
				39508	PCB-1260	UG/L	TOTAL	U
TURP.RUN 87/10/07 0855								
LOCATION CODE: 3700 SUBSTRATE: AQUEOUS								
DESCRIPTION: VIAL HOUSING WELL #3								
			090783	34418	METHYL CHLORIDE	UG/L	TOTAL	U
				34413	METHYL BROMIDE	UG/L	TOTAL	U
				39175	VINYL CHLORIDE	UG/L	TOTAL	U
				34311	CHLOROETHANE	UG/L	TOTAL	U
				34423	METHYLENE CHLORIDE	UG/L	TOTAL	6.9
				34501	1,1-DICHLOROETHYLENE	UG/L	TOTAL	U
				34496	1,1-DICHLOROETHANE	UG/L	TOTAL	U
				34546	1,2-TRANS DICHLOROETHYLENE	UG/L	TOTAL	U
				32106	CHLOROFORM	UG/L	TOTAL	U
				32103	1,2-DICHLOROETHANE	UG/L	TOTAL	U
				34506	1,1,1-TRICHLOROETHANE	UG/L	TOTAL	U
				32102	CARBON TETRACHLORIDE	UG/L	TOTAL	U
				32101	DICHLOROBROMOMETHANE	UG/L	TOTAL	U
				34541	1,2-DICHLOROPROPANE	UG/L	TOTAL	U
				34561	1,3-DICHLOROPROPYLENE	UG/L	TOTAL	U
				39180	TRICHLOROETHYLENE	UG/L	TOTAL	0.7
				34030	BENZENE	UG/L	TOTAL	U
				32105	CHLORODIBROMOMETHANE	UG/L	TOTAL	U
				34511	1,1,2-TRICHLOROETHANE	UG/L	TOTAL	U
				32104	BROMOFORM	UG/L	TOTAL	U
				34516	1,1,2,2-TETRACHLOROETHANE	UG/L	TOTAL	U
				34475	TETRACHLOROETHYLENE	UG/L	TOTAL	U
				34010	TOLUENE	UG/L	TOTAL	U
				34301	CHLOROBENZENE	UG/L	TOTAL	U

COMPLETED ANALYSIS REPORT — REPORT DATE: 87/12/22

PROJECT NO: 262 — PROJECT NAME: TURPENTINE RUN

STATION NO	DATE FROM TO	TIME OF DAY	LABNO	PARNO	PARAMETER NAME	UNITS	CHEMISTRY	VALUE C	REMARK
			030795	34371	ETHYLBENZENE	UG/L	TOTAL	U	
				34586	2-CHLOROPHENOL	UG/L	TOTAL	U	
				34591	2-NITROPHENOL	UG/L	TOTAL	U	
				34694	PHENOL	UG/L	TOTAL	U	
				34606	2,4-DIMETHYLPHENOL	UG/L	TOTAL	U	
				34601	2,4-DICHLOROPHENOL	UG/L	TOTAL	U	
				34621	2,4,6-TRICHLOROPHENOL	UG/L	TOTAL	U	
				34452	P-CHLORO-M-CRESOL	UG/L	TOTAL	U	
				34616	2,4-DINITROPHENOL	UG/L	TOTAL	U	
				34657	4,6-DINITRO-O-CRESOL	UG/L	TOTAL	U	
				39032	PENTACHLOROPHENOL	UG/L	TOTAL	U	
				34646	4-NITROPHENOL	UG/L	TOTAL	U	
				34566	1,3-DICHLOROBENZENE	UG/L	TOTAL	U	
				34571	1,4-DICHLOROBENZENE	UG/L	TOTAL	U	
				34536	1,2-DICHLOROBENZENE	UG/L	TOTAL	U	
				34396	HEXACHLOROETHANE	UG/L	TOTAL	U	
				39702	HEXACHLOROBUTADIENE	UG/L	TOTAL	U	
				34551	1,2,4-TRICHLOROBENZENE	UG/L	TOTAL	U	
				34696	NAPHTHALENE	UG/L	TOTAL	U	
				34273	BIS(2-CHLOROETHYL) ET.	UG/L	TOTAL	U	
				34278	BIS(2-CHLOROETHOXY) METH.	UG/L	TOTAL	U	
				34408	ISOPHORONE	UG/L	TOTAL	U	
				34447	NITROBENZENE	UG/L	TOTAL	U	
				34426	N-NITROSODI-N-PROPYLAMINE	UG/L	TOTAL	U	
				34433	N-NITROSODIPHENYLAMINE	UG/L	TOTAL	U	
				34283	BIS(2-CHLOROISOPROPYL) ET.	UG/L	TOTAL	U	
				34386	HEXACHLOROCYCLOPENTADIENE	UG/L	TOTAL	U	
				34561	2-CHLORONAPHTHALENE	UG/L	TOTAL	U	
				34200	ACENAPHTHYLENE	UG/L	TOTAL	U	
				34205	ACENAPHTHENE	UG/L	TOTAL	U	
				34381	FLUORENE	UG/L	TOTAL	U	
				39700	HEXACHLOROBENZENE	UG/L	TOTAL	U	
				34676	4-BROMOPHENYL PHENYL ET.	UG/L	TOTAL	U	
				34461	PHENANTHRENE	UG/L	TOTAL	U	
				34220	ANTHRACENE	UG/L	TOTAL	U	
				34341	DIMETHYL PHTHALATE	UG/L	TOTAL	U	
				34336	DIETHYL PHTHALATE	UG/L	TOTAL	U	
				39110	DI-N-BUTYLPHTHALATE	UG/L	TOTAL	U	
				34292	BUTYL BENZYL PHTHALATE	UG/L	TOTAL	U	
				34596	DI-N-OCTYL PHTHALATE	UG/L	TOTAL	U	
				34100	BIS(2-ETHYLHEXYL) PHTHAL.	UG/L	TOTAL	U	

COMPLETE ANALYSIS REPORT — REPORT DATE: 87/12/..

PROJECT NO: 262 — PROJECT NAME: TURPENTINE RUN

STATION NO	DATE FROM TO	TIME OF DAY	LABNO	PARNO	PARAMETER NAME	UNITS	CHEMISTRY	VALUE	REMARK
			093705	34376	FLUORANTHENE	UG/L	TOTAL		U
				34469	PYRENE	UG/L	TOTAL		U
				34320	CHRYSENE	UG/L	TOTAL		U
				34526	1,2-BENZANTHRACENE	UG/L	TOTAL		U
				34641	4-CHLOROPHENYL PHENYL ET.	UG/L	TOTAL		U
				34403	INDENO(1,2,3-C,D) PYRENE	UG/L	TOTAL		U
				34247	BENZO(A)PYRENE	UG/L	TOTAL		U
				34521	1,12-BENZOPERYLENE	UG/L	TOTAL		U
				34556	1,2:5,6-DIBENZANTHRACENE	UG/L	TOTAL		U
				34631	3,3'-DICHLOROBENZIDENE	UG/L	TOTAL		U
				34626	2,6-DINITROTOLUENE	UG/L	TOTAL		U
				34611	2,4-DINITROTOLUENE	UG/L	TOTAL		U
				34346	1,2-DIPHENYLHYDRAZINE	UG/L	TOTAL		U
				34230	3,4-BENZOFLUORANTHENE	UG/L	TOTAL		U
				34242	11,12-BENZOFLUORANTHENE	UG/L	TOTAL		U
				99999	BENZOIC ACID	UG/L	TOTAL	2.2	M
				99999	4-METHOXY 1,1-DIMET.ETH.PHEN	UG/L	TOTAL	2.1	J
				99999	2-BUTOXYETHYL PHOSPHATE	UG/L	TOTAL	3.1	J
				39330	ALDRIN	UG/L	TOTAL		U
				39360	DIELDRIN	UG/L	TOTAL		U
				39350	CHLORDANE	UG/L	TOTAL		U
				39300	4,4'-DDT	UG/L	TOTAL		U
				39320	4,4'-DDE	UG/L	TOTAL		U
				39310	4,4'-DDD	UG/L	TOTAL		U
				34361	ALPHA ENDOSULFAN	UG/L	TOTAL		U
				34356	BETA ENDOSULFAN	UG/L	TOTAL		U
				34351	ENDOSULFAN SULFATE	UG/L	TOTAL		U
				39390	ENDRIN	UG/L	TOTAL		U
				34366	ENDRIN ALDEHYDE	UG/L	TOTAL		U
				39410	HEPTACLOR	UG/L	TOTAL		U
				39420	HEPTACHLOR EPOXIDE	UG/L	TOTAL		U
				39337	ALPHA-BHC	UG/L	TOTAL		U
				39338	BETA-BHC	UG/L	TOTAL		U
				39340	GAMMA-BHC	UG/L	TOTAL		U
				34259	DELTA-BHC	UG/L	TOTAL		U
				39400	TOXAPHENE	UG/L	TOTAL		U
				34671	PCB-1016	UG/L	TOTAL		U
				39488	PCB-1221	UG/L	TOTAL		U
				39492	PCB-1232	UG/L	TOTAL		U
				39496	PCB-1242	UG/L	TOTAL		U
				39500	PCB-1248	UG/L	TOTAL		U

COMPLETED ANALYSIS REPORT — REPORT DATE: 87/12/22

PROJECT NO: 262 — PROJECT NAME: TURPENTINE RUN

STATION NO	DATE FROM TO	TIME OF DAY	LABNO	PARNO	PARAMETER NAME	UNITS	CHEMISTRY	VALUE & REMARK
			090785	39504	PCB-1254	UG/L	TOTAL	U
				39508	PCB-1260	UG/L	TOTAL	U
TURP.RUN	07/10/87	1045						
LOCATION CODE: 3700 SUBSTRATE: AQUEOUS								
DESCRIPTION: HARTMAN ESTATE WELL								
			090785	34418	METHYL CHLORIDE	UG/L	TOTAL	U
				34413	METHYL BROMIDE	UG/L	TOTAL	U
				39175	VINYL CHLORIDE	UG/L	TOTAL	U
				34311	CHLOROETHANE	UG/L	TOTAL	U
				34423	METHYLENE CHLORIDE	UG/L	TOTAL	U
				34501	1,1-DICHLOROETHYLENE	UG/L	TOTAL	U
				34496	1,1-DICHLOROETHANE	UG/L	TOTAL	U
				34546	1,2-TRANS DICHLOROETHYLENE	UG/L	TOTAL	U
				32105	CHLOROFORM	UG/L	TOTAL	U
				32103	1,2-DICHLOROETHANE	UG/L	TOTAL	U
				34506	1,1,1-TRICHLOROETHANE	UG/L	TOTAL	U
				32102	CARBON TETRACHLORIDE	UG/L	TOTAL	U
				32101	DICHLOROBROMOMETHANE	UG/L	TOTAL	U
				34541	1,2-DICHLOROPROPANE	UG/L	TOTAL	U
				34541	1,3-DICHLOROPROPYLENE	UG/L	TOTAL	U
				39180	TRICHLOROETHYLENE	UG/L	TOTAL	U
				34030	BENZENE	UG/L	TOTAL	U
				32175	CHLORODIBROMOMETHANE	UG/L	TOTAL	U
				34511	1,1,2-TRICHLOROETHANE	UG/L	TOTAL	U
				32104	BROMOFORM	UG/L	TOTAL	U
				34516	1,1,2,2-TETRACHLOROETHANE	UG/L	TOTAL	U
				34475	TETRACHLOROETHYLENE	UG/L	TOTAL	U
				34010	TOLUENE	UG/L	TOTAL	U
				34301	CHLOROBENZENE	UG/L	TOTAL	U
				34371	ETHYLBENZENE	UG/L	TOTAL	U
				34586	2-CHLOROPHENOL	UG/L	TOTAL	U
				34591	2-NITROPHENOL	UG/L	TOTAL	U
				34694	PHENOL	UG/L	TOTAL	U
				34606	2,4-DIMETHYLPHENOL	UG/L	TOTAL	U
				34601	2,4-DICHLOROPHENOL	UG/L	TOTAL	U
				34621	2,4,6-TRICHLOROPHENOL	UG/L	TOTAL	U
				34452	P-CHLORO-M-CRESOL	UG/L	TOTAL	U
				34616	2,4-DINITROPHENOL	UG/L	TOTAL	U
				34657	4,6-DINITRO-O-CRESOL	UG/L	TOTAL	U

COMPLETED ANALYSIS REPORT REPORT DATE: 87/12/22

PROJECT NO: 262 PROJECT NAME: TURPENTINE RUN

STATION NO	DATE FROM TO	TIME OF DAY	LABNO	PARNO	PARAMETER NAME	UNITS	CHEMISTRY	VALUE & REMARK
			090706	39032	PENTACHLOROPHENOL	UG/L	TOTAL	U
				34646	4-NITROPHENOL	UG/L	TOTAL	U
				34566	1,3-DICHLOROBENZENE	UG/L	TOTAL	U
				34571	1,4-DICHLOROBENZENE	UG/L	TOTAL	U
				34536	1,2-DICHLOROBENZENE	UG/L	TOTAL	U
				34396	HEXACHLOROETHANE	UG/L	TOTAL	U
				39702	HEXACHLOROBUTADIENE	UG/L	TOTAL	U
				34551	1,2,4-TRICHLOROBENZENE	UG/L	TOTAL	U
				34696	NAPHTHALENE	UG/L	TOTAL	U
				34273	BIS(2-CHLOROETHYL) ET.	UG/L	TOTAL	U
				34278	BIS(2-CHLOROETHOXY) METH.	UG/L	TOTAL	U
				34408	ISOPHORONE	UG/L	TOTAL	U
				34447	NITROBENZENE	UG/L	TOTAL	U
				34428	N-NITROSODI-N-PROPYLAMINE	UG/L	TOTAL	U
				34433	N-NITROSODIPHENYLAMINE	UG/L	TOTAL	U
				34283	BIS(2-CHLOROISOPROPYL) ET.	UG/L	TOTAL	U
				34386	HEXACHLOROCYCLOPENTADIENE	UG/L	TOTAL	U
				34581	2-CHLORONAPHTHALENE	UG/L	TOTAL	U
				34200	ACENAPHTHYLENE	UG/L	TOTAL	U
				34205	ACENAPHTHENE	UG/L	TOTAL	U
				34381	FLOURENE	UG/L	TOTAL	U
				39700	HEXACHLOROBENZENE	UG/L	TOTAL	U
				34636	4-BROMOPHENYL PHENYL ET.	UG/L	TOTAL	U
				34461	PHENANTHRENE	UG/L	TOTAL	U
				34220	ANTHRACENE	UG/L	TOTAL	U
				34341	DIMETHYL PHTHALATE	UG/L	TOTAL	U
				34336	DIETHYL PHTHALATE	UG/L	TOTAL	0.2
				39110	DI-N-BUTYLPHTHALATE	UG/L	TOTAL	U
				34292	BUTYL BENZYL PHTHALATE	UG/L	TOTAL	U
				34596	DI-N-OCTYL PHTHALATE	UG/L	TOTAL	U
				39100	BIS(2-ETHYLHEXYL) PHTHAL.	UG/L	TOTAL	U
				34376	FLUORANTHENE	UG/L	TOTAL	U
				34469	PYRENE	UG/L	TOTAL	U
				34320	CHRYSENE	UG/L	TOTAL	U
				34526	1,2-BENZANTHRACENE	UG/L	TOTAL	U
				34641	4-CHLOROPHENYL PHENYL ET.	UG/L	TOTAL	U
				34403	INDENO(1,2,3-C,D) PYRENE	UG/L	TOTAL	U
				34247	BENZO(A)PYRENE	UG/L	TOTAL	U
				34521	1,12-BENZOPERYLENE	UG/L	TOTAL	U
				34556	1,2:5,6-DIBENZANTHRACENE	UG/L	TOTAL	U
				34581	3,3'-DICHLOROBENZIDENE	UG/L	TOTAL	U

JUL 001 1282

COMPLETED ANALYSIS REPORT — REPORT DATE: 87/12/22

PROJECT NO: 262 — PROJECT NAME: TURPENTINE RUN

STATION NO	DATE FROM TO	TIME OF DAY	LABNO	PARNO	PARAMETER NAME	UNITS	CHEMISTRY	VALUE & REMARK
			099786	34626	2,6-DINITROTOLUENE	UG/L	TOTAL	U
				34611	2,4-DINITROTOLUENE	UG/L	TOTAL	U
				34346	1,2-DIPHENYLHYDRAZINE	UG/L	TOTAL	U
				34230	3,4-BENZOFLUORANTHENE	UG/L	TOTAL	U
				34242	11,12-BENZOFLUORANTHENE	UG/L	TOTAL	U
				39330	ALDRIN	UG/L	TOTAL	U
				39390	DIELDRIN	UG/L	TOTAL	U
				39350	CHLORDANE	UG/L	TOTAL	U
				39300	4,4'-DDT	UG/L	TOTAL	U
				39320	4,4'-DDE	UG/L	TOTAL	U
				39310	4,4'-DDD	UG/L	TOTAL	U
				34361	ALPHA ENDOSULFAN	UG/L	TOTAL	U
				34356	BETA ENDOSULFAN	UG/L	TOTAL	U
				34351	ENDOSULFAN SULFATE	UG/L	TOTAL	U
				39390	ENDRIN	UG/L	TOTAL	U
				34366	ENDRIN ALDEHYDE	UG/L	TOTAL	U
				39410	HEPTACHLOR	UG/L	TOTAL	U
				39420	HEPTACHLOR EPOXIDE	UG/L	TOTAL	U
				39397	ALPHA-BHC	UG/L	TOTAL	U
				39338	BETA-BHC	UG/L	TOTAL	U
				39340	GAMMA-BHC	UG/L	TOTAL	U
				34259	DELTA-BHC	UG/L	TOTAL	U
				39400	TOXAPHENE	UG/L	TOTAL	U
				34671	PCB-1016	UG/L	TOTAL	U
				39488	PCB-1221	UG/L	TOTAL	U
				39492	PCB-1232	UG/L	TOTAL	U
				39496	PCB-1242	UG/L	TOTAL	U
				39500	PCB-1248	UG/L	TOTAL	U
				39504	PCB-1254	UG/L	TOTAL	U
				39508	PCB-1260	UG/L	TOTAL	U
TURP.RUN	87/10/07	1300						
LOCATION CODE: 3700		SUBSTRATE: AQUEOUS						
DESCRIPTION: DEMITEIS WELL								
			099787	34418	METHYL CHLORIDE	UG/L	TOTAL	U
				34413	METHYL BROMIDE	UG/L	TOTAL	U
				39175	VINYL CHLORIDE	UG/L	TOTAL	U
				34311	CHLOROETHANE	UG/L	TOTAL	U
				34423	METHYLENE CHLORIDE	UG/L	TOTAL	U
				34501	1,1-DICHLOROETHYLENE	UG/L	TOTAL	U

TUT 001 1284

COMPLETED (.YSIS REPORT REPORT DATE: 87/12/2(

PROJECT NO: 262 PROJECT NAME: TURPENTINE RUN

STATION NO	DATE FROM TO	TIME OF DAY	LABNO	PARNO	PARAMETER NAME	UNITS	CHEMISTRY	VALUE	REMARK
			095787	34496	1,1-DICHLOROETHANE	UG/L	TOTAL	U	
				34546	1,2-TRANS DICHLOROETHYLENE	UG/L	TOTAL	U	M
				32106	CHLOROFORM	UG/L	TOTAL	U	
				32103	1,2-DICHLOROETHANE	UG/L	TOTAL	U	
				34506	1,1,1-TRICHLOROETHANE	UG/L	TOTAL	U	
				32102	CARBON TETRACHLORIDE	UG/L	TOTAL	U	
				32101	DICHLOROBROMOMETHANE	UG/L	TOTAL	U	
				34541	1,2-DICHLOROPROPANE	UG/L	TOTAL	U	
				34561	1,3-DICHLOROPROPYLENE	UG/L	TOTAL	U	
				39180	TRICHLOROETHYLENE	UG/L	TOTAL	U	
				34030	BENZENE	UG/L	TOTAL	U	
				32105	CHLORODIBROMOMETHANE	UG/L	TOTAL	U	
				34511	1,1,2-TRICHLOROETHANE	UG/L	TOTAL	U	
				32104	BROMOFORM	UG/L	TOTAL	U	M
				34516	1,1,2,2-TETRACHLOROETHANE	UG/L	TOTAL	U	
				34475	TETRACHLOROETHYLENE	UG/L	TOTAL	0.5	M
				34010	TOLUENE	UG/L	TOTAL	U	
				34301	CHLOROBENZENE	UG/L	TOTAL	U	
				34371	ETHYLBENZENE	UG/L	TOTAL	U	
				34580	2-CHLOROPHENOL	UG/L	TOTAL	U	
				34591	2-NITROPHENOL	UG/L	TOTAL	U	
				34694	PHENOL	UG/L	TOTAL	U	
				34606	2,6-DIMETHYLPHENOL	UG/L	TOTAL	U	
				34601	2,4-DICHLOROPHENOL	UG/L	TOTAL	U	
				34621	2,4,6-TRICHLOROPHENOL	UG/L	TOTAL	U	
				34452	P-CHLORO-M-CRESOL	UG/L	TOTAL	U	M
				34616	2,4-DINITROPHENOL	UG/L	TOTAL	U	
				34657	4,6-DINITRO-O-CRESOL	UG/L	TOTAL	U	
				39032	PENTACHLOROPHENOL	UG/L	TOTAL	U	
				34646	4-NITROPHENOL	UG/L	TOTAL	U	
				34566	1,3-DICHLOROBENZENE	UG/L	TOTAL	U	
				34571	1,4-DICHLOROBENZENE	UG/L	TOTAL	U	
				34536	1,2-DICHLOROBENZENE	UG/L	TOTAL	U	
				34396	HEXACHLOROETHANE	UG/L	TOTAL	U	
				39702	HEXACHLOROBUTADIENE	UG/L	TOTAL	U	
				34551	1,2,4-TRICHLOROBENZENE	UG/L	TOTAL	U	
				34696	NAPHTHALENE	UG/L	TOTAL	U	
				34273	BIS(2-CHLOROETHYL) ET.	UG/L	TOTAL	U	M
				34278	BIS(2-CHLOROETHOXY) METH.	UG/L	TOTAL	U	
				34408	ISOPHORONE	UG/L	TOTAL	U	
				34447	NITROBENZENE	UG/L	TOTAL	U	

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TUT 001 1285

COMPLETED ANALYSIS REPORT — REPORT DATE: 87/12/22

PROJECT NO: 262 — PROJECT NAME: TURPENTINE RUN

STATION NO	DATE FROM TO	TIME OF DAY	LABNO	PARNO	PARAMETER NAME	UNITS	CHEMISTRY	VALUE	R	REMARK
			090787	34428	N-NITROSODI-N-PROPYLAMINE	UG/L	TOTAL			U
				34433	N-NITROSODIPHENYLAMINE	UG/L	TOTAL			U
				34283	BIS(2-CHLOROISOPROPYL) ET.	UG/L	TOTAL			U
				34386	HEXACHLOROCYCLOPENTADIENE	UG/L	TOTAL			U
				34581	2-CHLORONAPHTHALENE	UG/L	TOTAL			U
				34200	ACENAPHTHYLENE	UG/L	TOTAL			U
				34205	ACENAPHTHENE	UG/L	TOTAL			U
				34381	FLOURENE	UG/L	TOTAL			U
				39700	HEXACHLOROBENZENE	UG/L	TOTAL			U
				34636	4-BROMOPHENYL PHENYL ET.	UG/L	TOTAL			U
				34681	PHENANTHRENE	UG/L	TOTAL			U
				34220	ANTHRACENE	UG/L	TOTAL			U
				34341	DIMETHYL PHTHALATE	UG/L	TOTAL			U
				34336	DIETHYL PHTHALATE	UG/L	TOTAL	0.1		M
				39110	DI-N-BUTYLPHTHALATE	UG/L	TOTAL			U
				34292	BUTYL BENZYL PHTHALATE	UG/L	TOTAL			U
				34596	DI-N-OCTYL PHTHALATE	UG/L	TOTAL			U
				39100	BIS(2-ETHYLHEXYL) PHTHAL.	UG/L	TOTAL			U
				34376	FLUORANTHENE	UG/L	TOTAL			U
				34469	PYRENE	UG/L	TOTAL			U
				34320	CHRYSENE	UG/L	TOTAL			U
				34526	1,2-BENZANTHRACENE	UG/L	TOTAL			U
				34641	4-CHLOROPHENYL PHENYL ET.	UG/L	TOTAL			U
				34403	INDENO(1,2,3-C,D) PYRENE	UG/L	TOTAL			U
				34247	BENZO(A)PYRENE	UG/L	TOTAL			U
				34521	1,12-BENZOPERYLENE	UG/L	TOTAL			U
				34556	1,2:5,6-DIBENZANTHRACENE	UG/L	TOTAL			U
				34631	3,3'-DICHLOROBENZIDENE	UG/L	TOTAL			U
				34626	2,6-DINITROTOLUENE	UG/L	TOTAL			U
				34611	2,4-DINITROTOLUENE	UG/L	TOTAL			U
				34346	1,2-DIPHENYLHYDRAZINE	UG/L	TOTAL			U
				34230	3,4-BENZOFLUORANTHENE	UG/L	TOTAL			U
				34242	11,12-BENZOFLUORANTHENE	UG/L	TOTAL			U
				39330	ALDRIN	UG/L	TOTAL			U
				39390	DIELDRIN	UG/L	TOTAL			U
				39350	CHLORDANE	UG/L	TOTAL			U
				39300	4,4'-DDT	UG/L	TOTAL			U
				39320	4,4'-DDE	UG/L	TOTAL			U
				39310	4,4'-DDD	UG/L	TOTAL			U
				34351	ALPHA ENDOSULFAN	UG/L	TOTAL			U
				34398	BETA ENDOSULFAN	UG/L	TOTAL			U

TUT 001 1286

COMPLETED (YSIS REPORT REPORT DATE: 87/12/22

PROJECT NO: 262 PROJECT NAME: TURPENTINE RUN

STATION NO	DATE FROM TO	TIME OF DAY	LABNO	PARNO	PARAMETER NAME	UNITS	CHEMISTRY	VALUE & REMARK
			090787	34351	ENDOSULFAN SULFATE	UG/L	TOTAL	U
				39390	ENDRIN	UG/L	TOTAL	U
				34366	ENDRIN ALDEHYDE	UG/L	TOTAL	U
				39410	HEPTACLOR	UG/L	TOTAL	U
				39420	HEPTACHLOR EPOXIDE	UG/L	TOTAL	U
				39337	ALPHA-BHC	UG/L	TOTAL	U
				39338	BETA-BHC	UG/L	TOTAL	U
				39340	GAMMA-BHC	UG/L	TOTAL	U
				34259	DELTA-BHC	UG/L	TOTAL	U
				39400	TOXAPHENE	UG/L	TOTAL	U
				34671	PCB-1016	UG/L	TOTAL	U
				39488	PCB-1221	UG/L	TOTAL	U
				39492	PCB-1232	UG/L	TOTAL	U
				39496	PCB-1242	UG/L	TOTAL	U
				39500	PCB-1248	UG/L	TOTAL	U
				39504	PCB-1254	UG/L	TOTAL	U
				39508	PCB-1260	UG/L	TOTAL	U
TURP.RUN	87/10/05	1021						
DEPTH: 0000	SUBSTRATE: AQUEOUS							
DESCRIPTION:	RODRIGUEZ AUTO PARTS							
	WELL # 3							
			091302	34413	METHYL CHLORIDE	UG/L	TOTAL	U
				34413	METHYL BROMIDE	UG/L	TOTAL	U
				39175	VINYL CHLORIDE	UG/L	TOTAL	U
				34311	CHLOROETHANE	UG/L	TOTAL	U
				34423	METHYLENE CHLORIDE	UG/L	TOTAL	U
				34501	1,1-DICHLOROETHYLENE	UG/L	TOTAL	U
				34496	1,1-DICHLOROETHANE	UG/L	TOTAL	U
				34546	1,2-TRANS DICHLOROETHYLENE	UG/L	TOTAL	U
				32106	CHLOROFORM	UG/L	TOTAL	U
				32103	1,2-DICHLOROETHANE	UG/L	TOTAL	U
				34506	1,1,1-TRICHLOROETHANE	UG/L	TOTAL	U
				32102	CARBON TETRACHLORIDE	UG/L	TOTAL	U
				32101	DICHLOROBROMOMETHANE	UG/L	TOTAL	U
				34541	1,2-DICHLOROPROPANE	UG/L	TOTAL	U
				34551	1,3-DICHLOROPROPYLENE	UG/L	TOTAL	U
				39180	TRICHLOROETHYLENE	UG/L	TOTAL	U
				34030	BENZENE	UG/L	TOTAL	U
				32105	CHLORODIBROMOMETHANE	UG/L	TOTAL	U
				34511	1,1,2-TRICHLOROETHANE	UG/L	TOTAL	U

TUT 001 1287

COMPLETED(_YSIS REPORT REPORT DATE: 87/12/22

PROJECT NO: 202 PROJECT NAME: TURPENTINE RUN

STATION NO	DATE FROM TO	TIME OF DAY	LABNO	PARNO	PARAMETER NAME	UNITS	CHEMISTRY	VALUE & REMARK
			091302	32104	BROMOFORM	UG/L	TOTAL	U
				34516	1,1,2,2-TETRACHLOROETHANE	UG/L	TOTAL	U
				34475	TETRACHLOROETHYLENE	UG/L	TOTAL	U
				34010	TOLUENE	UG/L	TOTAL	U
				34301	CHLOROBENZENE	UG/L	TOTAL	U
				34371	ETHYLBENZENE	UG/L	TOTAL	U
				34586	2-CHLOROPHENOL	UG/L	TOTAL	U
				34591	2-NITROPHENOL	UG/L	TOTAL	U
				34694	PHENOL	UG/L	TOTAL	U
				34606	2,4-DIMETHYLPHENOL	UG/L	TOTAL	U
				34601	2,4-DICHLOROPHENOL	UG/L	TOTAL	U
				34621	2,4,6-TRICHLOROPHENOL	UG/L	TOTAL	U
				34452	P-CHLORO-M-CRESOL	UG/L	TOTAL	U
				34616	2,4-DINITROPHENOL	UG/L	TOTAL	U
				34657	4,6-DINITRO-O-CRESOL	UG/L	TOTAL	U
				39032	PENTACHLOROPHENOL	UG/L	TOTAL	U
				34646	4-NITROPHENOL	UG/L	TOTAL	U
				34566	1,3-DICHLOROBENZENE	UG/L	TOTAL	U
				34571	1,4-DICHLOROBENZENE	UG/L	TOTAL	U
				34536	1,2-DICHLOROBENZENE	UG/L	TOTAL	U
				34396	HEXACHLOROETHANE	UG/L	TOTAL	U
				39702	HEXACHLOROBUTADIENE	UG/L	TOTAL	U
				34551	1,2,4-TRICHLOROBENZENE	UG/L	TOTAL	U
				34696	NAPHTHALENE	UG/L	TOTAL	U
				34273	BIS(2-CHLOROETHYL) ET.	UG/L	TOTAL	U
				34278	BIS(2-CHLOROETHOXY) METH.	UG/L	TOTAL	U
				34409	ISOPHORONE	UG/L	TOTAL	U
				34447	NITROBENZENE	UG/L	TOTAL	U
				34428	N-NITROSODI-N-PROPYLAMINE	UG/L	TOTAL	U
				34433	N-NITROSODIPHENYLAMINE	UG/L	TOTAL	U
				34283	BIS(2-CHLOROISOPROPYL) ET.	UG/L	TOTAL	U
				34386	HEXACHLOROCYCLOPENTADIENE	UG/L	TOTAL	U
				34581	2-CHLORONAPHTHALENE	UG/L	TOTAL	U
				34200	ACENAPHTHYLENE	UG/L	TOTAL	U
				34209	ACENAPHTHENE	UG/L	TOTAL	U
				34381	FLOURENE	UG/L	TOTAL	U
				34700	HEXACHLOROBENZENE	UG/L	TOTAL	U
				34636	4-BROMOPHENYL PHENYL ET.	UG/L	TOTAL	U
				34461	PHENANTHRENE	UG/L	TOTAL	U
				34220	ANTHRACENE	UG/L	TOTAL	U
				34341	DIMETHYL PHTHALATE	UG/L	TOTAL	U

8827 001 TUT

COMPLETED ANALYSIS REPORT

REPORT DATE: 87/12/22

PROJECT NO: 262

PROJECT NAME: TURPENTINE RUN

STATION NO	DATE FROM TO	TIME OF DAY	LABNO	PARNO	PARAMETER NAME	UNITS	CHEMISTRY	VALUE & REMARK
			091302	34336	DIETHYL PHTHALATE	UG/L	TOTAL	U
				39110	DI-N-BUTYLPHTHALATE	UG/L	TOTAL	U
				34292	BUTYL BENZYL PHTHALATE	UG/L	TOTAL	U
				34596	DI-N-OCTYL PHTHALATE	UG/L	TOTAL	U
				39100	BIS(2-ETHYLHEXYL) PHTHAL.	UG/L	TOTAL	U
				34376	FLUORANTHENE	UG/L	TOTAL	U
				34469	PYRENE	UG/L	TOTAL	U
				34320	CHRYSENE	UG/L	TOTAL	U
				34526	1,2-BENZANTHRACENE	UG/L	TOTAL	U
				34641	4-CHLOROPHENYL PHENYL ET.	UG/L	TOTAL	U
				34403	INDENO(1,2,3-C,D) PYRENE	UG/L	TOTAL	U
				34247	BENZO(A)PYRENE	UG/L	TOTAL	U
				34521	3,12-BENZOPERYLENE	UG/L	TOTAL	U
				34556	1,2:5,6-DIBENZANTHRACENE	UG/L	TOTAL	U
				34691	3,3'-DICHLOROBENZIDENE	UG/L	TOTAL	U
				34626	2,6-DINITROTOLUENE	UG/L	TOTAL	U
				34611	2,4-DINITROTOLUENE	UG/L	TOTAL	U
				34346	1,2-DIPHENYLHYDRAZINE	UG/L	TOTAL	U
				34230	3,4-BENZOFLUORANTHENE	UG/L	TOTAL	U
				34242	11,12-BENZOFLUORANTHENE	UG/L	TOTAL	U
				39333	ALDRIN	UG/L	TOTAL	U
				39380	DIELDRIN	UG/L	TOTAL	U
				39350	CHLORDANE	UG/L	TOTAL	U
				39300	4,4'-DDT	UG/L	TOTAL	U
				39320	4,4'-DDE	UG/L	TOTAL	U
				39310	4,4'-DDD	UG/L	TOTAL	U
				34351	ALPHA ENDOSULFAN	UG/L	TOTAL	U
				34356	BETA ENDOSULFAN	UG/L	TOTAL	U
				34351	ENDOSULFAN SULFATE	UG/L	TOTAL	U
				39390	ENDRIN	UG/L	TOTAL	U
				34366	ENDRIN ALDEHYDE	UG/L	TOTAL	U
				39410	HEPTACLOR	UG/L	TOTAL	U
				39420	HEPTACHLOR EPOXIDE	UG/L	TOTAL	U
				39337	ALPHA-BHC	UG/L	TOTAL	U
				39338	BETA-BHC	UG/L	TOTAL	U
				39340	GAMMA-BHC	UG/L	TOTAL	U
				34259	DELTA-BHC	UG/L	TOTAL	U
				39400	TOXAPHENE	UG/L	TOTAL	U
				34671	PCB-1016	UG/L	TOTAL	U
				39488	PCB-1221	UG/L	TOTAL	U
				39492	PCB-1232	UG/L	TOTAL	U

6827 1289 001 TUT

COMPLETED LYSIS REPORT REPORT DATE: 07/12/1

PROJECT NO: 262 PROJECT NAME: TURPENTINE RUN

STATION NO	DATE FROM TO	TIME OF DAY	LABNO	PARNO	PARAMETER NAME	UNITS	CHEMISTRY	VALUE	C	REMARK
			091302	39496	PCB-1242	UG/L	TOTAL			U
				39500	PCB-1248	UG/L	TOTAL			U
				39504	PCB-1254	UG/L	TOTAL			U
				39508	PCB-1260	UG/L	TOTAL			U
TURP.RUN	07/10/86	1130								
DEPTH: 0000	SUBSTRATE: AQUEOUS									
DESCRIPTION: RAMSEY MOTORS - WELL LOCATED NEAR AUTO REPAIR WORKS										
			091303	34418	METHYL CHLORIDE	UG/L	TOTAL			U
				34413	METHYL BROMIDE	UG/L	TOTAL			U
				39175	VINYL CHLORIDE	UG/L	TOTAL			U
				34311	CHLOROETHANE	UG/L	TOTAL			U
				34423	METHYLENE CHLORIDE	UG/L	TOTAL			U
				34501	1,1-DICHLOROETHYLENE	UG/L	TOTAL			U
				34476	1,1-DICHLOROETHANE	UG/L	TOTAL			U
				34546	1,2-TRANS DICHLOROETHYLENE	UG/L	TOTAL	6.3		
				32106	CHLOROFORM	UG/L	TOTAL			U
				32103	1,2-DICHLOROETHANE	UG/L	TOTAL			U
				34506	1,1,1-TRICHLOROETHANE	UG/L	TOTAL			U
				32102	CARBON TETRACHLORIDE	UG/L	TOTAL			U
				32101	DICHLOROBROMOMETHANE	UG/L	TOTAL			U
				34541	1,2-DICHLOROPROPANE	UG/L	TOTAL			U
				34551	1,3-DICHLOROPROPYLENE	UG/L	TOTAL			U
				39180	TRICHLOROETHYLENE	UG/L	TOTAL	1.7		M
				34030	BENZENE	UG/L	TOTAL			U
				32105	CHLORODIBROMOMETHANE	UG/L	TOTAL			U
				34511	1,1,2-TRICHLOROETHANE	UG/L	TOTAL			U
				32104	BROMOFORM	UG/L	TOTAL			U
				34516	1,1,2,2-TETRACHLOROETHANE	UG/L	TOTAL			U
				34475	TETRACHLOROETHYLENE	UG/L	TOTAL	2		
				34010	TOLUENE	UG/L	TOTAL			U
				34301	CHLOROBENZENE	UG/L	TOTAL			U
				34371	ETHYLBENZENE	UG/L	TOTAL			U
				34586	2-CHLOROPHENOL	UG/L	TOTAL			U
				34591	2-NITROPHENOL	UG/L	TOTAL			U
				34694	PHENOL	UG/L	TOTAL			U
				34606	2,4-DIMETHYLPHENOL	UG/L	TOTAL			U
				34601	2,4-DICHLOROPHENOL	UG/L	TOTAL			U
				34621	2,4,6-TRICHLOROPHENOL	UG/L	TOTAL			U
				34452	P-CHLORO-M-CRESOL	UG/L	TOTAL			U

TUT 001 1290

COMPLETED ANALYSIS REPORT — REPORT DATE: 87/12/22

PROJECT NO: 262 — PROJECT NAME: TURPENTINE RUN

STATION NO	DATE FROM TO	TIME OF DAY	LABNO	PARNO	PARAMETER NAME	UNITS	CHEMISTRY	VALUE & REMARK
			891303	34616	2,4-DINITROPHENOL	UG/L	TOTAL	U
				34657	4,6-DINITRO-O-CRESOL	UG/L	TOTAL	U
				39032	PENTACHLOROPHENOL	UG/L	TOTAL	U
				34646	4-NITROPHENOL	UG/L	TOTAL	U
				34566	1,3-DICHLOROBENZENE	UG/L	TOTAL	U
				34571	1,4-DICHLOROBENZENE	UG/L	TOTAL	U
				34536	1,2-DICHLOROBENZENE	UG/L	TOTAL	U
				34396	HEXACHLOROETHANE	UG/L	TOTAL	U
				39702	HEXACHLOROBUTADIENE	UG/L	TOTAL	U
				34551	1,2,4-TRICHLOROBENZENE	UG/L	TOTAL	U
				34696	NAPHTHALENE	UG/L	TOTAL	U
				34273	BIS(2-CHLOROETHYL) ET.	UG/L	TOTAL	U
				34278	BIS(2-CHLOROETHOXY) METH.	UG/L	TOTAL	U
				34408	ISOPHORONE	UG/L	TOTAL	U
				34447	NITROBENZENE	UG/L	TOTAL	U
				34428	N-NITROSODI-N-PROPYLAMINE	UG/L	TOTAL	U
				34493	N-NITROSODIPHENYLAMINE	UG/L	TOTAL	U
				34283	BIS(2-CHLOROISOPROPYL) ET.	UG/L	TOTAL	U
				34386	HEXACHLOROCYCLOPENTADIENE	UG/L	TOTAL	U
				34581	2-CHLORONAPHTHALENE	UG/L	TOTAL	U
				34200	ACENAPHTHYLENE	UG/L	TOTAL	U
				34205	ACENAPHTHENE	UG/L	TOTAL	U
				34381	FLOURENE	UG/L	TOTAL	U
				39700	HEXACHLOROBENZENE	UG/L	TOTAL	U
				34696	4-BROMOPHENYL PHENYL ET.	UG/L	TOTAL	U
				34461	PHENANTHRENE	UG/L	TOTAL	U
				34220	ANTHRACENE	UG/L	TOTAL	U
				34341	DIMETHYL PHTHALATE	UG/L	TOTAL	U
				34336	DIETHYL PHTHALATE	UG/L	TOTAL	U
				39110	DI-N-BUTYLPHTHALATE	UG/L	TOTAL	U
				34292	BUTYL BENZYL PHTHALATE	UG/L	TOTAL	U
				34596	DI-N-OCTYL PHTHALATE	UG/L	TOTAL	0.2
				39100	BIS(2-ETHYLHEXYL) PHTHAL.	UG/L	TOTAL	U
				34376	FLUORANTHENE	UG/L	TOTAL	U
				34469	PYRENE	UG/L	TOTAL	U
				34320	CHRYSENE	UG/L	TOTAL	U
				34526	1,2-BENZANTHRACENE	UG/L	TOTAL	U
				34641	4-CHLOROPHENYL PHENYL ET.	UG/L	TOTAL	U
				34403	INDENO(1,2,3-C,D) PYRENE	UG/L	TOTAL	U
				34247	BENZO(A)PYRENE	UG/L	TOTAL	U
				34521	1,12-BENZOPERYLENE	UG/L	TOTAL	U

TUT 001 1291

COMPLETED ANALYSIS REPORT — REPORT DATE: 97/12/22

PROJECT NO: 262 — PROJECT NAME: TURPENTINE RUN

STATION NO	DATE FROM TO	TIME OF DAY	LABNO	PARNO	PARAMETER NAME	UNITS	CHEMISTRY	VALUE & REMARK
			091303	34556	1,2:5,6-DIBENZANTHRACENE	UG/L	TOTAL	U
				34631	3,3'-DICHLOROBENZIDENE	UG/L	TOTAL	U
				34626	2,6-DINITROTOLUENE	UG/L	TOTAL	U
				34611	2,4-DINITROTOLUENE	UG/L	TOTAL	U
				34346	1,2-DIPHENYLHYDRAZINE	UG/L	TOTAL	U
				34230	3,4-BENZOFLUORANTHENE	UG/L	TOTAL	U
				34242	11,12-BENZOFLUORANTHENE	UG/L	TOTAL	U
				39330	ALDRIN	UG/L	TOTAL	U
				39380	DIELDRIN	UG/L	TOTAL	U
				39350	CHLORDANE	UG/L	TOTAL	U
				39300	4,4'-DDT	UG/L	TOTAL	U
				39320	4,4'-DDE	UG/L	TOTAL	U
				39310	4,4'-DDD	UG/L	TOTAL	U
				34361	ALPHA ENDOSULFAN	UG/L	TOTAL	U
				34356	BETA ENDOSULFAN	UG/L	TOTAL	U
				34351	ENDOSULFAN SULFATE	UG/L	TOTAL	U
				39390	ENDRIN	UG/L	TOTAL	U
				34366	ENDRIN ALDEHYDE	UG/L	TOTAL	U
				39410	HEPTACLOR	UG/L	TOTAL	U
				39420	HEPTACHLOR EPOXIDE	UG/L	TOTAL	U
				39337	ALPHA-BHC	UG/L	TOTAL	U
				39338	BETA-BHC	UG/L	TOTAL	U
				39340	GAMMA-BHC	UG/L	TOTAL	U
				34259	DELTA-BHC	UG/L	TOTAL	U
				39400	TOXAPHENE	UG/L	TOTAL	U
				34671	PCB-1016	UG/L	TOTAL	U
				39488	PCB-1221	UG/L	TOTAL	U
				39492	PCB-1232	UG/L	TOTAL	U
				39496	PCB-1242	UG/L	TOTAL	U
				39500	PCB-1248	UG/L	TOTAL	U
				39504	PCB-1254	UG/L	TOTAL	U
				39508	PCB-1260	UG/L	TOTAL	U
TURP.RUN	87/10/06	1299						
DEPTH: 0000	SUBSTRATE: AQUEOUS							
DESCRIPTION: STEEL	FROM SPIGOT AT WELLHEAD							
			091304	34418	METHYL CHLORIDE	UG/L	TOTAL	U
				34413	METHYL BROMIDE	UG/L	TOTAL	U
				39175	VINYL CHLORIDE	UG/L	TOTAL	U
				34311	CHLOROETHANE	UG/L	TOTAL	U

TUT 001 1292

COMPLETED ANALYSIS REPORT

REPORT DATE: 87/12/22

PROJECT NO: 262

PROJECT NAME: TURPENTINE RUN

STATION NO	DATE FROM TO	TIME OF DAY	LABNO	PARNO	PARAMETER NAME	UNITS	CHEMISTRY	VALUE	REMARK
			091304	34423	METHYLENE CHLORIDE	UG/L	TOTAL		U
				34501	1,1-DICHLOROETHYLENE	UG/L	TOTAL		U
				34496	1,1-DICHLOROETHANE	UG/L	TOTAL		U
				34546	1,2-TRANS DICHLOROETHYLENE	UG/L	TOTAL	47	
				32106	CHLOROFORM	UG/L	TOTAL		U
				32103	1,2-DICHLOROETHANE	UG/L	TOTAL		U
				34506	1,1,1-TRICHLOROETHANE	UG/L	TOTAL		U
				32102	CARBON TETRACHLORIDE	UG/L	TOTAL		U
				32101	DICHLOROBROMOMETHANE	UG/L	TOTAL		U
				34541	1,2-DICHLOROPROPANE	UG/L	TOTAL		U
				34561	1,3-DICHLOROPROPYLENE	UG/L	TOTAL		U
				39180	TRICHLOROETHYLENE	UG/L	TOTAL	15	
				34030	BENZENE	UG/L	TOTAL		U
				32105	CHLORODIBROMOMETHANE	UG/L	TOTAL		U
				34511	1,1,2-TRICHLOROETHANE	UG/L	TOTAL		U
				32104	BROMOFORM	UG/L	TOTAL		U
				34516	1,1,2,2-TETRACHLOROETHANE	UG/L	TOTAL		U
				34475	TETRACHLOROETHYLENE	UG/L	TOTAL	320	
				34010	TOLUENE	UG/L	TOTAL		U
				34301	CHLOROBENZENE	UG/L	TOTAL		U
				34371	ETHYLBENZENE	UG/L	TOTAL		U
				99999	TERT-BUTYLMETHYLETHER	UG/L	TOTAL	37	J
				34586	2-CHLOROPHENOL	UG/L	TOTAL		U
				34591	2-NITROPHENOL	UG/L	TOTAL		U
				34694	PHENOL	UG/L	TOTAL		U
				34606	2,4-DIMETHYLPHENOL	UG/L	TOTAL		U
				34601	2,4-DICHLOROPHENOL	UG/L	TOTAL		U
				34621	2,4,6-TRICHLOROPHENOL	UG/L	TOTAL		U
				34452	P-CHLORO-M-CRESOL	UG/L	TOTAL		U
				34616	2,4-DINITROPHENOL	UG/L	TOTAL		U
				34657	4,6-DINITRO-O-CRESOL	UG/L	TOTAL		U
				39032	PENTACHLOROPHENOL	UG/L	TOTAL		U
				34646	4-NITROPHENOL	UG/L	TOTAL		U
				34566	1,3-DICHLOROBENZENE	UG/L	TOTAL		U
				34571	1,4-DICHLOROBENZENE	UG/L	TOTAL		U
				34536	1,2-DICHLOROBENZENE	UG/L	TOTAL	1.0	J
				34396	HEXACHLOROETHANE	UG/L	TOTAL		U
				39702	HEXACHLOROBUTADIENE	UG/L	TOTAL		U
				34551	1,2,4-TRICHLOROBENZENE	UG/L	TOTAL		U
				34696	NAPHTHALENE	UG/L	TOTAL		U
				34273	BIS(2-CHLOROETHYL) ET.	UG/L	TOTAL		U

COMPLETED AN IS REPORT REPORT DATE: 87/12/22

PROJECT NO: 262 PROJECT NAME: TURPENTINE RUN

STATION NO	DATE FROM TO	TIME OF DAY	LABNO	PARNO	PARAMETER NAME	UNITS	CHEMISTRY	VALUE & REMARK
			091304	34278	BIS(2-CHLOROETHOXY) METH.	UG/L	TOTAL	U
				34408	ISOPHORONE	UG/L	TOTAL	U
				34447	NITROBENZENE	UG/L	TOTAL	U
				34428	N-NITROSODI-N-PROPYLAMINE	UG/L	TOTAL	U
				34433	N-NITROSODIPHENYLAMINE	UG/L	TOTAL	U
				34283	BIS(2-CHLOROISOPROPYL) ET.	UG/L	TOTAL	U
				34386	HEXACHLOROCYCLOPENTADIENE	UG/L	TOTAL	U
				34591	2-CHLORONAPHTHALENE	UG/L	TOTAL	U
				34200	ACENAPHTHYLENE	UG/L	TOTAL	U
				34205	ACENAPHTHENE	UG/L	TOTAL	U
				34391	FLOURENE	UG/L	TOTAL	U
				39700	HEXACHLOROBENZENE	UG/L	TOTAL	U
				34636	4-BROMOPHENYL PHENYL ET.	UG/L	TOTAL	U
				34461	PHENANTHRENE	UG/L	TOTAL	U
				34220	ANTHRACENE	UG/L	TOTAL	U
				34741	DIMETHYL PHTHALATE	UG/L	TOTAL	U
				34336	DIETHYL PHTHALATE	UG/L	TOTAL	U
				39110	DI-N-BUTYLPHTHALATE	UG/L	TOTAL	U
				34292	BUTYL BENZYL PHTHALATE	UG/L	TOTAL	U
				34596	DI-N-OCTYL PHTHALATE	UG/L	TOTAL	0.5 M
				39100	BIS(2-ETHYLHEXYL) PHTHAL.	UG/L	TOTAL	U
				34376	FLUORANTHENE	UG/L	TOTAL	U
				34469	PYRENE	UG/L	TOTAL	U
				34320	CHRYSENE	UG/L	TOTAL	U
				34526	1,2-BENZANTHRACENE	UG/L	TOTAL	U
				34641	4-CHLOROPHENYL PHENYL ET.	UG/L	TOTAL	U
				34403	INDENO(1,2,3-C,D) PYRENE	UG/L	TOTAL	U
				34247	BENZO(A)PYRENE	UG/L	TOTAL	U
				34521	1,12-BENZOPERYLENE	UG/L	TOTAL	U
				34556	1,2:5,6-DIBENZANTHRACENE	UG/L	TOTAL	U
				34631	3,3'-DICHLOROBENZIDENE	UG/L	TOTAL	U
				34526	2,4-DINITROTOLUENE	UG/L	TOTAL	U
				34611	2,6-DINITROTOLUENE	UG/L	TOTAL	U
				34346	1,2-DIPHENYLHYDRAZINE	UG/L	TOTAL	U
				34230	3,4-BENZOFLUORANTHENE	UG/L	TOTAL	U
				34242	11,12-BENZOFLUORANTHENE	UG/L	TOTAL	U
				39330	ALDRIN	UG/L	TOTAL	U
				39380	DIELDRIN	UG/L	TOTAL	U
				39350	CHLORDANE	UG/L	TOTAL	U
				39300	4,4'-DDT	UG/L	TOTAL	U
				39320	4,4'-DDE	UG/L	TOTAL	U

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COMPLETED ANALYSIS REPORT — REPORT DATE: 87/12/22

PROJECT NO: 262 — PROJECT NAME: TURPENTINE RUN

STATION NO	DATE FROM TO	TIME OF DAY	LABNO	PARNO	PARAMETER NAME	UNITS	CHEMISTRY	VALUE & REMARK
			091304	39310	4,4'-DDD	UG/L	TOTAL	U
				34361	ALPHA ENDOSULFAN	UG/L	TOTAL	U
				34356	BETA ENDOSULFAN	UG/L	TOTAL	U
				34351	ENDOSULFAN SULFATE	UG/L	TOTAL	U
				39390	ENDRIN	UG/L	TOTAL	U
				34366	ENDRIN ALDEHYDE	UG/L	TOTAL	U
				39410	HEPTACLOR	UG/L	TOTAL	U
				39420	HEPTACHLOR EPOXIDE	UG/L	TOTAL	U
				39337	ALPHA-BHC	UG/L	TOTAL	U
				39338	BETA-BHC	UG/L	TOTAL	U
				39340	GAMMA-BHC	UG/L	TOTAL	U
				34259	DELTA-BHC	UG/L	TOTAL	U
				39400	TOXAPHENE	UG/L	TOTAL	U
				34671	PCB-1016	UG/L	TOTAL	U
				39488	PCB-1221	UG/L	TOTAL	U
				39492	PCB-1232	UG/L	TOTAL	U
				39496	PCB-1242	UG/L	TOTAL	U
				39500	PCB-1248	UG/L	TOTAL	U
				39504	PCB-1254	UG/L	TOTAL	U
				39508	PCB-1260	UG/L	TOTAL	U
TURP.RUN 87/10/06 1310								
DEPTH: 0000 SUBSTRATE: AQUEOUS								
DESCRIPTION: HARVEY WELL GEMINO O'HENRY								
DRY CLEANERS IN WOODS								
			091305	34415	METHYL CHLORIDE	UG/L	TOTAL	U
				34413	METHYL BROMIDE	UG/L	TOTAL	U
				39175	VINYL CHLORIDE	UG/L	TOTAL	U
				34311	CHLOROETHANE	UG/L	TOTAL	U
				34423	METHYLENE CHLORIDE	UG/L	TOTAL	170000
				34501	1,1-DICHLOROETHYLENE	UG/L	TOTAL	U
				34496	1,1-DICHLOROETHANE	UG/L	TOTAL	U
				34546	1,2-TRANS DICHLOROETHYLENE	UG/L	TOTAL	
				32106	CHLOROFORM	UG/L	TOTAL	U
				32103	1,2-DICHLOROETHANE	UG/L	TOTAL	U
				34506	1,1,1-TRICHLOROETHANE	UG/L	TOTAL	U
				32102	CARBON TETRACHLORIDE	UG/L	TOTAL	U
				32101	DICHLOROBROMOMETHANE	UG/L	TOTAL	U
				34541	1,2-DICHLOROPROPANE	UG/L	TOTAL	U
				34551	1,3-DICHLOROPROPYLENE	UG/L	TOTAL	U
				39180	TRICHLOROETHYLENE	UG/L	TOTAL	

COMPLETED AN[illegible]SIS REPORT REPORT DATE: 87/12/22

PROJECT NO: 262 PROJECT NAME: TURPENTINE RUN

STATION NO	DATE FROM TO	TIME OF DAY	LABNO	PARNO	PARAMETER NAME	UNITS	CHEMISTRY	VALUE & REMARK
			091305	34030	BENZENE	UG/L	TOTAL	U
				32105	CHLORODIBROMOMETHANE	UG/L	TOTAL	U
				34311	1,1,2-TRICHLOROETHANE	UG/L	TOTAL	U
				32104	BROMOFORM	UG/L	TOTAL	U
				34516	1,1,2,2-TETRACHLOROETHANE	UG/L	TOTAL	U
				34475	TETRACHLOROETHYLENE	UG/L	TOTAL	2000
				34010	TOLUENE	UG/L	TOTAL	U
				34301	CHLOROBENZENE	UG/L	TOTAL	U
				34371	ETHYLBENZENE	UG/L	TOTAL	U
				34586	2-CHLOROPHENOL	UG/L	TOTAL	U
				34591	2-NITROPHENOL	UG/L	TOTAL	U
				34694	PHENOL	UG/L	TOTAL	U
				34606	2,4-DIMETHYLPHENOL	UG/L	TOTAL	U
				34601	2,4-DICHLOROPHENOL	UG/L	TOTAL	U
				34621	2,4,6-TRICHLOROPHENOL	UG/L	TOTAL	U
				34452	P-CHLORO-M-CRESOL	UG/L	TOTAL	U
				34616	2,4-DINITROPHENOL	UG/L	TOTAL	U
				34657	4,6-DINITRO-O-CRESOL	UG/L	TOTAL	U
				34032	PENTACHLOROPHENOL	UG/L	TOTAL	U
				34646	4-NITROPHENOL	UG/L	TOTAL	U
				34566	1,3-DICHLOROBENZENE	UG/L	TOTAL	U
				34571	1,4-DICHLOROBENZENE	UG/L	TOTAL	U
				34536	1,2-DICHLOROBENZENE	UG/L	TOTAL	U
				34396	HEXACHLOROETHANE	UG/L	TOTAL	U
				39702	HEXACHLOROBUTADIENE	UG/L	TOTAL	U
				34551	1,2,4-TRICHLOROBENZENE	UG/L	TOTAL	U
				34696	NAPHTHALENE	UG/L	TOTAL	U
				34273	BIS(2-CHLOROETHYL) ET.	UG/L	TOTAL	U
				34276	BIS(2-CHLOROETHOXY) METH.	UG/L	TOTAL	U
				34408	ISOPHORONE	UG/L	TOTAL	U
				34447	NITROBENZENE	UG/L	TOTAL	U
				34428	N-NITROSODI-N-PROPYLAMINE	UG/L	TOTAL	U
				34491	N-NITROSODIPHENYLAMINE	UG/L	TOTAL	U
				34283	BIS(2-CHLOROISOPROPYL) ET.	UG/L	TOTAL	U
				34386	HEXACHLOROCYCLOPENTADIENE	UG/L	TOTAL	U
				34581	2-CHLORONAPHTHALENE	UG/L	TOTAL	U
				34200	ACENAPHTHYLENE	UG/L	TOTAL	U
				34205	ACENAPHTHENE	UG/L	TOTAL	U
				34381	FLUORENE	UG/L	TOTAL	U
				39700	HEXACHLOROBENZENE	UG/L	TOTAL	U
				34636	4-BROMOPHENYL PHENYL ET.	UG/L	TOTAL	U

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COMPLETED ANALYSIS REPORT — REPORT DATE: 97/12/22

PROJECT NO: 262 — PROJECT NAME: TURPENTINE RUN

STATION NO	DATE FROM TO	TIME OF DAY	LABNO	PARNO	PARAMETER NAME	UNITS	CHEMISTRY	VALUE & REMARK
			091305	34461	PHENANTHRENE	UG/L	TOTAL	U
				34220	ANTHRACENE	UG/L	TOTAL	U
				34341	DIMETHYL PHTHALATE	UG/L	TOTAL	U
				34336	DIETHYL PHTHALATE	UG/L	TOTAL	U
				39110	DI-N-BUTYLPHTHALATE	UG/L	TOTAL	U
				34292	BUTYL BENZYL PHTHALATE	UG/L	TOTAL	U
				34596	DI-N-OCTYL PHTHALATE	UG/L	TOTAL	U
				39100	BIS(2-ETHYLHEXYL) PHTHAL.	UG/L	TOTAL	U
				34376	FLUORANTHENE	UG/L	TOTAL	U
				34469	PYRENE	UG/L	TOTAL	U
				34320	CHRYSENE	UG/L	TOTAL	U
				34526	1,2-BENZANTHRACENE	UG/L	TOTAL	U
				34641	4-CHLOROPHENYL PHENYL ET.	UG/L	TOTAL	U
				34403	INDENO(1,2,3-C,D) PYRENE	UG/L	TOTAL	U
				34247	BENZO(A)PYRENE	UG/L	TOTAL	U
				34521	1,12-BENZOPERYLENE	UG/L	TOTAL	U
				34556	1,2:5,6-DIBENZANTHRACENE	UG/L	TOTAL	U
				34631	3,3'-DICHLOROBENZIDENE	UG/L	TOTAL	U
				34626	2,6-DINITROTOLUENE	UG/L	TOTAL	U
				34611	2,4-DINITROTOLUENE	UG/L	TOTAL	U
				34346	1,2-DIPHENYLHYDRAZINE	UG/L	TOTAL	U
				34230	3,4-BENZOFLUORANTHENE	UG/L	TOTAL	U
				34242	11,12-BENZOFLUORANTHENE	UG/L	TOTAL	U
				39330	ALDRIN	UG/L	TOTAL	U
				39390	DIELDRIN	UG/L	TOTAL	U
				39350	CHLORDANE	UG/L	TOTAL	U
				39300	4,4'-DDT	UG/L	TOTAL	U
				39320	4,4'-DDE	UG/L	TOTAL	U
				39310	4,4'-DDD	UG/L	TOTAL	U
				34351	ALPHA ENDOSULFAN	UG/L	TOTAL	U
				34356	BETA ENDOSULFAN	UG/L	TOTAL	U
				34351	ENDOSULFAN SULFATE	UG/L	TOTAL	U
				39390	ENDRIN	UG/L	TOTAL	U
				34356	ENDRIN ALDEHYDE	UG/L	TOTAL	U
				39410	HEPTACHLOR	UG/L	TOTAL	U
				39420	HEPTACHLOR EPOXIDE	UG/L	TOTAL	U
				39337	ALPHA-BHC	UG/L	TOTAL	U
				39338	BETA-BHC	UG/L	TOTAL	U
				39340	GAMMA-BHC	UG/L	TOTAL	U
				34259	DELTA-BHC	UG/L	TOTAL	U
				39400	TOXAPHENE	UG/L	TOTAL	U

TLT 001 1297

COMPLETED A(SIS REPORT REPORT DATE: 87/12/22

PROJECT NO: 262 PROJECT NAME: TURPENTINE RUN

STATION NO	DATE FROM TO	TIME OF DAY	LABNO	PARNO	PARAMETER NAME	UNITS	CHEMISTRY	VALUE	REMARK
			091305	34671	PCB-1016	UG/L	TOTAL		U
				39488	PCB-1221	UG/L	TOTAL		U
				39492	PCB-1232	UG/L	TOTAL		U
				39496	PCB-1242	UG/L	TOTAL		U
				39500	PCB-1248	UG/L	TOTAL		U
				39504	PCB-1254	UG/L	TOTAL		U
				39508	PCB-1260	UG/L	TOTAL		U
URP.RUN	87/10/06	1445							
DEPTH: 0000 SUBSTRATE: AQUEOUS									
DESCRIPTION: MATHIAS WELL PUMP NOT OPERATING									
			091306	34418	METHYL CHLORIDE	UG/L	TOTAL		U
				34413	METHYL BROMIDE	UG/L	TOTAL		U
				39175	VINYL CHLORIDE	UG/L	TOTAL		U
				34311	CHLOROETHANE	UG/L	TOTAL		U
				34423	METHYLENE CHLORIDE	UG/L	TOTAL		U
				34501	1,1-DICHLOROETHYLENE	UG/L	TOTAL		U
				34496	1,1-DICHLOROETHANE	UG/L	TOTAL		U
				34546	1,2-TRANS DICHLOROETHYLENE	UG/L	TOTAL		U
				32106	CHLOROFORM	UG/L	TOTAL		U
				32103	1,2-DICHLOROETHANE	UG/L	TOTAL		U
				34506	1,1,1-TRICHLOROETHANE	UG/L	TOTAL		U
				32102	CARBON TETRACHLORIDE	UG/L	TOTAL		U
				32101	DICHLOROBROMOMETHANE	UG/L	TOTAL		U
				34541	1,2-DICHLOROPROPANE	UG/L	TOTAL		U
				34561	1,3-DICHLOROPROPYLENE	UG/L	TOTAL		U
				39180	TRICHLOROETHYLENE	UG/L	TOTAL	0.6	*
				34030	BENZENE	UG/L	TOTAL		U
				32105	CHLORODIBROMOMETHANE	UG/L	TOTAL		U
				34511	1,1,2-TRICHLOROETHANE	UG/L	TOTAL		U
				32104	BROMOFORM	UG/L	TOTAL		U
				34516	1,1,2,2-TETRACHLOROETHANE	UG/L	TOTAL		U
				34475	TETRACHLOROETHYLENE	UG/L	TOTAL	2.5	
				34010	TOLUENE	UG/L	TOTAL		U
				34301	CHLOROBENZENE	UG/L	TOTAL		U
				34371	ETHYLBENZENE	UG/L	TOTAL		U
				34586	4-CHLOROPHENOL	UG/L	TOTAL		U
				34591	2-NITROPHENOL	UG/L	TOTAL		U
				34694	PHENOL	UG/L	TOTAL		U
				34606	2,4-DIMETHYLPHENOL	UG/L	TOTAL		U

FUT 001 1298

COMPLETED ANALYSIS REPORT

REPORT DATE: 87/12/22

PROJECT NO: 262 PROJECT NAME: TURPENTINE RUN

STATION NO	DATE FROM TO	TIME OF DAY	LABNO	PARNO	PARAMETER NAME	UNITS	CHEMISTRY	VALUE & REMARK
			091306	34601	2,4-DICHLOROPHENOL	UG/L	TOTAL	U
				34621	2,4,6-TRICHLOROPHENOL	UG/L	TOTAL	U
				34452	P-CHLORO-M-CRESOL	UG/L	TOTAL	U
				34616	2,4-DINITROPHENOL	UG/L	TOTAL	U
				34657	4,6-DINITRO-O-CRESOL	UG/L	TOTAL	U
				39032	PENTACHLOROPHENOL	UG/L	TOTAL	U
				34646	4-NITROPHENOL	UG/L	TOTAL	U
				34566	1,3-DICHLOROBENZENE	UG/L	TOTAL	U
				34571	1,4-DICHLOROBENZENE	UG/L	TOTAL	0.3
				34536	1,2-DICHLOROBENZENE	UG/L	TOTAL	U
				34396	HEXACHLOROETHANE	UG/L	TOTAL	U
				39702	HEXACHLOROBUTADIENE	UG/L	TOTAL	U
				34551	1,2,4-TRICHLOROBENZENE	UG/L	TOTAL	U
				34696	NAPHTHALENE	UG/L	TOTAL	U
				34273	BIS(2-CHLOROETHYL) ET.	UG/L	TOTAL	U
				34278	BIS(2-CHLOROETHOXY) METH.	UG/L	TOTAL	U
				34408	ISOPHORONE	UG/L	TOTAL	U
				34447	NITROBENZENE	UG/L	TOTAL	U
				34428	N-NITROSODI-N-PROPYLAMINE	UG/L	TOTAL	U
				34433	N-NITROSODIPHENYLAMINE	UG/L	TOTAL	U
				34283	BIS(2-CHLOROISOPROPYL) ET.	UG/L	TOTAL	U
				34386	HEXACHLOROCYCLOPENTADIENE	UG/L	TOTAL	U
				34591	2-CHLORONAPHTHALENE	UG/L	TOTAL	U
				34200	ACENAPHTHYLENE	UG/L	TOTAL	U
				34205	ACENAPHTHENE	UG/L	TOTAL	U
				34381	FLOURENE	UG/L	TOTAL	U
				34700	HEXACHLOROBENZENE	UG/L	TOTAL	U
				34636	4-BROMOPHENYL PHENYL ET.	UG/L	TOTAL	U
				34461	PHENANTHRENE	UG/L	TOTAL	U
				34220	ANTHRACENE	UG/L	TOTAL	U
				34341	DIMETHYL PHTHALATE	UG/L	TOTAL	U
				34336	DIETHYL PHTHALATE	UG/L	TOTAL	U
				39110	DI-N-BUTYLPHTHALATE	UG/L	TOTAL	U
				34292	BUTYL BENZYL PHTHALATE	UG/L	TOTAL	U
				34596	DI-N-OCTYL PHTHALATE	UG/L	TOTAL	1.2
				39100	BIS(2-ETHYLHEXYL) PHTHAL.	UG/L	TOTAL	1
				34376	FLUORANTHENE	UG/L	TOTAL	U
				34469	PYRENE	UG/L	TOTAL	U
				34320	CHRYSENE	UG/L	TOTAL	U
				34526	1,2-BENZANTHRACENE	UG/L	TOTAL	U
				34641	4-CHLOROPHENYL PHENYL ET.	UG/L	TOTAL	U

COMPLETE(ALYSIS REPORT REPORT DATE: 87/12/

PROJECT NO: 262 PROJECT NAME: TURPENTINE RUN

STATION NO	DATE FROM TO	TIME OF DAY	LABNO	PARNO	PARAMETER NAME	UNITS	CHEMISTRY	VALUE	REMARK
			091306	34403	INDENO(1,2,3-C,D) PYRENE	UG/L	TOTAL		U
				34247	BENZO(A)PYRENE	UG/L	TOTAL		U
				34521	1,12-BENZOPERYLENE	UG/L	TOTAL		U
				34556	1,2:5,6-DIBENZANTHRACENE	UG/L	TOTAL		U
				34631	3,3'-DICHLOROBENZIDINE	UG/L	TOTAL		U
				34626	2,6-DINITROTOLUENE	UG/L	TOTAL		U
				34611	2,4-DINITROTOLUENE	UG/L	TOTAL		U
				34346	1,2-DIPHENYLHYDRAZINE	UG/L	TOTAL		U
				34230	3,4-BENZOFLUORANTHENE	UG/L	TOTAL		U
				34242	11,12-BENZOFLUORANTHENE	UG/L	TOTAL		U
				99999	2-ETHYL-1-HEXENOL	UG/L	TOTAL	4.7	J
				99999	N,2-DIMETHYL-1-PROPANAMINE	UG/L	TOTAL	32	J
				39390	ALDRIN	UG/L	TOTAL		U
				39380	DIELDRIN	UG/L	TOTAL		U
				39350	CHLORDANE	UG/L	TOTAL		U
				39300	4,4'-DDT	UG/L	TOTAL		U
				39320	4,4'-DDE	UG/L	TOTAL		U
				39310	4,4'-DDD	UG/L	TOTAL		U
				34361	ALPHA ENDOSULFAN	UG/L	TOTAL		U
				34356	BETA ENDOSULFAN	UG/L	TOTAL		U
				34351	ENDOSULFAN SULFATE	UG/L	TOTAL		U
				39390	ENDRIN	UG/L	TOTAL		U
				34356	ENDRIN ALDEHYDE	UG/L	TOTAL		U
				39410	HEPTACLOR	UG/L	TOTAL		U
				39420	HEPTACHLOR EPOXIDE	UG/L	TOTAL		U
				39337	ALPHA-BHC	UG/L	TOTAL		U
				39338	BETA-BHC	UG/L	TOTAL		U
				39340	GAMMA-BHC	UG/L	TOTAL		U
				34259	DELTA-BHC	UG/L	TOTAL		U
				39400	TOXAPHENE	UG/L	TOTAL		U
				34671	PCB-1016	UG/L	TOTAL		U
				39493	PCB-1221	UG/L	TOTAL		U
				39492	PCB-1232	UG/L	TOTAL		U
				39496	PCB-1242	UG/L	TOTAL		U
				39500	PCB-1248	UG/L	TOTAL		U
				39504	PCB-1254	UG/L	TOTAL		U
				39508	PCB-1260	UG/L	TOTAL		U

COMPLETED ANALYSIS REPORT — REPORT DATE: 87/12/22

PROJECT NO: 262 — PROJECT NAME: TURPENTINE RUN

STATION NO	DATE FROM TO	TIME OF DAY	LABNO	PARNO	PARAMETER NAME	UNITS	CHEMISTRY	VALUE & REMARK
TURP.RUN	87/10/06	1600						
DEPTH: 0000	SUBSTRATE: AQUEOUS							
DESCRIPTION: SMITH WELL								
			051307	34418	METHYL CHLORIDE	UG/L	TOTAL	U
				34413	METHYL BROMIDE	UG/L	TOTAL	U
				39175	VINYL CHLORIDE	UG/L	TOTAL	U
				34311	CHLOROETHANE	UG/L	TOTAL	U
				34423	METHYLENE CHLORIDE	UG/L	TOTAL	U
				34501	1,1-DICHLOROETHYLENE	UG/L	TOTAL	U
				34498	1,1-DICHLOROETHANE	UG/L	TOTAL	U
				34546	1,2-TRANS DICHLOROETHYLENE	UG/L	TOTAL	100
				32106	CHLOROFORM	UG/L	TOTAL	0.9 J
				32103	1,2-DICHLOROETHANE	UG/L	TOTAL	U
				34506	1,1,1-TRICHLOROETHANE	UG/L	TOTAL	U
				32102	CARBON TETRACHLORIDE	UG/L	TOTAL	U
				32101	DICHLOROBROMOMETHANE	UG/L	TOTAL	U
				34541	1,2-DICHLOROPROPANE	UG/L	TOTAL	U
				34551	1,3-DICHLOROPROPYLENE	UG/L	TOTAL	U
				39180	TRICHLOROETHYLENE	UG/L	TOTAL	21
				34030	BENZENE	UG/L	TOTAL	U
				32105	CHLORODIBROMOMETHANE	UG/L	TOTAL	U
				34511	1,1,2-TRICHLOROETHANE	UG/L	TOTAL	U
				32104	BROMOFORM	UG/L	TOTAL	U
				34516	1,1,2,2-TETRACHLOROETHANE	UG/L	TOTAL	U
				34475	TETRACHLOROETHYLENE	UG/L	TOTAL	150
				34010	TOLUENE	UG/L	TOTAL	U
				34301	CHLOROBENZENE	UG/L	TOTAL	U
				34371	ETHYLBENZENE	UG/L	TOTAL	U
				99999	TERT-BUTYLMETHYLETHER	UG/L	TOTAL	34 J
				34586	2-CHLOROPHENOL	UG/L	TOTAL	U
				34591	2-NITROPHENOL	UG/L	TOTAL	U
				34694	PHENOL	UG/L	TOTAL	U
				34606	2,4-DIMETHYLPHENOL	UG/L	TOTAL	U
				34601	2,4-DICHLOROPHENOL	UG/L	TOTAL	U
				34621	2,4,6-TRICHLOROPHENOL	UG/L	TOTAL	U
				34452	P-CHLORO-M-CRESOL	UG/L	TOTAL	U
				34616	2,4-DINITROPHENOL	UG/L	TOTAL	U
				34597	4,6-DINITRO-O-CRESOL	UG/L	TOTAL	U
				39032	PENTACHLOROPHENOL	UG/L	TOTAL	U
				34406	4-NITROPHENOL	UG/L	TOTAL	U
				34566	1,3-DICHLOROBENZENE	UG/L	TOTAL	U
				34571	1,4-DICHLOROBENZENE	UG/L	TOTAL	U
				34536	1,2-DICHLOROBENZENE	UG/L	TOTAL	U
				34396	HEXACHLOROETHANE	UG/L	TOTAL	U

COMPLETED ANALYSIS REPORT

REPORT DATE: 87/12/22

PROJECT NO: 262

PROJECT NAME: TURPENTINE RUN

STATION NO	DATE FROM TO	TIME OF DAY	LABNO	PARNO	PARAMETER NAME	UNITS	CHEMISTRY	VALUE & REMARK
			091307	39702	HEXACHLOROBUTADIENE	UG/L	TOTAL	U
				34551	1,2,4-TRICHLOROBENZENE	UG/L	TOTAL	U
				34696	NAPHTHALENE	UG/L	TOTAL	U
				34273	BIS(2-CHLOROETHYL) ET.	UG/L	TOTAL	U
				34278	BIS(2-CHLOROETHOXY) METH.	UG/L	TOTAL	U
				34408	ISOPHORONE	UG/L	TOTAL	U
				34447	NITROBENZENE	UG/L	TOTAL	U
				34428	N-NITROSODI-N-PROPYLAMINE	UG/L	TOTAL	U
				34433	N-NITROSODIPHENYLAMINE	UG/L	TOTAL	U
				34283	BIS(2-CHLOROISOPROPYL) ET.	UG/L	TOTAL	U
				34386	HEXACHLOROCYCLOPENTADIENE	UG/L	TOTAL	U
				34581	2-CHLORONAPHTHALENE	UG/L	TOTAL	U
				34200	ACENAPHTHYLENE	UG/L	TOTAL	U
				34205	ACENAPHTHENE	UG/L	TOTAL	U
				34381	FLOURENE	UG/L	TOTAL	U
				39700	HEXACHLOROBENZENE	UG/L	TOTAL	U
				34936	4-BROMOPHENYL PHENYL ET.	UG/L	TOTAL	U
				34461	PHENANTHRENE	UG/L	TOTAL	U
				34220	ANTHRACENE	UG/L	TOTAL	U
				34341	DIMETHYL PHTHALATE	UG/L	TOTAL	U
				34336	DIETHYL PHTHALATE	UG/L	TOTAL	U
				39110	DI-N-BUTYLPHTHALATE	UG/L	TOTAL	U
				34292	BUTYL BENZYL PHTHALATE	UG/L	TOTAL	U
				34596	DI-N-OCTYL PHTHALATE	UG/L	TOTAL	U
				39100	BIS(2-ETHYLHEXYL) PHTHAL.	UG/L	TOTAL	U
				34376	FLUORANTHENE	UG/L	TOTAL	U
				34469	PYRENE	UG/L	TOTAL	U
				34320	CHRYSENE	UG/L	TOTAL	U
				34526	1,2-BENZANTHRACENE	UG/L	TOTAL	U
				34641	4-CHLOROPHENYL PHENYL ET.	UG/L	TOTAL	U
				34403	INDENO(1,2,3-C,D) PYRENE	UG/L	TOTAL	U
				34247	BENZO(A)PYRENE	UG/L	TOTAL	U
				34521	1,12-BENZOPERYLENE	UG/L	TOTAL	U
				34556	1,2:5,6-DIBENZANTHRACENE	UG/L	TOTAL	U
				34531	3,3'-DICHLOROBENZIDENE	UG/L	TOTAL	U
				34626	2,6-DINITROTOLUENE	UG/L	TOTAL	U
				34611	2,4-DINITROTOLUENE	UG/L	TOTAL	U
				34346	1,2-DIPHENYLHYDRAZINE	UG/L	TOTAL	U
				34230	3,4-BENZOFLUORANTHENE	UG/L	TOTAL	U
				34242	11,12-BENZOFLUORANTHENE	UG/L	TOTAL	U
				39390	ALDRIN	UG/L	TOTAL	U

COMPLETED ANALYSIS REPORT — REPORT DATE: 87/12/22

PROJECT NO: 262 — PROJECT NAME: TURPENTINE RUN

STATION NO	DATE FROM TO	TIME OF DAY	LABNO	PARNO	PARAMETER NAME	UNITS	CHEMISTRY	VALUE & REMARK
			091307	39380	DIELDRIN	UG/L	TOTAL	U
				39350	CHLORDANE	UG/L	TOTAL	U
				39300	4,4'-DDT	UG/L	TOTAL	U
				39320	4,4'-DDE	UG/L	TOTAL	U
				39310	4,4'-DDD	UG/L	TOTAL	U
				34351	ALPHA ENDOSULFAN	UG/L	TOTAL	U
				34356	BETA ENDOSULFAN	UG/L	TOTAL	U
				34351	ENDOSULFAN SULFATE	UG/L	TOTAL	U
				39390	ENDRIN	UG/L	TOTAL	U
				34366	ENDRIN ALDEHYDE	UG/L	TOTAL	U
				39410	HEPTACLOR	UG/L	TOTAL	U
				39420	HEPTACHLOR EPOXIDE	UG/L	TOTAL	U
				39337	ALPHA-BHC	UG/L	TOTAL	U
				39338	BETA-BHC	UG/L	TOTAL	U
				39340	GAMMA-BHC	UG/L	TOTAL	U
				34259	DELTA-BHC	UG/L	TOTAL	U
				39400	TOXAPHENE	UG/L	TOTAL	U
				34671	PCB-1016	UG/L	TOTAL	U
				39488	PCB-1221	UG/L	TOTAL	U
				39492	PCB-1232	UG/L	TOTAL	U
				39496	PCB-1242	UG/L	TOTAL	U
				39500	PCB-1248	UG/L	TOTAL	U
				39504	PCB-1254	UG/L	TOTAL	U
				39508	PCB-1260	UG/L	TOTAL	U
TURP.RUN	87/10/09	1645						
DEPTH: 0000	SUBSTRATE: AQUEOUS							
DESCRIPTION: DEVCON	WELL #1							
			091308	34418	METHYL CHLORIDE	UG/L	TOTAL	U
				34413	METHYL BROMIDE	UG/L	TOTAL	U
				39175	VINYL CHLORIDE	UG/L	TOTAL	U
				34311	CHLOROETHANE	UG/L	TOTAL	U
				34423	METHYLENE CHLORIDE	UG/L	TOTAL	U
				34501	1,1-DICHLOROETHYLENE	UG/L	TOTAL	U
				34496	1,1-DICHLOROETHANE	UG/L	TOTAL	U
				34546	1,2-TRANS DICHLOROETHYLENE	UG/L	TOTAL	U
				32106	CHLOROFORM	UG/L	TOTAL	U
				32103	1,2-DICHLOROETHANE	UG/L	TOTAL	U
				34506	1,1,1-TRICHLOROETHANE	UG/L	TOTAL	U
				32102	CARBON TETRACHLORIDE	UG/L	TOTAL	U

TUF 001 1303

COMPLETED ALYSIS REPORT REPORT DATE: 87/12/2

PROJECT NO: 262 PROJECT NAME: TURPENTINE RUN

STATION NO	DATE FROM TO	TIME OF DAY	LABNO	PARNO	PARAMETER NAME	UNITS	CHEMISTRY	VALUE & REMARK
			091309	32101	DICHLOROBROMOMETHANE	UG/L	TOTAL	U
				34541	1,2-DICHLOROPROPANE	UG/L	TOTAL	U
				34561	1,3-DICHLOROPROPYLENE	UG/L	TOTAL	U
				39180	TRICHLOROETHYLENE	UG/L	TOTAL	U
				34030	BENZENE	UG/L	TOTAL	U
				32105	CHLORODIBROMOMETHANE	UG/L	TOTAL	U
				34511	1,1,2-TRICHLOROETHANE	UG/L	TOTAL	U
				32104	BROMOFORM	UG/L	TOTAL	U
				34516	1,1,2,2-TETRACHLOROETHANE	UG/L	TOTAL	U
				34475	TETRACHLOROETHYLENE	UG/L	TOTAL	U
				34010	TOLUENE	UG/L	TOTAL	U
				34301	CHLOROBENZENE	UG/L	TOTAL	U
				34371	ETHYLBENZENE	UG/L	TOTAL	U
				34586	2-CHLOROPHENOL	UG/L	TOTAL	U
				34591	2-NITROPHENOL	UG/L	TOTAL	U
				34694	PHENOL	UG/L	TOTAL	U
				34606	2,4-DIMETHYLPHENOL	UG/L	TOTAL	U
				34601	2,4-DICHLOROPHENOL	UG/L	TOTAL	U
				34621	2,4,6-TRICHLOROPHENOL	UG/L	TOTAL	U
				34652	P-CHLORO-M-CRESOL	UG/L	TOTAL	U
				34616	2,4-DINITROPHENOL	UG/L	TOTAL	U
				34657	4,6-DINITRO-O-CRESOL	UG/L	TOTAL	U
				39032	PENTACHLOROPHENOL	UG/L	TOTAL	U
				34646	4-NITROPHENOL	UG/L	TOTAL	U
				34566	1,3-DICHLOROBENZENE	UG/L	TOTAL	U
				34571	1,4-DICHLOROBENZENE	UG/L	TOTAL	U
				34536	1,2-DICHLOROBENZENE	UG/L	TOTAL	U
				34396	HEXACHLOROETHANE	UG/L	TOTAL	U
				39702	HEXACHLOROBUTADIENE	UG/L	TOTAL	U
				34551	1,2,4-TRICHLOROBENZENE	UG/L	TOTAL	U
				34696	NAPHTHALENE	UG/L	TOTAL	U
				34273	BIS(2-CHLOROETHYL) ET.	UG/L	TOTAL	U
				34278	BIS(2-CHLOROETHOXY) METH.	UG/L	TOTAL	U
				34408	ISOPHORONE	UG/L	TOTAL	U
				34447	NITROBENZENE	UG/L	TOTAL	U
				34428	N-NITROSODI-N-PROPYLAMINE	UG/L	TOTAL	U
				34433	N-NITROSODIPHENYLAMINE	UG/L	TOTAL	U
				34283	BIS(2-CHLOROISOPROPYL) ET.	UG/L	TOTAL	U
				34386	HEXACHLOROCYCLOPENTADIENE	UG/L	TOTAL	U
				34581	2-CHLORONAPHTHALENE	UG/L	TOTAL	U
				34200	ACENAPHTHYLENE	UG/L	TOTAL	U

TUT 001 1304

COMPLETED ANALYSIS REPORT

REPORT DATE: 87/12/22

PROJECT NO: 262

PROJECT NAME: TURPENTINE RUN

STATION NO	DATE FROM TO	TIME OF DAY	LABNO	PARNO	PARAMETER NAME	UNITS	CHEMISTRY	VALUE & REMARK
			091304	34205	ACENAPHTHENE	UG/L	TOTAL	U
				34381	FLOURENE	UG/L	TOTAL	U
				39700	HEXACHLOROBENZENE	UG/L	TOTAL	U
				34636	4-BROMOPHENYL PHENYL ET.	UG/L	TOTAL	U
				34461	PHENANTHRENE	UG/L	TOTAL	0.1 M
				34220	ANTHRACENE	UG/L	TOTAL	U
				34341	DIMETHYL PHTHALATE	UG/L	TOTAL	U
				34336	DIETHYL PHTHALATE	UG/L	TOTAL	U
				39110	DI-N-BUTYLPHTHALATE	UG/L	TOTAL	U
				34292	BUTYL BENZYL PHTHALATE	UG/L	TOTAL	U
				34596	DI-N-OCTYL PHTHALATE	UG/L	TOTAL	5.7
				39100	BIS(2-ETHYLHEXYL) PHTHAL.	UG/L	TOTAL	U
				34376	FLUORANTHENE	UG/L	TOTAL	U
				34469	PYRENE	UG/L	TOTAL	U
				34320	CHRYSENE	UG/L	TOTAL	U
				34526	1,2-BENZANTHRACENE	UG/L	TOTAL	U
				34641	4-CHLOROPHENYL PHENYL ET.	UG/L	TOTAL	U
				34403	INDENO(1,2,3-C,D) PYRENE	UG/L	TOTAL	U
				34247	BENZO(A)PYRENE	UG/L	TOTAL	U
				34521	1,12-BENZOPERYLENE	UG/L	TOTAL	U
				34556	1,2:5,6-DIBENZANTHRACENE	UG/L	TOTAL	U
				34631	3,3'-DICHLOROBENZIDENE	UG/L	TOTAL	U
				34626	2,6-DINITROTOLUENE	UG/L	TOTAL	U
				34611	2,4-DINITROTOLUENE	UG/L	TOTAL	U
				34346	1,2-DIPHENYLHYDRAZINE	UG/L	TOTAL	U
				34230	3,4-BENZOFLUORANTHENE	UG/L	TOTAL	U
				34242	11,12-BENZOFLUORANTHENE	UG/L	TOTAL	U
				39337	ALDRIN	UG/L	TOTAL	U
				39350	DIELDRIN	UG/L	TOTAL	U
				39360	CHLORDANE	UG/L	TOTAL	U
				39300	4,4'-DDT	UG/L	TOTAL	U
				39320	4,4'-DDE	UG/L	TOTAL	U
				39310	4,4'-DDD	UG/L	TOTAL	U
				34361	ALPHA ENDOSULFAN	UG/L	TOTAL	U
				34356	BETA ENDOSULFAN	UG/L	TOTAL	U
				34351	ENDOSULFAN SULFATE	UG/L	TOTAL	U
				39390	ENDRIN	UG/L	TOTAL	U
				34356	ENDRIN ALDEHYDE	UG/L	TOTAL	U
				39410	HEPTACLOR	UG/L	TOTAL	U
				39420	HEPTACHLOR EPOXIDE	UG/L	TOTAL	U
				39337	ALPHA-BHC	UG/L	TOTAL	U

COMPLETED ...LYSIS REPORT REPORT DATE: 87/12/2...

PROJECT NO: 262 PROJECT NAME: TURPENTINE RUN

STATION NO	DATE FROM TO	TIME OF DAY	LABNO	PARNO	PARAMETER NAME	UNITS	CHEMISTRY	VALUE & REMARK
			091308	39338	BETA-BHC	UG/L	TOTAL	U
				39340	GAMMA-BHC	UG/L	TOTAL	U
				34259	DELTA-BHC	UG/L	TOTAL	U
				39400	TOXAPHENE	UG/L	TOTAL	U
				34671	PCB-1016	UG/L	TOTAL	U
				39488	PCB-1221	UG/L	TOTAL	U
				39492	PCB-1232	UG/L	TOTAL	U
				39496	PCB-1242	UG/L	TOTAL	U
				39500	PCB-1248	UG/L	TOTAL	U
				39504	PCB-1254	UG/L	TOTAL	U
				39508	PCB-1260	UG/L	TOTAL	U
TURP.RUN	87/10/05	1715						
DEPTH: 0000 SUBSTRATE: AQUEOUS								
DESCRIPTION: DEVCON WELL #3								
			091309	34418	METHYL CHLORIDE	UG/L	TOTAL	U
				34413	METHYL BROMIDE	UG/L	TOTAL	U
				39175	VINYL CHLORIDE	UG/L	TOTAL	U
				34311	CHLOROETHANE	UG/L	TOTAL	U
				34423	METHYLENE CHLORIDE	UG/L	TOTAL	U
				34501	1,2-DICHLOROETHYLENE	UG/L	TOTAL	U
				34496	1,1-DICHLOROETHANE	UG/L	TOTAL	U
				34546	1,2-TRANS DICHLOROETHYLENE	UG/L	TOTAL	U
				32106	CHLOROFORM	UG/L	TOTAL	U
				32103	1,2-DICHLOROETHANE	UG/L	TOTAL	U
				34506	1,1,1-TRICHLOROETHANE	UG/L	TOTAL	U
				32102	CARBON TETRACHLORIDE	UG/L	TOTAL	U
				32101	DICHLOROBROMOMETHANE	UG/L	TOTAL	U
				34541	1,2-DICHLOROPROPANE	UG/L	TOTAL	U
				34551	1,3-DICHLOROPROPYLENE	UG/L	TOTAL	U
				39180	TRICHLOROETHYLENE	UG/L	TOTAL	U
				34030	BENZENE	UG/L	TOTAL	U
				32105	CHLORODIBROMOMETHANE	UG/L	TOTAL	U
				34511	1,1,2-TRICHLOROETHANE	UG/L	TOTAL	U
				32104	BROMOFORM	UG/L	TOTAL	U
				34516	1,1,2,2-TETRACHLOROETHANE	UG/L	TOTAL	U
				34475	TETRACHLOROETHYLENE	UG/L	TOTAL	U
				34010	TOLUENE	UG/L	TOTAL	U
				34301	CHLOROBENZENE	UG/L	TOTAL	U
				34371	ETHYLBENZENE	UG/L	TOTAL	U

TLT 001 1306

COMPLETED ANALYSIS REPORT — REPORT DATE: 87/12/22

PROJECT NO: 262 — PROJECT NAME: TURPENTINE RUN

STATION NO	DATE FROM TO	TIME OF DAY	LABNO	PARNO	PARAMETER NAME	UNITS	CHEMISTRY	VALUE & REMARK
			091309	34586	2-CHLOROPHENOL	UG/L	TOTAL	U
				34591	2-NITROPHENOL	UG/L	TOTAL	U
				34694	PHENOL	UG/L	TOTAL	U
				34606	2,4-DIMETHYLPHENOL	UG/L	TOTAL	U
				34601	2,4-DICHLOROPHENOL	UG/L	TOTAL	U
				34621	2,4,6-TRICHLOROPHENOL	UG/L	TOTAL	U
				34452	P-CHLORO-M-CRESOL	UG/L	TOTAL	U
				34616	2,4-DINITROPHENOL	UG/L	TOTAL	U
				34657	4,6-DINITRO-O-CRESOL	UG/L	TOTAL	U
				35032	PENTACHLOROPHENOL	UG/L	TOTAL	U
				34646	4-NITROPHENOL	UG/L	TOTAL	U
				34566	1,3-DICHLOROBENZENE	UG/L	TOTAL	U
				34571	1,4-DICHLOROBENZENE	UG/L	TOTAL	U
				34536	1,2-DICHLOROBENZENE	UG/L	TOTAL	U
				34396	HEXACHLOROETHANE	UG/L	TOTAL	U
				39702	HEXACHLOROBUTADIENE	UG/L	TOTAL	U
				34551	1,2,4-TRICHLOROBENZENE	UG/L	TOTAL	U
				34696	NAPHTHALENE	UG/L	TOTAL	U
				34273	BIS(2-CHLOROETHYL) ET.	UG/L	TOTAL	U
				34278	BIS(2-CHLOROETHOXY) METH.	UG/L	TOTAL	U
				34409	ISOPHORONE	UG/L	TOTAL	U
				34447	NITROBENZENE	UG/L	TOTAL	U
				34428	N-NITROSODI-N-PROPYLAMINE	UG/L	TOTAL	U
				34433	N-NITROSODIPHENYLAMINE	UG/L	TOTAL	U
				34283	BIS(2-CHLOROISOPROPYL) ET.	UG/L	TOTAL	U
				34386	HEXACHLOROCYCLOPENTADIENE	UG/L	TOTAL	U
				34581	2-CHLORONAPHTHALENE	UG/L	TOTAL	U
				34200	ACENAPHTHYLENE	UG/L	TOTAL	U
				34205	ACENAPHTHENE	UG/L	TOTAL	U
				34381	FLOURENE	UG/L	TOTAL	U
				39700	HEXACHLOROBENZENE	UG/L	TOTAL	U
				34636	4-BROMOPHENYL PHENYL ET.	UG/L	TOTAL	U
				34461	PHENANTHRENE	UG/L	TOTAL	U
				34220	ANTHRACENE	UG/L	TOTAL	U
				34341	DIMETHYL PHTHALATE	UG/L	TOTAL	U
				34336	DIETHYL PHTHALATE	UG/L	TOTAL	U
				39110	DI-N-BUTYLPHTHALATE	UG/L	TOTAL	U
				34292	BUTYL BENZYL PHTHALATE	UG/L	TOTAL	U
				34596	DI-N-OCTYL PHTHALATE	UG/L	TOTAL	U
				39100	BIS(2-ETHYLHEXYL) PHTHAL.	UG/L	TOTAL	U
				34376	FLUORANTHENE	UG/L	TOTAL	U

COMPLETED ALYSIS REPORT — REPORT DATE: 97/12/2

PROJECT NO: 262 — PROJECT NAME: TURPENTINE RUN

STATION NO	DATE FROM TO	TIME OF DAY	LABNO	PARNO	PARAMETER NAME	UNITS	CHEMISTRY	VALUE & REMARK
			091369	34469	PYRENE	UG/L	TOTAL	U
				34320	CHRYSENE	UG/L	TOTAL	U
				34526	1,2-BENZANTHRACENE	UG/L	TOTAL	U
				34641	4-CHLOROPHENYL PHENYL ET.	UG/L	TOTAL	U
				34403	INDENO(1,2,3-C,D) PYRENE	UG/L	TOTAL	U
				34247	BENZO(A)PYRENE	UG/L	TOTAL	U
				34521	1,12-BENZOPERYLENE	UG/L	TOTAL	U
				34556	1,2:5,6-DIBENZANTHRACENE	UG/L	TOTAL	U
				34631	3,3'-DICHLOROBENZIDENE	UG/L	TOTAL	U
				34626	2,6-DINITROTOLUENE	UG/L	TOTAL	U
				34611	2,4-DINITROTOLUENE	UG/L	TOTAL	U
				34346	1,2-DIPHENYLHYDRAZINE	UG/L	TOTAL	U
				34230	3,4-BENZOFLUORANTHENE	UG/L	TOTAL	U
				34242	11,12-BENZOFLUORANTHENE	UG/L	TOTAL	U
				39330	ALDRIN	UG/L	TOTAL	U
				39390	DIELDRIN	UG/L	TOTAL	U
				39350	CHLORDANE	UG/L	TOTAL	U
				39300	4,4'-DDT	UG/L	TOTAL	U
				39320	4,4'-DDE	UG/L	TOTAL	U
				39310	4,4'-DDD	UG/L	TOTAL	U
				34351	ALPHA ENDOSULFAN	UG/L	TOTAL	U
				34356	BETA ENDOSULFAN	UG/L	TOTAL	U
				34351	ENDOSULFAN SULFATE	UG/L	TOTAL	U
				39390	ENDRIN	UG/L	TOTAL	U
				34366	ENDRIN ALDEHYDE	UG/L	TOTAL	U
				39410	HEPTACLOR	UG/L	TOTAL	U
				39420	HEPTACHLOR EPOXIDE	UG/L	TOTAL	U
				39337	ALPHA-BHC	UG/L	TOTAL	U
				39338	BETA-BHC	UG/L	TOTAL	U
				39340	GAMMA-BHC	UG/L	TOTAL	U
				34259	DELTA-BHC	UG/L	TOTAL	U
				39400	TOXAPHENE	UG/L	TOTAL	U
				34671	PCB-1016	UG/L	TOTAL	U
				39488	PCB-1221	UG/L	TOTAL	U
				39492	PCB-1232	UG/L	TOTAL	U
				39496	PCB-1242	UG/L	TOTAL	U
				39500	PCB-1248	UG/L	TOTAL	U
				39504	PCB-1254	UG/L	TOTAL	U
				39508	PCB-1260	UG/L	TOTAL	U

TUT 001 1508

COMPLETED ANALYSIS REPORT — REPORT DATE: 87/12/22

PROJECT NO: 262 — PROJECT NAME: TURPENTINE RUN

STATION NO	DATE FROM TO	TIME OF DAY	LABNO	PARNO	PARAMETER NAME	UNITS	CHEMISTRY	VALUE	REMARK
TURP.RUN	87/10/05	1920							
DEPTH: 0000 SUBSTRATE: AQUEOUS									
DESCRIPTION: ALPHA LEONARD WELLHEAD									
			891315	34418	METHYL CHLORIDE	UG/L	TOTAL		U
				34413	METHYL BROMIDE	UG/L	TOTAL		U
				39175	VINYL CHLORIDE	UG/L	TOTAL		U
				34311	CHLOROETHANE	UG/L	TOTAL		U
				34423	METHYLENE CHLORIDE	UG/L	TOTAL		U
				34501	1,1-DICHLOROETHYLENE	UG/L	TOTAL		U
				34496	1,1-DICHLOROETHANE	UG/L	TOTAL		U
				34566	1,2-TRANS DICHLOROETHYLENE	UG/L	TOTAL		U
				32106	CHLOROFORM	UG/L	TOTAL		U
				32103	1,2-DICHLOROETHANE	UG/L	TOTAL		U
				34506	1,1,1-TRICHLOROETHANE	UG/L	TOTAL		U
				32102	CARBON TETRACHLORIDE	UG/L	TOTAL		U
				32101	DICHLOROBROMOMETHANE	UG/L	TOTAL		U
				34541	1,2-DICHLOROPROPANE	UG/L	TOTAL		U
				34561	1,3-DICHLOROPROPYLENE	UG/L	TOTAL		U
				39180	TRICHLOROETHYLENE	UG/L	TOTAL		U
				34030	BENZENE	UG/L	TOTAL		U
				32105	CHLORODIBROMOMETHANE	UG/L	TOTAL		U
				34511	1,1,2-TRICHLOROETHANE	UG/L	TOTAL		U
				32104	BROMOFORM	UG/L	TOTAL		U
				34516	1,1,2,2-TETRACHLOROETHANE	UG/L	TOTAL		U
				34475	TETRACHLOROETHYLENE	UG/L	TOTAL	0.3	
				34010	TOLUENE	UG/L	TOTAL	23	
				34301	CHLOROBENZENE	UG/L	TOTAL		U
				34371	ETHYLBENZENE	UG/L	TOTAL		U
				34586	2-CHLOROPHENOL	UG/L	TOTAL		U
				34591	2-NITROPHENOL	UG/L	TOTAL		U
				34694	PHENOL	UG/L	TOTAL		U
				34606	2,4-DIMETHYLPHENOL	UG/L	TOTAL		U
				34601	2,4-DICHLOROPHENOL	UG/L	TOTAL		U
				34621	2,4,6-TRICHLOROPHENOL	UG/L	TOTAL		U
				34452	P-CHLORO-M-CRESOL	UG/L	TOTAL		U
				34616	2,4-DINITROPHENOL	UG/L	TOTAL		U
				34657	4,6-DINITRO-O-CRESOL	UG/L	TOTAL		U
				39032	PENTACHLOROPHENOL	UG/L	TOTAL		U
				34646	4-NITROPHENOL	UG/L	TOTAL		U
				34566	1,3-DICHLOROBENZENE	UG/L	TOTAL		U
				34571	1,4-DICHLOROBENZENE	UG/L	TOTAL		U
				34536	1,2-DICHLOROBENZENE	UG/L	TOTAL		U
				34226	HEXACHLOROETHANE	UG/L	TOTAL		U
				34702	HEXACHLOROBUTADIENE	UG/L	TOTAL		U

TUT 001 1309

COMPLETED ALYSIS REPORT REPORT DATE: 87/12/

PROJECT NO: 262 PROJECT NAME: TURPENTINE RUN

STATION NO	DATE FROM TO	TIME OF DAY	LABNO	PARNO	PARAMETER NAME	UNITS	CHEMISTRY	VALUE & REMARK
			091310	34551	1,2,4-TRICHLOROBENZENE	UG/L	TOTAL	U
				34696	NAPHTHALENE	UG/L	TOTAL	U
				34273	BIS(2-CHLOROETHYL) ET.	UG/L	TOTAL	U
				34278	BIS(2-CHLOROETHOXY) METH.	UG/L	TOTAL	U
				34406	ISOPHORONE	UG/L	TOTAL	U
				34447	NITROBENZENE	UG/L	TOTAL	U
				34428	N-NITROSODI-N-PROPYLAMINE	UG/L	TOTAL	U
				34433	N-NITROSODIPHENYLAMINE	UG/L	TOTAL	U
				34283	BIS(2-CHLOROISOPROPYL) ET.	UG/L	TOTAL	U
				34386	HEXACHLOROCYCLOPENTADIENE	UG/L	TOTAL	U
				34581	2-CHLORONAPHTHALENE	UG/L	TOTAL	U
				34200	ACENAPHTHYLENE	UG/L	TOTAL	U
				34205	ACENAPHTHENE	UG/L	TOTAL	U
				34381	FLOURENE	UG/L	TOTAL	U
				39700	HEXACHLOROBENZENE	UG/L	TOTAL	U
				34636	4-BROMOPHENYL PHENYL ET.	UG/L	TOTAL	U
				34461	PHENANTHRENE	UG/L	TOTAL	U
				34220	ANTHRACENE	UG/L	TOTAL	U
				34341	DIMETHYL PHTHALATE	UG/L	TOTAL	U
				34336	DIETHYL PHTHALATE	UG/L	TOTAL	U
				39110	DI-N-BUTYLPHTHALATE	UG/L	TOTAL	U
				34292	BUTYL BENZYL PHTHALATE	UG/L	TOTAL	U
				34596	DI-N-OCTYL PHTHALATE	UG/L	TOTAL	1.1 M
				39100	BIS(2-ETHYLHEXYL) PHTHAL.	UG/L	TOTAL	U
				34376	FLUORANTHENE	UG/L	TOTAL	U
				34469	PYRENE	UG/L	TOTAL	U
				34320	CHRYSENE	UG/L	TOTAL	U
				34526	1,2-BENZANTHRACENE	UG/L	TOTAL	U
				34641	4-CHLOROPHENYL PHENYL ET.	UG/L	TOTAL	U
				34403	INDENO(1,2,3-C,D) PYRENE	UG/L	TOTAL	U
				34247	BENZO(A)PYRENE	UG/L	TOTAL	U
				34521	1,12-BENZOPERYLENE	UG/L	TOTAL	U
				34556	1,2:5,6-DIBENZANTHRACENE	UG/L	TOTAL	U
				34631	3,3'-DICHLOROBENZIDENE	UG/L	TOTAL	U
				34626	2,6-DINITROTOLUENE	UG/L	TOTAL	U
				34611	2,4-DINITROTOLUENE	UG/L	TOTAL	U
				34346	1,2-DIPHENYLHYDRAZINE	UG/L	TOTAL	U
				34230	3,4-BENZOFLUORANTHENE	UG/L	TOTAL	U
				34242	11,12-BENZOFLUORANTHENE	UG/L	TOTAL	U
				39330	ALDRIN	UG/L	TOTAL	U
				39380	DIELDRIN	UG/L	TOTAL	U

COMPLETED ANALYSIS REPORT — REPORT DATE: 87/12/22

PROJECT NO: 262 — PROJECT NAME: TURPENTINE RUN

STATION NO	DATE FROM TO	TIME OF DAY	LABNO	PARNO	PARAMETER NAME	UNITS	CHEMISTRY	VALUE & REMARK
			091310	39350	CHLORDANE	UG/L	TOTAL	U
				34300	4,4'-DDT	UG/L	TOTAL	U
				39370	4,4'-DDE	UG/L	TOTAL	U
				39310	4,4'-DDD	UG/L	TOTAL	U
				34361	ALPHA ENDOSULFAN	UG/L	TOTAL	U
				34356	BETA ENDOSULFAN	UG/L	TOTAL	U
				34351	ENDOSULFAN SULFATE	UG/L	TOTAL	U
				39340	ENDRIN	UG/L	TOTAL	U
				34366	ENDRIN ALDEHYDE	UG/L	TOTAL	U
				39410	HEPTACLOR	UG/L	TOTAL	U
				39420	HEPTACHLOR EPOXIDE	UG/L	TOTAL	U
				39337	ALPHA-BHC	UG/L	TOTAL	U
				39338	BETA-BHC	UG/L	TOTAL	U
				39346	GAMMA-BHC	UG/L	TOTAL	U
				34259	DELTA-BHC	UG/L	TOTAL	U
				39400	TOXAPHENE	UG/L	TOTAL	U
				34671	PCB-1016	UG/L	TOTAL	U
				39488	PCB-1221	UG/L	TOTAL	U
				39492	PCB-1232	UG/L	TOTAL	U
				39496	PCB-1242	UG/L	TOTAL	U
				39500	PCB-1248	UG/L	TOTAL	U
				39504	PCB-1254	UG/L	TOTAL	U
				39506	PCB-1260	UG/L	TOTAL	U
TURP.RUN 87/10/27 0955 LOCATION CODE: 3700 SUBSTRATE: AQUEOUS DESCRIPTION: TRANSPORT BLANK FROM PO JOINT								
			091311	34413	METHYL CHLORIDE	UG/L	TOTAL	U
				34413	METHYL BROMIDE	UG/L	TOTAL	U
				39175	VINYL CHLORIDE	UG/L	TOTAL	U
				34311	CHLOROETHANE	UG/L	TOTAL	U
				34423	METHYLENE CHLORIDE	UG/L	TOTAL	U
				34501	1,1-DICHLOROETHYLENE	UG/L	TOTAL	U
				34496	1,1-DICHLOROETHANE	UG/L	TOTAL	U
				34546	1,2-TRANS DICHLOROETHYLENE	UG/L	TOTAL	U
				32106	CHLOROFORM	UG/L	TOTAL	U
				32103	1,2-DICHLOROETHANE	UG/L	TOTAL	U
				34506	1,1,1-TRICHLOROETHANE	UG/L	TOTAL	U
				32102	CARBON TETRACHLORIDE	UG/L	TOTAL	U
				32101	DICHLOROBROMOMETHANE	UG/L	TOTAL	U

COMPLETED (YSIS REPORT REPORT DATE: 97/12/22 (

PROJECT NO: 262 PROJECT NAME: TURPENTINE RUN

STATION NO	DATE FROM TO	TIME OF DAY	LABNO	PARNO	PARAMETER NAME	UNITS	CHEMISTRY	VALUE	REMARK
			071311	34541	1,2-DICHLOROPROPANE	UG/L	TOTAL		U
				34561	1,3-DICHLOROPROPYLENE	UG/L	TOTAL		U
				99999	HEXANE	UG/L	TOTAL	12	J
				39180	TRICHLOROETHYLENE	UG/L	TOTAL		U
				34030	BENZENE	UG/L	TOTAL		U
				32105	CHLORODIBROMOMETHANE	UG/L	TOTAL		U
				34511	1,1,2-TRICHLOROETHANE	UG/L	TOTAL		U
				32104	BROMOFORM	UG/L	TOTAL		U
				34516	1,1,2,2-TETRACHLOROETHANE	UG/L	TOTAL		U
				34475	TETRACHLOROETHYLENE	UG/L	TOTAL		U
				34010	TOLUENE	UG/L	TOTAL		U
				34301	CHLOROBENZENE	UG/L	TOTAL		U
				34371	ETHYLBENZENE	UG/L	TOTAL		U
				34586	2-CHLOROPHENOL	UG/L	TOTAL		U
				34591	2-NITROPHENOL	UG/L	TOTAL		U
				34694	PHENOL	UG/L	TOTAL		U
				34606	2,4-DIMETHYLPHENOL	UG/L	TOTAL		U
				34601	2,4-DICHLOROPHENOL	UG/L	TOTAL		U
				34621	2,4,6-TRICHLOROPHENOL	UG/L	TOTAL		U
				34452	P-CHLORO-M-CRESOL	UG/L	TOTAL		U
				34616	2,4-DINITROPHENOL	UG/L	TOTAL		U
				34657	4,6-DINITRO-2-CRESOL	UG/L	TOTAL		U
				39032	PENTACHLOROPHENOL	UG/L	TOTAL		U
				34646	4-NITROPHENOL	UG/L	TOTAL		U
				34566	1,3-DICHLOROBENZENE	UG/L	TOTAL		U
				34571	1,4-DICHLOROBENZENE	UG/L	TOTAL	7.2	
				34536	1,2-DICHLOROBENZENE	UG/L	TOTAL		U
				34396	HEXACHLOROETHANE	UG/L	TOTAL		U
				39702	HEXACHLOROBUTADIENE	UG/L	TOTAL		U
				34551	1,2,4-TRICHLOROBENZENE	UG/L	TOTAL		U
				34695	NAPHTHALENE	UG/L	TOTAL		U
				34273	BIS(2-CHLOROETHYL) ET.	UG/L	TOTAL		U
				34278	BIS(2-CHLOROETHOXY) METH.	UG/L	TOTAL		U
				34406	ISOPHORONE	UG/L	TOTAL		U
				34447	NITROBENZENE	UG/L	TOTAL		U
				34428	N-NITROSODI-N-PROPYLAMINE	UG/L	TOTAL		U
				34433	N-NITROSODIPHENYLAMINE	UG/L	TOTAL		U
				34293	BIS(2-CHLOROISOPROPYL) ET.	UG/L	TOTAL		U
				34386	HEXACHLOROCYCLOPENTADIENE	UG/L	TOTAL		U
				34581	2-CHLORONAPHTHALENE	UG/L	TOTAL		U
				34200	ACENAPHTHYLENE	UG/L	TOTAL		U

TUT 001 1512

COMPLETED ANALYSIS REPORT — REPORT DATE: 87/12/22

PROJECT NO: 262 — PROJECT NAME: TURPENTINE RUN

STATION NO	DATE FROM TO	TIME OF DAY	LABNO	PARNO	PARAMETER NAME	UNITS	CHEMISTRY	VALUE & REMARK
			021311	34205	ACENAPHTHENE	UG/L	TOTAL	
				34381	FLOURENE	UG/L	TOTAL	
				39700	HEXACHLOROBENZENE	UG/L	TOTAL	
				34636	4-BROMOPHENYL PHENYL ET.	UG/L	TOTAL	
				34461	PHENANTHRENE	UG/L	TOTAL	
				34220	ANTHRACENE	UG/L	TOTAL	
				34341	DIMETHYL PHTHALATE	UG/L	TOTAL	
				34336	DIETHYL PHTHALATE	UG/L	TOTAL	
				39110	DI-N-BUTYLPHTHALATE	UG/L	TOTAL	
				34292	BUTYL BENZYL PHTHALATE	UG/L	TOTAL	
				34596	DI-N-OCTYL PHTHALATE	UG/L	TOTAL	
				39100	BIS(2-ETHYLHEXYL) PHTHAL.	UG/L	TOTAL	
				34376	FLUORANTHENE	UG/L	TOTAL	
				34469	PYRENE	UG/L	TOTAL	
				34321	CHRYSENE	UG/L	TOTAL	
				34526	1,2-BENZANTHRACENE	UG/L	TOTAL	
				34641	4-CHLOROPHENYL PHENYL ET.	UG/L	TOTAL	
				34403	INDENO(1,2,3-C,D) PYRENE	UG/L	TOTAL	
				34247	BENZO(A)PYRENE	UG/L	TOTAL	
				34571	1,12-BENZOPERYLENE	UG/L	TOTAL	
				34556	1,2:5,6-DIBENZANTHRACENE	UG/L	TOTAL	
				34581	3,3'-DICHLOROBENZIDENE	UG/L	TOTAL	
				34626	2,6-DINITROTOLUENE	UG/L	TOTAL	
				34611	2,4-DINITROTOLUENE	UG/L	TOTAL	
				34346	1,2-DIPHENYLHYDRAZINE	UG/L	TOTAL	
				34330	3,4-BENZOFLUORANTHENE	UG/L	TOTAL	
				34242	11,12-BENZOFLUORANTHENE	UG/L	TOTAL	
				39333	ALDRIN	UG/L	TOTAL	
				39360	DIELDRIN	UG/L	TOTAL	
				39350	CHLORDANE	UG/L	TOTAL	
				39300	4,4'-DDT	UG/L	TOTAL	
				39320	4,4'-DDE	UG/L	TOTAL	
				39310	4,4'-DDD	UG/L	TOTAL	
				34361	ALPHA ENDOSULFAN	UG/L	TOTAL	
				34356	BETA ENDOSULFAN	UG/L	TOTAL	
				34351	ENDOSULFAN SULFATE	UG/L	TOTAL	
				39390	ENDRIN	UG/L	TOTAL	
				34366	ENDRIN ALDEHYDE	UG/L	TOTAL	
				39410	HEPTACLOR	UG/L	TOTAL	
				39420	HEPTACHLOR EPOXIDE	UG/L	TOTAL	
				39337	ALPHA-BHC	UG/L	TOTAL	

COMPLETED (YSIS REPORT REPORT DATE: 87/12/22

PROJECT NO: 262 PROJECT NAME: TURPENTINE RUN

STATION NO	DATE FROM TO	TIME OF DAY	LABNO	PARNO	PARAMETER NAME	UNITS	CHEMISTRY	VALUE	REMARK
			091311	39338	BETA-BHC	UG/L	TOTAL		U
				39340	GAMMA-BHC	UG/L	TOTAL		U
				34259	DELTA-BHC	UG/L	TOTAL		U
				39400	TOXAPHENE	UG/L	TOTAL		U
				34671	PCB-1016	UG/L	TOTAL		U
				39488	PCB-1221	UG/L	TOTAL		U
				39492	PCB-1232	UG/L	TOTAL		U
				39496	PCB-1242	UG/L	TOTAL		U
				39500	PCB-1248	UG/L	TOTAL		U
				39504	PCB-1254	UG/L	TOTAL		U
				39508	PCB-1260	UG/L	TOTAL		U
TURP.RUN	87/10/07	0955							
LOCATION CODE: 3700 SUBSTRATE: AQUEOUS									
DESCRIPTION: HARTMANN CRUSHER WELL									
			091312	34416	METHYL CHLORIDE	UG/L	TOTAL		U
				34413	METHYL BROMIDE	UG/L	TOTAL		U
				39175	VINYL CHLORIDE	UG/L	TOTAL		U
				34311	CHLOROETHANE	UG/L	TOTAL		U
				34423	METHYLENE CHLORIDE	UG/L	TOTAL		U
				34501	1,1-DICHLOROETHYLENE	UG/L	TOTAL		U
				34496	1,1-DICHLOROETHANE	UG/L	TOTAL		U
				34546	1,2-TRANS DICHLOROETHYLEN	UG/L	TOTAL		U
				32106	CHLOROFORM	UG/L	TOTAL		U
				32103	1,2-DICHLOROETHANE	UG/L	TOTAL		U
				34506	1,1,1-TRICHLOROETHANE	UG/L	TOTAL		U
				32102	CARBON TETRACHLORIDE	UG/L	TOTAL		U
				32101	DICHLOROBROMOMETHANE	UG/L	TOTAL		U
				34541	1,2-DICHLOROPROPANE	UG/L	TOTAL		U
				34561	1,3-DICHLOROPROPYLENE	UG/L	TOTAL		U
				34010	TRICHLOROETHYLENE	UG/L	TOTAL		U
				34030	BENZENE	UG/L	TOTAL		U
				32105	CHLORODIBROMOMETHANE	UG/L	TOTAL		U
				34511	1,1,2-TRICHLOROETHANE	UG/L	TOTAL		U
				32104	BROMOFORM	UG/L	TOTAL		U
				34516	1,1,2,2-TETRACHLOROETHANE	UG/L	TOTAL		U
				34475	TETRACHLOROETHYLENE	UG/L	TOTAL		U
				34010	TOLUENE	UG/L	TOTAL		U
				34301	CHLOROBENZENE	UG/L	TOTAL		U
				34371	ETHYLBENZENE	UG/L	TOTAL		U

TUF 001 1314

COMPLETED ANALYSIS REPORT

REPORT DATE: 97/12/22

PROJECT NO: 262

PROJECT NAME: TURPENTINE RUN

STATION NO	DATE FROM TO	TIME OF DAY	LABNO	PARNO	PARAMETER NAME	UNITS	CHEMISTRY	VALUE & REMARK
			091312	34586	2-CHLOROPHENOL	UG/L	TOTAL	U
				34591	2-NITROPHENOL	UG/L	TOTAL	U
				34694	PHENOL	UG/L	TOTAL	U
				34606	2,4-DIMETHYLPHENOL	UG/L	TOTAL	U
				34601	2,4-DICHLOROPHENOL	UG/L	TOTAL	U
				34621	2,4,6-TRICHLOROPHENOL	UG/L	TOTAL	U
				34452	P-CHLORO-M-CRESOL	UG/L	TOTAL	U
				34616	2,4-DINITROPHENOL	UG/L	TOTAL	U
				34657	4,6-DINITRO-O-CRESOL	UG/L	TOTAL	U
				39032	PENTACHLOROPHENOL	UG/L	TOTAL	U
				34646	4-NITROPHENOL	UG/L	TOTAL	U
				34566	1,3-DICHLOROBENZENE	UG/L	TOTAL	U
				34571	1,4-DICHLOROBENZENE	UG/L	TOTAL	U
				34536	1,2-DICHLOROBENZENE	UG/L	TOTAL	U
				34396	HEXACHLOROETHANE	UG/L	TOTAL	U
				39702	HEXACHLOROBUTADIENE	UG/L	TOTAL	U
				34551	1,2,4-TRICHLOROBENZENE	UG/L	TOTAL	U
				34696	NAPHTHALENE	UG/L	TOTAL	U
				34273	BIS(2-CHLOROETHYL) ET.	UG/L	TOTAL	U
				34276	BIS(2-CHLOROETHOXY) METH.	UG/L	TOTAL	U
				34408	ISOPHORONE	UG/L	TOTAL	U
				34447	NITROBENZENE	UG/L	TOTAL	U
				34426	N-NITROSODI-N-PROPYLAMINE	UG/L	TOTAL	U
				34433	N-NITROSODIPHENYLAMINE	UG/L	TOTAL	U
				34283	BIS(2-CHLOROISOPROPYL) ET.	UG/L	TOTAL	U
				34386	HEXACHLOROCYCLOPENTADIENE	UG/L	TOTAL	U
				34581	2-CHLORONAPHTHALENE	UG/L	TOTAL	U
				34200	ACENAPHTHYLENE	UG/L	TOTAL	U
				34205	ACENAPHTHENE	UG/L	TOTAL	U
				34381	FLOURENE	UG/L	TOTAL	U
				39700	HEXACHLOROBENZENE	UG/L	TOTAL	U
				34636	4-BROMOPHENYL PHENYL ET.	UG/L	TOTAL	U
				34461	PHENANTHRENE	UG/L	TOTAL	U
				34220	ANTHRACENE	UG/L	TOTAL	U
				34341	DIMETHYL PHTHALATE	UG/L	TOTAL	U
				34336	DIETHYL PHTHALATE	UG/L	TOTAL	U
				39110	DI-N-BUTYLPHTHALATE	UG/L	TOTAL	U
				34292	BUTYL BENZYL PHTHALATE	UG/L	TOTAL	U
				34596	DI-N-OCTYL PHTHALATE	UG/L	TOTAL	U
				39100	BIS(2-ETHYLHEXYL) PHTHAL.	UG/L	TOTAL	U
				34376	FLUORANTHENE	UG/L	TOTAL	U

COMPLETED ANALYSIS REPORT — REPORT DATE: 87/12/22

PROJECT NO: 262 — PROJECT NAME: TURPENTINE RUN

STATION NO	DATE FROM TO	TIME OF DAY	LABNO	PARNO	PARAMETER NAME	UNITS	CHEMISTRY	VALUE & REMARK
			091312	34469	PYRENE	UG/L	TOTAL	U
				34320	CHRYSENE	UG/L	TOTAL	U
				34526	1,2-BENZANTHRACENE	UG/L	TOTAL	U
				34641	4-CHLOROPHENYL PHENYL ET.	UG/L	TOTAL	U
				34403	INDENO(1,2,3-C,D) PYRENE	UG/L	TOTAL	U
				34247	BENZO(A)PYRENE	UG/L	TOTAL	U
				34521	1,12-BENZOPERYLENE	UG/L	TOTAL	U
				34556	1,2:5,6-DIBENZANTHRACENE	UG/L	TOTAL	U
				34631	3,3'-DICHLOROBENZIDENE	UG/L	TOTAL	U
				34620	2,6-DINITROTOLUENE	UG/L	TOTAL	U
				34611	2,4-DINITROTOLUENE	UG/L	TOTAL	U
				34346	1,2-DIPHENYLHYDRAZINE	UG/L	TOTAL	U
				34230	3,4-BENZOFLUORANTHENE	UG/L	TOTAL	U
				34242	11,12-BENZOFLUORANTHENE	UG/L	TOTAL	U
				39330	ALDRIN	UG/L	TOTAL	U
				39390	DIELDRIN	UG/L	TOTAL	U
				39350	CHLORDANE	UG/L	TOTAL	U
				39300	4,4'-DDT	UG/L	TOTAL	U
				39320	4,4'-DDE	UG/L	TOTAL	U
				39310	4,4'-DDD	UG/L	TOTAL	U
				34351	ALPHA ENDOSULFAN	UG/L	TOTAL	U
				34356	BETA ENDOSULFAN	UG/L	TOTAL	U
				34351	ENDOSULFAN SULFATE	UG/L	TOTAL	U
				39330	ENDRIN	UG/L	TOTAL	U
				34366	ENDRIN ALDEHYDE	UG/L	TOTAL	U
				39410	HEPTACHLOR	UG/L	TOTAL	U
				39420	HEPTACHLOR EPOXIDE	UG/L	TOTAL	U
				39337	ALPHA-BHC	UG/L	TOTAL	U
				39339	BETA-BHC	UG/L	TOTAL	U
				39340	GAMMA-BHC	UG/L	TOTAL	U
				34259	DELTA-BHC	UG/L	TOTAL	U
				34400	TOXAPHENE	UG/L	TOTAL	U
				34671	PCB-1016	UG/L	TOTAL	U
				39488	PCB-1221	UG/L	TOTAL	U
				39492	PCB-1232	UG/L	TOTAL	U
				39496	PCB-1242	UG/L	TOTAL	U
				39500	PCB-1248	UG/L	TOTAL	U
				39504	PCB-1254	UG/L	TOTAL	U
				39508	PCB-1260	UG/L	TOTAL	U

TUT 001 1316

COMPLETED ANALYSIS REPORT

REPORT DATE: 87/12/22

PROJECT NO: 262

PROJECT NAME: TURPENTINE RUN

STATION NO	DATE FROM TO	TIME OF DAY	LABNO	PARNO	PARAMETER NAME	UNITS	CHEMISTRY	VALUE & REMARK
TURP.RUN	87/10/07	1130						
LOCATION CODE: 3700 SUBSTRATE: AQUEOUS								
DESCRIPTION: DEEP WELL								
			091313	34418	METHYL CHLORIDE	UG/L	TOTAL	U
				34413	METHYL BROMIDE	UG/L	TOTAL	U
				39175	VINYL CHLORIDE	UG/L	TOTAL	U
				34311	CHLOROETHANE	UG/L	TOTAL	U
				34423	METHYLENE CHLORIDE	UG/L	TOTAL	U
				34501	1,1-DICHLOROETHYLENE	UG/L	TOTAL	U
				34496	1,1-DICHLOROETHANE	UG/L	TOTAL	U
				34546	1,2-TRANS DICHLOROETHYLENE	UG/L	TOTAL	U
				32106	CHLOROFORM	UG/L	TOTAL	U
				32103	1,2-DICHLOROETHANE	UG/L	TOTAL	U
				34506	1,1,1-TRICHLOROETHANE	UG/L	TOTAL	U
				32102	CARBON TETRACHLORIDE	UG/L	TOTAL	U
				32101	DICHLOROBROMOMETHANE	UG/L	TOTAL	U
				34541	1,2-DICHLOROPROPANE	UG/L	TOTAL	U
				34561	1,3-DICHLOROPROPYLENE	UG/L	TOTAL	U
				39180	TRICHLOROETHYLENE	UG/L	TOTAL	U
				34030	BENZENE	UG/L	TOTAL	U
				32105	DICHLORODIBROMOMETHANE	UG/L	TOTAL	U
				34511	1,1,2-TRICHLOROETHANE	UG/L	TOTAL	U
				32104	BROMOFORM	UG/L	TOTAL	U
				34516	1,1,2,2-TETRACHLOROETHANE	UG/L	TOTAL	U
				34475	TETRACHLOROETHYLENE	UG/L	TOTAL	U
				34010	TOLUENE	UG/L	TOTAL	U
				34301	CHLOROBENZENE	UG/L	TOTAL	U
				34371	ETHYLBENZENE	UG/L	TOTAL	U
				34586	2-CHLOROPHENOL	UG/L	TOTAL	U
				34591	2-NITROPHENOL	UG/L	TOTAL	U
				34694	PHENOL	UG/L	TOTAL	U
				34606	2,4-DIMETHYLPHENOL	UG/L	TOTAL	U
				34601	2,4-DICHLOROPHENOL	UG/L	TOTAL	U
				34621	2,4,6-TRICHLOROPHENOL	UG/L	TOTAL	U
				34452	P-CHLORO-M-CRESOL	UG/L	TOTAL	U
				34616	2,4-DINITROPHENOL	UG/L	TOTAL	U
				34657	4,6-DINITRO-O-CRESOL	UG/L	TOTAL	U
				39032	PENTACHLOROPHENOL	UG/L	TOTAL	U
				34646	4-NITROPHENOL	UG/L	TOTAL	U
				34566	1,3-DICHLOROBENZENE	UG/L	TOTAL	U
				34571	1,4-DICHLOROBENZENE	UG/L	TOTAL	U
				34536	1,2-DICHLOROBENZENE	UG/L	TOTAL	U
				34396	HEXACHLOROETHANE	UG/L	TOTAL	U
				39702	HEXACHLOROBUTADIENE	UG/L	TOTAL	U

TUT 001 1817

COMPLETED ANALYSIS REPORT

REPORT DATE: 87/12/22

PROJECT NO: 262

PROJECT NAME: TURPENTINE RUN

STATION NO	DATE FROM TO	TIME OF DAY	LABNO	PARNO	PARAMETER NAME	UNITS	CHEMISTRY	VALUE & REMARK
			041313	34551	1,2,4-TRICHLOROBENZENE	UG/L	TOTAL	
				34696	NAPHTHALENE	UG/L	TOTAL	
				34273	BIS(2-CHLOROETHYL) ET.	UG/L	TOTAL	
				34278	BIS(2-CHLOROETHOXY) METH.	UG/L	TOTAL	
				34408	ISOPHORONE	UG/L	TOTAL	
				34447	NITROBENZENE	UG/L	TOTAL	
				34428	N-NITROSODI-N-PROPYLAMINE	UG/L	TOTAL	
				34433	N-NITROSODIPHENYLAMINE	UG/L	TOTAL	
				34283	BIS(2-CHLOROISOPROPYL) ET.	UG/L	TOTAL	
				34386	HEXACHLOROCYCLOPENTADIENE	UG/L	TOTAL	
				34581	2-CHLORONAPHTHALENE	UG/L	TOTAL	
				34200	ACENAPHTHYLENE	UG/L	TOTAL	
				34205	ACENAPHTHENE	UG/L	TOTAL	
				34381	FLOURENE	UG/L	TOTAL	
				39700	HEXACHLOROBENZENE	UG/L	TOTAL	
				34635	4-BROMOPHENYL PHENYL ET.	UG/L	TOTAL	
				34461	PHENANTHRENE	UG/L	TOTAL	
				34220	ANTHRACENE	UG/L	TOTAL	
				34341	DIMETHYL PHTHALATE	UG/L	TOTAL	
				34336	DIETHYL PHTHALATE	UG/L	TOTAL	
				39110	DI-N-BUTYLPHTHALATE	UG/L	TOTAL	
				34292	BUTYL BENZYL PHTHALATE	UG/L	TOTAL	
				34596	DI-N-OCTYL PHTHALATE	UG/L	TOTAL	
				39100	BIS(2-ETHYLHEXYL) PHTHAL.	UG/L	TOTAL	
				34376	FLUORANTHENE	UG/L	TOTAL	
				34469	PYRENE	UG/L	TOTAL	
				34320	CHRYSENE	UG/L	TOTAL	
				34526	1,2-BENZANTHRACENE	UG/L	TOTAL	
				34641	4-CHLOROPHENYL PHENYL ET.	UG/L	TOTAL	
				34403	INDENO(1,2,3-C,D) PYRENE	UG/L	TOTAL	
				34247	BENZO(A)PYRENE	UG/L	TOTAL	
				34521	1,12-BENZOPERYLENE	UG/L	TOTAL	
				34556	1,2:5,6-DIBENZANTHRACENE	UG/L	TOTAL	
				34631	3,3'-DICHLOROBENZIDENE	UG/L	TOTAL	
				34626	2,6-DINITROTOLUENE	UG/L	TOTAL	
				34611	2,4-DINITROTOLUENE	UG/L	TOTAL	
				34346	1,2-DIPHENYLHYDRAZINE	UG/L	TOTAL	
				34230	3,4-BENZOFLUORANTHENE	UG/L	TOTAL	
				34462	11,12-BENZOFLUORANTHENE	UG/L	TOTAL	
				39330	ALDRIN	UG/L	TOTAL	
				39380	DIELDRIN	UG/L	TOTAL	

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COMPLETED ANALYSIS REPORT — REPORT DATE: 87/12/22

PROJECT NO: 262 — PROJECT NAME: TURPENTINE RUN

STATION NO	DATE FROM TO	TIME OF DAY	LABNO	PARNO	PARAMETER NAME	UNITS	CHEMISTRY	VALUE & REMARK
			091313	39350	CHLORDANE	UG/L	TOTAL	U
				39300	4,4'-DDT	UG/L	TOTAL	U
				39320	4,4'-DDE	UG/L	TOTAL	U
				39310	4,4'-DDD	UG/L	TOTAL	U
				34361	ALPHA ENDOSULFAN	UG/L	TOTAL	U
				34356	BETA ENDOSULFAN	UG/L	TOTAL	U
				34351	ENDOSULFAN SULFATE	UG/L	TOTAL	U
				39390	ENDRIN	UG/L	TOTAL	U
				34366	ENDRIN ALDEHYDE	UG/L	TOTAL	U
				39410	HEPTACHLOR	UG/L	TOTAL	U
				39420	HEPTACHLOR EPOXIDE	UG/L	TOTAL	U
				39337	ALPHA-BHC	UG/L	TOTAL	U
				39338	BETA-BHC	UG/L	TOTAL	U
				39340	GAMMA-BHC	UG/L	TOTAL	U
				34459	DELTA-BHC	UG/L	TOTAL	U
				39600	TOXAPHENE	UG/L	TOTAL	U
				34671	PCB-1016	UG/L	TOTAL	U
				39488	PCB-1221	UG/L	TOTAL	U
				39492	PCB-1232	UG/L	TOTAL	U
				39496	PCB-1242	UG/L	TOTAL	U
				39500	PCB-1248	UG/L	TOTAL	U
				39504	PCB-1254	UG/L	TOTAL	U
				39508	PCB-1260	UG/L	TOTAL	U
TURP.RUN 87/10/07 1250 LOCATION CODE: 370C SUBSTRATE: WOODGUS DESCRIPTION: BENCH #FLL								
			091314	34418	METHYL CHLORIDE	UG/L	TOTAL	U
				34413	METHYL BROMIDE	UG/L	TOTAL	U
				39175	VINYL CHLORIDE	UG/L	TOTAL	U
				34311	CHLOROETHANE	UG/L	TOTAL	U
				34423	METHYLENE CHLORIDE	UG/L	TOTAL	U
				34501	1,1-DICHLOROETHYLENE	UG/L	TOTAL	U
				34496	1,1-DICHLOROETHANE	UG/L	TOTAL	U
				34546	1,2-TRANS DICHLOROETHYLENE	UG/L	TOTAL	U
				32106	CHLOROFORM	UG/L	TOTAL	U
				32103	1,2-DICHLOROETHANE	UG/L	TOTAL	U
				34506	1,1,1-TRICHLOROETHANE	UG/L	TOTAL	U
				32102	CARBON TETRACHLORIDE	UG/L	TOTAL	U
				32101	DICHLOROBROMOMETHANE	UG/L	TOTAL	U

TUT 001 1319

COMPLETED (...YSIS REPORT REPORT DATE: 87/12/22

PROJECT NO: 262 PROJECT NAME: TURPENTINE RUN

STATION NO	DATE FROM TO	TIME OF DAY	LABNO	PARNO	PARAMETER NAME	UNITS	CHEMISTRY	VALUE & REMARK
			091314	34541	1,2-DICHLOROPROPANE	UG/L	TOTAL	
				34561	1,3-DICHLOROPROPYLENE	UG/L	TOTAL	
				39180	TRICHLOROETHYLENE	UG/L	TOTAL	
				34030	BENZENE	UG/L	TOTAL	
				32105	CHLORODIBROMOMETHANE	UG/L	TOTAL	
				34511	1,1,2-TRICHLOROETHANE	UG/L	TOTAL	
				32104	BROMOFORM	UG/L	TOTAL	
				34516	1,1,2,2-TETRACHLOROETHANE	UG/L	TOTAL	
				34475	TETRACHLOROETHYLENE	UG/L	TOTAL	
				34010	TOLUENE	UG/L	TOTAL	
				34301	CHLOROBENZENE	UG/L	TOTAL	
				34371	ETHYLBENZENE	UG/L	TOTAL	
				34586	2-CHLOROPHENOL	UG/L	TOTAL	
				34591	2-NITROPHENOL	UG/L	TOTAL	
				34694	PHENOL	UG/L	TOTAL	
				34606	2,4-DIMETHYLPHENOL	UG/L	TOTAL	
				34601	2,4-DICHLOROPHENOL	UG/L	TOTAL	
				34621	2,4,6-TRICHLOROPHENOL	UG/L	TOTAL	
				34452	P-CHLORO-M-CRESOL	UG/L	TOTAL	
				34616	2,4-DINITROPHENOL	UG/L	TOTAL	
				34657	4,6-DINITRO-O-CRESOL	UG/L	TOTAL	
				39032	PENTACHLOROPHENOL	UG/L	TOTAL	
				34646	4-NITROPHENOL	UG/L	TOTAL	
				34566	1,2-DICHLOROBENZENE	UG/L	TOTAL	
				34571	1,4-DICHLOROBENZENE	UG/L	TOTAL	
				34536	1,2-DICHLOROBENZENE	UG/L	TOTAL	
				34396	HEXACHLOROETHANE	UG/L	TOTAL	
				39702	HEXACHLOROBUTADIENE	UG/L	TOTAL	
				34551	1,2,4-TRICHLOROBENZENE	UG/L	TOTAL	
				34696	NAPHTHALENE	UG/L	TOTAL	
				34273	BIS(2-CHLOROETHYL) ET.	UG/L	TOTAL	
				34278	BIS(2-CHLOROISOPROPYL) ETH.	UG/L	TOTAL	
				34426	DIPHENYLAMINE	UG/L	TOTAL	
				34447	NITROBENZENE	UG/L	TOTAL	
				34433	4-NITROSODI-N-PROPYLAMINE	UG/L	TOTAL	
				34646	4-NITROSODIPHENYLAMINE	UG/L	TOTAL	
				34233	BIS(2-CHLOROISOPROPYL) ET.	UG/L	TOTAL	
				34356	HEXACHLOROCYCLOPENTADIENE	UG/L	TOTAL	
				34581	2-CHLORONAPHTHALENE	UG/L	TOTAL	
				34200	ACENAPHTHYLENE	UG/L	TOTAL	
				34205	ACENAPHTHENE	UG/L	TOTAL	

TUT 001 1520

COMPLETED ANALYSIS REPORT

REPORT DATE: 87/12/22

PROJECT NO: 252

PROJECT NAME: TURPENTINE RUN

STATION NO	DATE PROF CT	TIME OF VAL	LABNO	PARNO	PARAMETER NAME	UNITS	CHEMISTRY	VALUE	REMARK
031814				34391	FLUORENE	UG/L	TOTAL		U
				39700	HEXACHLOROBENZENE	UG/L	TOTAL		U
				34536	4-BROMOPHENYL PHENYL ET.	UG/L	TOTAL		U
				34461	PHENANTHRENE	UG/L	TOTAL		U
				34220	ANTHRACENE	UG/L	TOTAL		U
				34341	DIMETHYL PHTHALATE	UG/L	TOTAL		U
				34335	DIETHYL PHTHALATE	UG/L	TOTAL	4.0	
				39110	DI-N-BUTYL PHTHALATE	UG/L	TOTAL		U
				34292	BUTYL BENZYL PHTHALATE	UG/L	TOTAL	1.7	
				34596	DI-N-OCTYL PHTHALATE	UG/L	TOTAL		U
				39100	BIS(2-ETHYLHEXYL) PHTHAL.	UG/L	TOTAL		U
				34376	FLUORANTHENE	UG/L	TOTAL		U
				34469	PYRENE	UG/L	TOTAL		U
				34320	CHRYSENE	UG/L	TOTAL		U
				34526	1,2-BENZANTHRACENE	UG/L	TOTAL		U
				34581	4-CHLOROPHENYL PHENYL ET.	UG/L	TOTAL		U
				34403	INDENO(1,2,3-C,D) PYRENE	UG/L	TOTAL		U
				34247	BENZO(A)PYRENE	UG/L	TOTAL		U
				34521	3,4-BENZOFLUORANTHENE	UG/L	TOTAL		U
				34556	1,2,5,6-DIBENZANTHRACENE	UG/L	TOTAL		U
				34531	3,3'-DICHLOROBENZIDENE	UG/L	TOTAL		U
				34526	2,6-DINITROTOLUENE	UG/L	TOTAL		U
				34611	2,4-DINITROTOLUENE	UG/L	TOTAL		U
				34346	1,2-DIPHENYLHYDRAZINE	UG/L	TOTAL		U
				34295	3,4-BENZOFLUORANTHENE	UG/L	TOTAL		U
				34242	11,12-BENZOFLUORANTHENE	UG/L	TOTAL		U
				39388	ALDRIN	UG/L	TOTAL		U
				39383	DIELDRIN	UG/L	TOTAL		U
				39380	CHLORDANE	UG/L	TOTAL		U
				39300	4,4'-DDT	UG/L	TOTAL		U
				39320	4,4'-DDE	UG/L	TOTAL		U
				39360	4,4'-DDD	UG/L	TOTAL		U
				34361	ALPHA ENDOSULFAN	UG/L	TOTAL		U
				34356	BETA ENDOSULFAN	UG/L	TOTAL		U
				34351	ENDOSULFAN SULFATE	UG/L	TOTAL		U
				39390	ENDRIN	UG/L	TOTAL		U
				34366	ENDRIN ALDEHYDE	UG/L	TOTAL		U
				39410	HEPTACHLOR	UG/L	TOTAL		U
				39420	HEPTACHLOR EPOXIDE	UG/L	TOTAL		U
				39337	ALPHA-BHC	UG/L	TOTAL		U
				39338	BETA-BHC	UG/L	TOTAL		U

TUF 001 1521

COMPLETED ANSES REPORT REPORT DATE: 07/12/2

PROJECT NO: 252

PROJECT NAME: TURPENTINE RUN

STATION ID	DATE SAMP	TIME SAMP	CASE NO	PARM	PARAMETER NAME	UNITS	CHEMISTRY	VALUE	REMARK
			39181	39340	GAMMA-BHC	UG/L	TOTAL	U	
				34259	DELTA-BHC	UG/L	TOTAL	U	
				39033	FLUORANENE	UG/L	TOTAL	U	
				34671	PCB-1016	UG/L	TOTAL	U	
				39488	PCB-1221	UG/L	TOTAL	U	
				39492	PCB-1232	UG/L	TOTAL	U	
				39496	PCB-1242	UG/L	TOTAL	U	
				39500	PCB-1248	UG/L	TOTAL	U	
				39504	PCB-1254	UG/L	TOTAL	U	
				39508	PCB-1260	UG/L	TOTAL	U	

LOCATION CODE: 9700 SUBSTRATE: ROADSIDE
DESCRIPTION: HARTMAN BAKERY WELL

			39181	34418	METHYLENE CHLORIDE	UG/L	TOTAL	U	
				34413	METHYL BROMIDE	UG/L	TOTAL	U	
				39175	VINYL CHLORIDE	UG/L	TOTAL	U	
				34311	CHLOROETHANE	UG/L	TOTAL	U	
				34423	METHYLENE CHLORIDE	UG/L	TOTAL	U	
				34531	1,1-DICHLOROETHYLENE	UG/L	TOTAL	U	
				34495	1,1-DICHLOROETHANE	UG/L	TOTAL	U	
				34546	1,2-TRANS DICHLOROETHYLENE	UG/L	TOTAL	0.7	M
				32105	CHLOROFORM	UG/L	TOTAL	U	
				32103	1,2-DICHLOROETHANE	UG/L	TOTAL	U	
				34506	1,1,1-TRICHLOROETHANE	UG/L	TOTAL	U	
				32102	CARBON TETRACHLORIDE	UG/L	TOTAL	U	
				32101	DICHLOROBROMOMETHANE	UG/L	TOTAL	U	
				34541	1,2-DICHLOROPROPANE	UG/L	TOTAL	U	
				34551	1,3-DICHLOROPROPYLENE	UG/L	TOTAL	U	
				39180	TRICHLOROETHYLENE	UG/L	TOTAL	0.6	M
				34030	BENZENE	UG/L	TOTAL	U	
				32106	CHLORODIBROMOMETHANE	UG/L	TOTAL	U	
				34511	1,1,2-TRICHLOROETHANE	UG/L	TOTAL	U	
				32104	BROMOFORM	UG/L	TOTAL	U	
				34516	1,1,2,2-TETRACHLOROETHANE	UG/L	TOTAL	U	
				34475	TETRACHLOROETHYLENE	UG/L	TOTAL	U	
				34010	TOLUENE	UG/L	TOTAL	U	
				34301	CHLOROBENZENE	UG/L	TOTAL	U	
				34371	ETHYLBENZENE	UG/L	TOTAL	U	
				34586	2-CHLOROPHENOL	UG/L	TOTAL	U	

TLT 001 1322

COMPLETED ANALYSIS REPORT — REPORT DATE: 87/12/22

PROJECT NO: 252 — PROJECT NAME: TURPENTINE RUN

STATION ID	DATE FROM TO	TIME OF DAY	LABNO	PARNO	PARAMETER NAME	UNITS	CHEMISTRY	VALUE & REMARK
			071815	34591	2-NITROPHENOL	UG/L	TOTAL	J
				34594	PHENOL	UG/L	TOTAL	J
				34606	2,4-DIMETHYLPHENOL	UG/L	TOTAL	J
				34601	2,4-DICHLOROPHENOL	UG/L	TOTAL	J
				34621	2,4,5-TRICHLOROPHENOL	UG/L	TOTAL	J
				34452	P-CHLORO-M-CRESOL	UG/L	TOTAL	J
				34615	2,4-DINITROPHENOL	UG/L	TOTAL	J
				34657	4,6-DINITRO-O-CRESOL	UG/L	TOTAL	J
				39032	PENTACHLOROPHENOL	UG/L	TOTAL	J
				34646	4-NITROPHENOL	UG/L	TOTAL	J
				34566	1,3-DICHLOROBENZENE	UG/L	TOTAL	J
				34571	1,4-DICHLOROBENZENE	UG/L	TOTAL	J 0.2
				34536	1,2-DICHLOROBENZENE	UG/L	TOTAL	J
				34396	HEXACHLOROETHANE	UG/L	TOTAL	J
				39702	HEXACHLOROBUTADIENE	UG/L	TOTAL	J
				34551	1,2,4-TRICHLOROBENZENE	UG/L	TOTAL	J
				34696	NAPHTHALENE	UG/L	TOTAL	J
				34273	BIS(2-CHLOROETHYL) ET.	UG/L	TOTAL	J
				34276	BIS(2-CHLOROETHOXY) METH.	UG/L	TOTAL	J
				34638	ISOPHORONE	UG/L	TOTAL	J
				34447	NITROBENZENE	UG/L	TOTAL	J
				34428	N-NITROSODI-N-PR PHYLAMINE	UG/L	TOTAL	J
				34433	N-NITROSODIPHENYLAMINE	UG/L	TOTAL	J
				34283	BIS(2-CHLOROISOPROPYL) ET.	UG/L	TOTAL	J
				34386	HEXACHLOROCYCLOPENTADIENE	UG/L	TOTAL	J
				34581	2-CHLORONAPHTHALENE	UG/L	TOTAL	J
				34200	ACENAPHTHYLEN	UG/L	TOTAL	J
				34205	ACENAPHTHENE	UG/L	TOTAL	J
				34381	FLOURENE	UG/L	TOTAL	J
				39700	HEXACHLOROBENZENE	UG/L	TOTAL	J
				34536	4-BROMOPHENYL-PHENYL ET.	UG/L	TOTAL	J
				34681	PHENANTHRENE	UG/L	TOTAL	J
				34220	ANTHRACENE	UG/L	TOTAL	J
				34341	DIMETHYL PHTHALATE	UG/L	TOTAL	J
				34336	DIETHYL PHTHALATE	UG/L	TOTAL	J 0.1
				39110	DI-N-BUTYL PHTHALATE	UG/L	TOTAL	J 0.3
				34292	BUTYL BENZYL PHTHALATE	UG/L	TOTAL	J
				34596	DI-N-OCTYL PHTHALATE	UG/L	TOTAL	J 0.1
				39100	BIS(2-ETHYLHEXYL) PHTHA..	UG/L	TOTAL	J
				34376	FLUORANTHENE	UG/L	TOTAL	J
				34469	PYRENE	UG/L	TOTAL	J

TUT 0001 1323

COMPLETED A SIS REPORT REPORT DATES 87/12/22

PROJECT NO: 252 PROJECT NAME: TURPENTINE PJN

STATION ID	DATE SMPL CT	TIME OF DAY	LABNO	PARAM	PARAMETER NAME	UNITS	CHEMISTRY	VALUE 1	LABQ
			001815	34320	CARBSTNE	UG/L	TOTAL		U
				34526	1,2-BENZANTHRICENE	UG/L	TOTAL		U
				34561	4-CHLOROPHENYL PHENYL ET.	UG/L	TOTAL		U
				34403	INDENO(1,2,3-C,D) PYRENE	UG/L	TOTAL		U
				34247	BENZO(A)PYRENE	UG/L	TOTAL		U
				34521	1,12-BENZOPERYLENE	UG/L	TOTAL		U
				34556	1,2:5,6-DIBENZANTHRACENE	UG/L	TOTAL		U
				34571	3,3'-DICHLOROBENZIDENE	UG/L	TOTAL		U
				99999	BENZOIC ACID	UG/L	TOTAL		U
				34526	2,6-DINITROTOLUENE	UG/L	TOTAL		U
				34611	2,4-DINITROTOLUENE	UG/L	TOTAL		U
				34346	1,2-DIPHENYLHYDRAZINE	UG/L	TOTAL		U
				34230	3,4-BENZOFLUORANTHENE	UG/L	TOTAL		U
				34242	11,12-BENZOFLUORANTHENE	UG/L	TOTAL		U
				39390	ALDRIN	UG/L	TOTAL		U
				39380	DIELDRIN	UG/L	TOTAL		U
				39350	CHLORDANE	UG/L	TOTAL		U
				39300	4,4'-DDT	UG/L	TOTAL		U
				39320	4,4'-DDE	UG/L	TOTAL		U
				39310	4,4'-DDD	UG/L	TOTAL		U
				34151	ALPHA ENDOSULFAN	UG/L	TOTAL		U
				34356	BETA ENDOSULFAN	UG/L	TOTAL		U
				34351	ENDOSULFAN SULFATE	UG/L	TOTAL		U
				39391	ENDRIN	UG/L	TOTAL		U
				34366	ENDRIN ALDEHYDE	UG/L	TOTAL		U
				39410	HEPTACHLOR	UG/L	TOTAL		U
				39420	HEPTACHLOR EPOXIDE	UG/L	TOTAL		U
				39337	ALPHA-BHC	UG/L	TOTAL		U
				39338	BETA-BHC	UG/L	TOTAL		U
				39340	GAMMA-BHC	UG/L	TOTAL		U
				34259	DELTA-BHC	UG/L	TOTAL		U
				39400	TOXAPHENE	UG/L	TOTAL		U
				34671	PCB-1016	UG/L	TOTAL		U
				39488	PCB-1221	UG/L	TOTAL		U
				39492	PCB-1232	UG/L	TOTAL		U
				39496	PCB-1242	UG/L	TOTAL		U
				39500	PCB-1248	UG/L	TOTAL		U
				39504	PCB-1254	UG/L	TOTAL		U
				39508	PCB-1260	UG/L	TOTAL		U

***** END OF PROJECT *****

TUT 001 1324

COMPLETED ANALYSIS REPORT — REPORT DATE: 87/11/25

PROJECT NO: 253 — PROJECT NAME: TURPENTINE RUN

STATION NO	DATE FROM TO	TIME OF DAY	LABNO	PARNO	PARAMETER NAME	UNITS	CHEMISTRY	VALUE & REMARK
TURP.RUN	87/10/05	1000						
DEPTH: 0000 SUBSTRATE: AQUEOUS								
DESCRIPTION: FIELD BLANK								
			090776	01077	SILVER	UG/L	TOTAL	20 U
				01002	ARSENIC	UG/L	TOTAL	1 U
				01012	BERYLLIUM	UG/L	TOTAL	1 U
				01027	CADMIUM	UG/L	TOTAL	6 U
				01034	CHROMIUM	UG/L	TOTAL	8 U
				01042	COPPER	UG/L	TOTAL	6 U
				71900	MERCURY	UG/L	TOTAL	.2 U
				01051	LEAD	UG/L	TOTAL	30 U
				01067	NICKEL	UG/L	TOTAL	20 U
				01097	ANTIMONY	UG/L	TOTAL	1 U
				01147	SELENIUM	UG/L	TOTAL	1 U
				01059	THALLIUM	UG/L	TOTAL	1 U
				01092	ZINC	UG/L	TOTAL	10 M
				00720	CYANIDE	MG/L	TOTAL	0.010 M
URP.RUN	87/10/05	1120						
EPTH: 0000 SUBSTRATE: AQUEOUS								
ESCRIPTION: BRYAN WELL #1 FROM STANDPIPE								
			090777	01077	SILVER	UG/L	TOTAL	20 U
				01002	ARSENIC	UG/L	TOTAL	1 U
				01012	BERYLLIUM	UG/L	TOTAL	1 U
				01027	CADMIUM	UG/L	TOTAL	6 U
				01034	CHROMIUM	UG/L	TOTAL	8 U
				01042	COPPER	UG/L	TOTAL	6 U
				71900	MERCURY	UG/L	TOTAL	.2 U
				01051	LEAD	UG/L	TOTAL	30 U
				01067	NICKEL	UG/L	TOTAL	20 U
				01097	ANTIMONY	UG/L	TOTAL	1 U
				01147	SELENIUM	UG/L	TOTAL	1 U
				01059	THALLIUM	UG/L	TOTAL	1 U
				01092	ZINC	UG/L	TOTAL	30 M
				00720	CYANIDE	MG/L	TOTAL	0.014 U
URP.RUN	87/10/06	1225						
EPTH: 0000 SUBSTRATE: AQUEOUS								
ESCRIPTION: TILLET WELL								
			090778	01077	SILVER	UG/L	TOTAL	20 U
				01002	ARSENIC	UG/L	TOTAL	1 U
				01012	BERYLLIUM	UG/L	TOTAL	1 U

COMPLETED ANALYSIS REPORT REPORT DATE: 87/11/25

OJECT NO: 269 PROJECT NAME: TURPENTINE RUN

N NO	DATE FROM YD	TIME OF DAY	LABNO	PARNO	PARAMETER NAME	UNITS	CHEMISTRY	VALUE & REMARK	
			090778	01027	CADMIUM	UG/L	TOTAL	6	U
				01034	CHROMIUM	UG/L	TOTAL	8	M
				01042	COPPER	UG/L	TOTAL	10	M
				71900	MERCURY	UG/L	TOTAL	.2	U
				01051	LEAD	UG/L	TOTAL	30	U
				01067	NICKEL	UG/L	TOTAL	40	U
				01097	ANTIMONY	UG/L	TOTAL	1	U
				01147	SELENIUM	UG/L	TOTAL	1	U
				01059	THALLIUM	UG/L	TOTAL	1	U
				01092	ZINC	UG/L	TOTAL	10	M
				00720	CYANIDE	MG/L	TOTAL	0.015	M

P. RUN 87/10/06 1340
THS 0000 SUBSTRATE: AQUEOUS
CRIPTION: FOUR WINDS PLAZA - WELL #1

			090779	01077	SILVER	UG/L	TOTAL	20	U
				01002	ARSENIC	UG/L	TOTAL	1	U
				01012	BERYLLIUM	UG/L	TOTAL	1	U
				01027	CADMIUM	UG/L	TOTAL	5	U
				01034	CHROMIUM	UG/L	TOTAL	5	M
				01042	COPPER	UG/L	TOTAL	5	M
				71900	MERCURY	UG/L	TOTAL	.2	U
				01051	LEAD	UG/L	TOTAL	30	U
				01067	NICKEL	UG/L	TOTAL	20	U
				01097	ANTIMONY	UG/L	TOTAL	1	U
				01147	SELENIUM	UG/L	TOTAL	1	U
				01059	THALLIUM	UG/L	TOTAL	1	U
				01092	ZINC	UG/L	TOTAL	51	
				00720	CYANIDE	MG/L	TOTAL	0.014	U

P. RUN 87/10/06 1500
THS 0000 SUBSTRATE: AQUEOUS
CRIPTION: ELGIN WELL #3

			090780	01077	SILVER	UG/L	TOTAL	20	U
				01002	ARSENIC	UG/L	TOTAL	1	U
				01012	BERYLLIUM	UG/L	TOTAL	1	U
				01027	CADMIUM	UG/L	TOTAL	6	U
				01034	CHROMIUM	UG/L	TOTAL	5	M
				01042	COPPER	UG/L	TOTAL	5	M

TUT 001 1526

COMPLETED ANALYSIS REPORT — REPORT DATE: 87/11/25

PROJECT NO: 263 — PROJECT NAME: TURPENTINE RUN

STATION NO	DATE FROM TO	TIME OF DAY	LABNO	PARNO	PARAMETER NAME	UNITS	CHEMISTRY	VALUE & REMARK	
			090780	71900	MERCURY	UG/L	TOTAL	.2	U
				01051	LEAD	UG/L	TOTAL	30	U
				01067	NICKEL	UG/L	TOTAL	20	U
				01097	ANTIMONY	UG/L	TOTAL	1	U
				01147	SELENIUM	UG/L	TOTAL	1	U
				01059	THALLIUM	UG/L	TOTAL	3	M
				01092	ZINC	UG/L	TOTAL	98	
				00720	CYANIDE	MG/L	TOTAL	0.014	U
URP. RUN 87/10/06 1525									
EPTH: 0000 SUBSTRATE: AQUEOUS									
ESCRIPTION: ELSIN WELL #2									
			090781	01077	SILVER	UG/L	TOTAL	20	U
				01002	ARSENIC	UG/L	TOTAL	1	U
				01012	BERYLLIUM	UG/L	TOTAL	1	U
				01027	CADMIUM	UG/L	TOTAL	6	U
				01034	CHROMIUM	UG/L	TOTAL	5	U
				01042	COPPER	UG/L	TOTAL	8	M
				71900	MERCURY	UG/L	TOTAL	.2	U
				01051	LEAD	UG/L	TOTAL	30	U
				01067	NICKEL	UG/L	TOTAL	20	U
				01097	ANTIMONY	UG/L	TOTAL	1	U
				01147	SELENIUM	UG/L	TOTAL	1	U
				01059	THALLIUM	UG/L	TOTAL	1	U
				01092	ZINC	UG/L	TOTAL	200	
				00720	CYANIDE	MG/L	TOTAL	0.014	U
URP. RUN 87/10/06 1530									
EPTH: 0000 SUBSTRATE: AQUEOUS									
ESCRIPTION: ELSIN WELL #1									
			090782	01077	SILVER	UG/L	TOTAL	20	U
				01002	ARSENIC	UG/L	TOTAL	1	U
				01012	BERYLLIUM	UG/L	TOTAL	1	U
				01027	CADMIUM	UG/L	TOTAL	6	U
				01034	CHROMIUM	UG/L	TOTAL	4	U
				01042	COPPER	UG/L	TOTAL	5	M
				71900	MERCURY	UG/L	TOTAL	.2	U
				01051	LEAD	UG/L	TOTAL	30	U
				01067	NICKEL	UG/L	TOTAL	20	U

COMPLETED ANALYSIS REPORT — REPORT DATE: 87/11/25

PROJECT NO: 269 — PROJECT NAME: TURPENTINE RUN

TATION NO	DATE FROM TO	TIME OF DAY	LABNO	PARNO	PARAMETER NAME	UNITS	CHEMISTRY	VALUE	REMARK
			090782	01097	ANTIMONY	UG/L	TOTAL	1	U
				01147	SELENIUM	UG/L	TOTAL	1	U
				01059	THALLIUM	UG/L	TOTAL	1	U
				01092	ZINC	UG/L	TOTAL	62	
				00720	CYANIDE	MG/L	TOTAL	0.036	
RF. RUN	87/10/06	1755							
PTH: 0000	SUBSTRATE: AQUEOUS								
SCRIPTION: FRANCOIS WELL									
			090783	01077	SILVER	UG/L	TOTAL	20	U
				01002	ARSENIC	UG/L	TOTAL	1	U
				01012	BERYLLIUM	UG/L	TOTAL	1	U
				01027	CADMIUM	UG/L	TOTAL	6	U
				01034	CHROMIUM	UG/L	TOTAL	9	M
				01042	COPPER	UG/L	TOTAL	4	U
				71900	MERCURY	UG/L	TOTAL	.2	U
				01051	LEAD	UG/L	TOTAL	30	U
				01067	NICKEL	UG/L	TOTAL	20	U
				01097	ANTIMONY	UG/L	TOTAL	1	U
				01147	SELENIUM	UG/L	TOTAL	1	U
				01059	THALLIUM	UG/L	TOTAL	1	U
				01092	ZINC	UG/L	TOTAL	108	
				00720	CYANIDE	MG/L	TOTAL	0.018	M
RUN	87/10/07	0855							
: 0000	SUBSTRATE: AQUEOUS								
SCRIPTION: VIHA HOUSING WELL #1									
			090786	01077	SILVER	UG/L	TOTAL	20	U
				01002	ARSENIC	UG/L	TOTAL	1	U
				01012	BERYLLIUM	UG/L	TOTAL	1	U
				01027	CADMIUM	UG/L	TOTAL	6	U
				01034	CHROMIUM	UG/L	TOTAL	5	U
				01042	COPPER	UG/L	TOTAL	10	M
				71900	MERCURY	UG/L	TOTAL	.2	U
				01051	LEAD	UG/L	TOTAL	30	U
				01067	NICKEL	UG/L	TOTAL	20	U
				01097	ANTIMONY	UG/L	TOTAL	1	U
				01147	SELENIUM	UG/L	TOTAL	13	
				01059	THALLIUM	UG/L	TOTAL	1	U

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COMPLETED ANALYSIS REPORT REPORT DATE: 97/11/25

PROJECT NO: 263 PROJECT NAME: TURPENTINE RUN

STATION NO	DATE FROM TO	TIME OF DAY	LABNO	PARNO	PARAMETER NAME	UNITS	CHEMISTRY	VALUE & REMARK	
			090784	01092	ZINC	UG/L	TOTAL	30	M
				00720	CYANIDE	MG/L	TOTAL	0.023	
RUN 97/10/07 0910									
: 0003 SUBSTRATE: AQUEOUS									
IPTION: VIMA HOUSING WELL #3									
			090785	01077	SILVER	UG/L	TOTAL	20	U
				01002	ARSENIC	UG/L	TOTAL	1	U
				01012	BERYLLIUM	UG/L	TOTAL	1	U
				01027	CADMIUM	UG/L	TOTAL	6	U
				01034	CHROMIUM	UG/L	TOTAL	5	U
				01042	COPPER	UG/L	TOTAL	22	M
				71900	MERCURY	UG/L	TOTAL	.2	U
				01051	LEAD	UG/L	TOTAL	30	U
				01067	NICKEL	UG/L	TOTAL	20	U
				01097	ANTIMONY	UG/L	TOTAL	1	U
				01147	SELENIUM	UG/L	TOTAL	3	M
				01059	THALLIUM	UG/L	TOTAL	1	U
				01092	ZINC	UG/L	TOTAL	30	M
				00720	CYANIDE	MG/L	TOTAL	0.019	M
.RUN 97/10/07 1045									
ATION CODE: 3700 SUBSTRATE: AQUEOUS									
CRIPTION: HARTMAN ESTATE WELL									
			090786	01077	SILVER	UG/L	TOTAL	20	U
				01002	ARSENIC	UG/L	TOTAL	1	U
				01012	BERYLLIUM	UG/L	TOTAL	1	U
				01027	CADMIUM	UG/L	TOTAL	5	U
				01034	CHROMIUM	UG/L	TOTAL	5	U
				01042	COPPER	UG/L	TOTAL	4	U
				71900	MERCURY	UG/L	TOTAL	.2	U
				01051	LEAD	UG/L	TOTAL	30	U
				01067	NICKEL	UG/L	TOTAL	20	U
				01097	ANTIMONY	UG/L	TOTAL	1	U
				01147	SELENIUM	UG/L	TOTAL	4	M
				01059	THALLIUM	UG/L	TOTAL	1	U
				01092	ZINC	UG/L	TOTAL	20	M
				00720	CYANIDE	MG/L	TOTAL	0.017	U

TLT 001 TOO ASSET 1339

COMPLETED ANALYSIS REPORT — REPORT DATE: 87/11/25

PROJECT NO: 263 — PROJECT NAME: TURPENTINE RUN

STATION NO	DATE FROM TO	TIME OF DAY	LABNO	PARNO	PARAMETER NAME	UNITS	CHEMISTRY	VALUE & REMARK	
RP.RUN 87/10/07 1300									
STATION CODE: 3700 SUBSTRATE: AQUEOUS									
DESCRIPTION: DEMITEIS WELL									
			090787	01077	SILVER	UG/L	TOTAL	30	U
				01002	ARSENIC	UG/L	TOTAL	1	U
				01012	BERYLLIUM	UG/L	TOTAL	20	U
				01027	CADMIUM	UG/L	TOTAL	30	U
				01034	CHROMIUM	UG/L	TOTAL	70	U
				01042	COPPER	UG/L	TOTAL	20	J
				71900	MERCURY	UG/L	TOTAL	.2	U
				01051	LEAD	UG/L	TOTAL	100	U
				01067	NICKEL	UG/L	TOTAL	50	U
				01097	ANTIMONY	UG/L	TOTAL	1	U
				01147	SELENIUM	UG/L	TOTAL	3	U
				01059	THALLIUM	UG/L	TOTAL	1	U
				01092	ZINC	UG/L	TOTAL	60	J
				00720	CYANIDE	MG/L	TOTAL	0.017	U
UN 87/10/05 1021									
0000 SUBSTRATE: AQUEOUS									
CRIPTION: RODRIGUEZ AUTO PARTS									
WELL # 3									
			091302	01077	SILVER	UG/L	TOTAL	20	U
				01002	ARSENIC	UG/L	TOTAL	1	U
				01012	BERYLLIUM	UG/L	TOTAL	1	U
				01027	CADMIUM	UG/L	TOTAL	5	U
				01034	CHROMIUM	UG/L	TOTAL	5	U
				01042	COPPER	UG/L	TOTAL	5	U
				71900	MERCURY	UG/L	TOTAL	.2	U
				01051	LEAD	UG/L	TOTAL	30	U
				01067	NICKEL	UG/L	TOTAL	20	U
				01097	ANTIMONY	UG/L	TOTAL	1	U
				01147	SELENIUM	UG/L	TOTAL	1	U
				01059	THALLIUM	UG/L	TOTAL	1	U
				01092	ZINC	UG/L	TOTAL	30	U
				00720	CYANIDE	MG/L	TOTAL	0.017	U
P.RUN 87/10/05 1130									
TH: 0000 SUBSTRATE: AQUEOUS									
CRIPTION: RAMSEY MOTORS WELL LOCATED NEAR									
AUTO REPAIR WORKS									
			091303	01077	SILVER	UG/L	TOTAL	20	U
				01002	ARSENIC	UG/L	TOTAL	1	U
				01012	BERYLLIUM	UG/L	TOTAL	1	U

COMPLETED ANALYSIS REPORT — REPORT DATE: 87/11/25

PROJECT NO: 263 — PROJECT NAME: TURPENTINE RUN

STATION NO	DATE FROM TO	TIME OF DAY	LABNO	PARNO	PARAMETER NAME	UNITS	CHEMISTRY	VALUE	REMARK
			091303	01027	CADMIUM	UG/L	TOTAL	6	U
				01034	CHROMIUM	UG/L	TOTAL	5	U
				01042	COPPER	UG/L	TOTAL	6	U
				71900	MERCURY	UG/L	TOTAL	.2	U
				01051	LEAD	UG/L	TOTAL	30	U
				01067	NICKEL	UG/L	TOTAL	20	U
				01097	ANTIMONY	UG/L	TOTAL	2	M
				01147	SELENIUM	UG/L	TOTAL	1	U
				01059	THALLIUM	UG/L	TOTAL	1	U
				01092	ZINC	UG/L	TOTAL	10	M
				00720	CYANIDE	MG/L	TOTAL	0.018	M
TURP.RUN	87/10/06	1230							
DEPTH: 0000 SUBSTRATE: AQUEOUS									
DESCRIPTION: SPIGOT AT WELL HEAD									
			091304	01077	SILVER	UG/L	TOTAL	20	U
				01002	ARSENIC	UG/L	TOTAL	1	U
				01012	BERYLLIUM	UG/L	TOTAL	1	U
				01027	CADMIUM	UG/L	TOTAL	6	U
				01034	CHROMIUM	UG/L	TOTAL	20	M
				01042	COPPER	UG/L	TOTAL	20	M
				71900	MERCURY	UG/L	TOTAL	.2	U
				01051	LEAD	UG/L	TOTAL	30	U
				01067	NICKEL	UG/L	TOTAL	20	U
				01097	ANTIMONY	UG/L	TOTAL	2	M
				01147	SELENIUM	UG/L	TOTAL	15	
				01059	THALLIUM	UG/L	TOTAL	1	U
				01092	ZINC	UG/L	TOTAL	20	M
				00720	CYANIDE	MG/L	TOTAL	0.017	U
TURP.RUN	87/10/05	1310							
DEPTH: 0000 SUBSTRATE: AQUEOUS									
DESCRIPTION: HARVEY WELL BEHIND O'HENRY DRY CLEANERS IN WOODS									
			091305	01077	SILVER	UG/L	TOTAL	20	U
				01002	ARSENIC	UG/L	TOTAL	1	U
				01012	BERYLLIUM	UG/L	TOTAL	1	U
				01027	CADMIUM	UG/L	TOTAL	6	U
				01034	CHROMIUM	UG/L	TOTAL	10	M
				01042	COPPER	UG/L	TOTAL	8	M

COMPLETED ANALYSIS REPORT — REPORT DATE: 87/11/23

PROJECT NO: 269 — PROJECT NAME: TURPENTINE RUN

STATION NO	DATE FROM TO	TIME OF DAY	LABNO	PARNO	PARAMETER NAME	UNITS	CHEMISTRY	VALUE & REMARK	
			091305	71900	MERCURY	UG/L	TOTAL	.2	U
				01051	LEAD	UG/L	TOTAL	30	U
				01067	NICKEL	UG/L	TOTAL	20	U
				01097	ANTIMONY	UG/L	TOTAL	1	U
				01147	SELENIUM	UG/L	TOTAL	1	U
				01059	THALLIUM	UG/L	TOTAL	1	U
				01092	ZINC	UG/L	TOTAL	340	
				00720	CYANIDE	MG/L	TOTAL	0.017	U
RP.RUN 87/10/06 1445									
PTHI 0003 SUBSTRATE: AQUEOUS									
SCRIPTION: MATHIAS WELL PUMP NOT OPERATING									
			091306	01077	SILVER	UG/L	TOTAL	20	U
				01002	ARSENIC	UG/L	TOTAL	1	U
				01012	BERYLLIUM	UG/L	TOTAL	1	U
				01027	CADMIUM	UG/L	TOTAL	5	U
				01034	CHROMIUM	UG/L	TOTAL	5	U
				01042	COPPER	UG/L	TOTAL	9	M
				71900	MERCURY	UG/L	TOTAL	.2	U
				01051	LEAD	UG/L	TOTAL	30	U
				01067	NICKEL	UG/L	TOTAL	20	U
				01097	ANTIMONY	UG/L	TOTAL	1	U
				01147	SELENIUM	UG/L	TOTAL	5.6	
				01059	THALLIUM	UG/L	TOTAL	1	U
				01092	ZINC	UG/L	TOTAL	10	M
				00720	CYANIDE	MG/L	TOTAL	0.017	U
RP.RUN 87/10/06 1600									
PTHI 0003 SUBSTRATE: AQUEOUS									
SCRIPTION: SMITH									
			091307	01077	SILVER	UG/L	TOTAL	20	U
				01002	ARSENIC	UG/L	TOTAL	1	U
				01012	BERYLLIUM	UG/L	TOTAL	1	U
				01027	CADMIUM	UG/L	TOTAL	5	U
				01034	CHROMIUM	UG/L	TOTAL	5	U
				01042	COPPER	UG/L	TOTAL	7	M
				71900	MERCURY	UG/L	TOTAL	.2	U
				01051	LEAD	UG/L	TOTAL	30	U
				01067	NICKEL	UG/L	TOTAL	20	U

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COMPLETED ANALYSIS REPORT — REPORT DATE: 87/11/25

PROJECT NO: 209 — PROJECT NAME: TURPENTINE RUN

STATION NO	DATE FROM TO	TIME OF DAY	LABNO	PARNO	PARAMETER NAME	UNITS	CHEMISTRY	VALUE & REMARK
			091307	01097	ANTIMONY	UG/L	TOTAL	1 U
				01147	SELENIUM	UG/L	TOTAL	3 M
				01059	THALLIUM	UG/L	TOTAL	1 U
				01092	ZINC	UG/L	TOTAL	460
				00720	CYANIDE	MG/L	TOTAL	0.017 U
TURP.RUN 87/10/06 1645								
DEPTH: 0000 SUBSTRATE: AQUEOUS								
DESCRIPTION: VEVCON WELL #1								
			091306	01077	SILVER	UG/L	TOTAL	20 U
				01002	ARSENIC	UG/L	TOTAL	1 U
				01012	BERYLLIUM	UG/L	TOTAL	1 U
				01027	CADMIUM	UG/L	TOTAL	6 U
				01034	CHROMIUM	UG/L	TOTAL	5 U
				01042	COPPER	UG/L	TOTAL	4 U
				71900	MERCURY	UG/L	TOTAL	.2 U
				01051	LEAD	UG/L	TOTAL	30 U
				01067	NICKEL	UG/L	TOTAL	20 U
				01097	ANTIMONY	UG/L	TOTAL	1 U
				01147	SELENIUM	UG/L	TOTAL	1 U
				01059	THALLIUM	UG/L	TOTAL	1 U
				01092	ZINC	UG/L	TOTAL	10 M
				00720	CYANIDE	MG/L	TOTAL	0.017 U
TURP.RUN 87/10/06 1715								
DEPTH: 0000 SUBSTRATE: AQUEOUS								
DESCRIPTION: VEVCON WELL #3 WATER FROM SPIGOT VERY AERATED								
			091309	01077	SILVER	UG/L	TOTAL	20 U
				01002	ARSENIC	UG/L	TOTAL	1 U
				01012	BERYLLIUM	UG/L	TOTAL	1 U
				01027	CADMIUM	UG/L	TOTAL	5 U
				01034	CHROMIUM	UG/L	TOTAL	10 M
				01042	COPPER	UG/L	TOTAL	4 U
				71900	MERCURY	UG/L	TOTAL	.2 U
				01051	LEAD	UG/L	TOTAL	30 U
				01067	NICKEL	UG/L	TOTAL	20 U
				01097	ANTIMONY	UG/L	TOTAL	1 U
				01147	SELENIUM	UG/L	TOTAL	7.1
				01059	THALLIUM	UG/L	TOTAL	1 U

COMPLETED ANALYSIS REPORT — REPORT DATE: 87/11/25

PROJECT NO: 265 — PROJECT NAME: TURPENTINE RUN

STATION NO	DATE FROM TO	TIME OF DAY	LABNO	PARNO	PARAMETER NAME	UNITS	CHEMISTRY	VALUE & REMARK	
			091309	01092	ZINC	UG/L	TOTAL	20	M
				00720	CYANIDE	MG/L	TOTAL	0.017	U
TURP.RUN	87/10/05	1920							
DEPTH: 0000 SUBSTRATE: AQUEOUS									
DESCRIPTION: ALPHA LEONARD WELL HEAD									
			091310	01077	SILVER	UG/L	TOTAL	20	U
				01002	ARSENIC	UG/L	TOTAL	1	U
				01012	BERYLLIUM	UG/L	TOTAL	1	U
				01027	CADMIUM	UG/L	TOTAL	6	U
				01034	CHROMIUM	UG/L	TOTAL	5	U
				01042	COPPER	UG/L	TOTAL	4	U
				71900	MERCURY	UG/L	TOTAL	.2	U
				01051	LEAD	UG/L	TOTAL	30	U
				01067	NICKEL	UG/L	TOTAL	20	U
				01097	ANTIMONY	UG/L	TOTAL	1	U
				01147	SELENIUM	UG/L	TOTAL	0.5	
				01059	THALLIUM	UG/L	TOTAL	1	U
				01092	ZINC	UG/L	TOTAL	10	M
				00720	CYANIDE	MG/L	TOTAL	0.017	U
TURP.RUN	87/10/07	0859							
LOCATION CODE: 3700 SUBSTRATE: AQUEOUS									
DESCRIPTION: TRANSPORT BLANK FROM RD UNIT									
			091311	01077	SILVER	UG/L	TOTAL	20	U
				01002	ARSENIC	UG/L	TOTAL	1	U
				01012	BERYLLIUM	UG/L	TOTAL	1	U
				01027	CADMIUM	UG/L	TOTAL	5	U
				01034	CHROMIUM	UG/L	TOTAL	5	U
				01042	COPPER	UG/L	TOTAL	4	U
				71900	MERCURY	UG/L	TOTAL	.2	U
				01051	LEAD	UG/L	TOTAL	30	U
				01067	NICKEL	UG/L	TOTAL	20	U
				01097	ANTIMONY	UG/L	TOTAL	1	U
				01147	SELENIUM	UG/L	TOTAL	1	U
				01059	THALLIUM	UG/L	TOTAL	1	U
				01092	ZINC	UG/L	TOTAL	9	U
				00720	CYANIDE	MG/L	TOTAL	0.017	U

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COMPLETED ANALYSIS REPORT — REPORT DATE: 87/11/25

PROJECT NO: 263 — PROJECT NAME: TURPENTINE RUN

STATION NO	DATE FROM TO	TIME OF DAY	LABNO	PARNO	PARAMETER NAME	UNITS	CHEMISTRY	VALUE & REMARK
TURP.RUN	87/10/07	0955						
LOCATION CODE: 3700 SUBSTRATE: AQUEOUS								
DESCRIPTION: HARTMANN CRUSHER WELL								
			091312	01077	SILVER	UG/L	TOTAL	20 U
				01002	ARSENIC	UG/L	TOTAL	15
				01012	BERYLLIUM	UG/L	TOTAL	1 U
				01027	CADMIUM	UG/L	TOTAL	5 U
				01034	CHROMIUM	UG/L	TOTAL	5 U
				01042	COPPER	UG/L	TOTAL	4 U
				71900	MERCURY	UG/L	TOTAL	.2 U
				01051	LEAD	UG/L	TOTAL	30 U
				01067	NICKEL	UG/L	TOTAL	20 U
				01097	ANTIMONY	UG/L	TOTAL	1 U
				01147	SELENIUM	UG/L	TOTAL	1 U
				01059	THALLIUM	UG/L	TOTAL	1 U
				01092	ZINC	UG/L	TOTAL	10 M
				00720	CYANIDE	MG/L	TOTAL	0.017 J
.RUN	87/10/07	1130						
ATION CODE: 3700 SUBSTRATE: AQUEOUS								
IPTION: DEEP WELL								
			091313	01077	SILVER	UG/L	TOTAL	20 U
				01002	ARSENIC	UG/L	TOTAL	1 U
				01012	BERYLLIUM	UG/L	TOTAL	1 U
				01027	CADMIUM	UG/L	TOTAL	5 U
				01034	CHROMIUM	UG/L	TOTAL	5 U
				01042	COPPER	UG/L	TOTAL	10 M
				71900	MERCURY	UG/L	TOTAL	.2 U
				01051	LEAD	UG/L	TOTAL	30 U
				01067	NICKEL	UG/L	TOTAL	20 U
				01097	ANTIMONY	UG/L	TOTAL	1 U
				01147	SELENIUM	UG/L	TOTAL	1 U
				01059	THALLIUM	UG/L	TOTAL	1 U
				01092	ZINC	UG/L	TOTAL	30 M
				00720	CYANIDE	MG/L	TOTAL	0.017 U
TURP.RUN	87/10/07	1250						
LOCATION CODE: 3700 SUBSTRATE: AQUEOUS								
DESCRIPTION: BENCH WELL								
			091314	01077	SILVER	UG/L	TOTAL	20 U
				01002	ARSENIC	UG/L	TOTAL	1 U
				01012	BERYLLIUM	UG/L	TOTAL	1 U

COMPLETED ANALYSIS REPORT REPORT DATE: 87/11/25

PROJECT NO: 263 PROJECT NAME: TURPENTINE RUN

STATION NO	DATE FROM TO	TIME OF DAY	LABNO	PARNO	PARAMETER NAME	UNITS	CHEMISTRY	VALUE & REMARKS	
			091314	01027	CADMIUM	UG/L	TOTAL	5	U
				01034	CHROMIUM	UG/L	TOTAL	5	U
				01042	COPPER	UG/L	TOTAL	10	U
				71900	MERCURY	UG/L	TOTAL	.2	U
				01051	LEAD	UG/L	TOTAL	20	U
				01067	NICKEL	UG/L	TOTAL	20	U
				01097	ANTIMONY	UG/L	TOTAL	4	U
				01147	SELENIUM	UG/L	TOTAL	1	U
				01059	THALLIUM	UG/L	TOTAL	12	
				01092	ZINC	UG/L	TOTAL	68	
				00720	CYANIDE	MG/L	TOTAL	0.017	U

RP.RUN 87/10/08 1200
CATION CODE: 3700 SUBSTRATE: AQUEOUS
SCRIPTION: HARTMAN BAKERY WELL

			091315	01077	SILVER	UG/L	TOTAL	20	U
				01002	ARSENIC	UG/L	TOTAL	1	U
				01012	BERYLLIUM	UG/L	TOTAL	1	U
				01027	CADMIUM	UG/L	TOTAL	5	U
				01034	CHROMIUM	UG/L	TOTAL	5	U
				01042	COPPER	UG/L	TOTAL	4	U
				71900	MERCURY	UG/L	TOTAL	.2	U
				01051	LEAD	UG/L	TOTAL	20	U
				01067	NICKEL	UG/L	TOTAL	20	U
				01097	ANTIMONY	UG/L	TOTAL	1	U
				01147	SELENIUM	UG/L	TOTAL	1	U
				01059	THALLIUM	UG/L	TOTAL	1	U
				01092	ZINC	UG/L	TOTAL	20	U
				00720	CYANIDE	MG/L	TOTAL	0.017	U

***** END OF PROJECT *****

TUT 001 1336

REFERENCE NO. 32

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION II

DATE: APR 04 1991

SUBJECT: Detection Limits for Turpentine Run

FROM: Joseph Soroka, Chief
Organic Chemistry Section

TO: Kevin Kubik, Chief
Superfund Support Section

Attached, please find the detection limits for the volatile organic compounds analyzed for in the 1987 Turpentine Run survey. I hope that this is sufficient; if not, please contact Lisa Gatton after April 8.

Attachment

TUT 001 1338

REGION II FORM 1320-1 (9/85)

value 2.44 used in the equation in Section 8.3.3 is two times the value 1.22 derived in this report.)

11. ASTM Annual Book of Standards, Part 31, D3370-76, "Standard Practices for Sampling Water," American Society for Testing and Materials, Philadelphia.

12. "Methods 330.4 (Titrimetric, DPD-FAS) and 330.5 (Spectrophotometric, DPD) for Chlorine, Total Residual," Methods for Chemical Analysis of Water and Wastes, EPA-600/4-79-020, U.S. Environmental Protection Agency, Environmental Monitoring and Support Laboratory, Cincinnati, Ohio 45268, March 1979.

13. Goerlitz, D.F., and Law, L.M. *Bulletin for Environmental Contamination and Toxicology, 6,* 9 (1971).

14. "Manual of Analytical Methods for the Analysis of Pesticides in Human and Environmental Samples," EPA-600/8-80-038, U.S. Environmental Protection Agency, Health Effects Research Laboratory, Research Triangle Park, North Carolina.

15. Burke, J.A. "Gas Chromatography for Pesticide Residue Analysis; Some Practical Aspects," *Journal of the Association of Official Analytical Chemists, 48,* 1037 (1965).

16. Webb, R.G., and McCall, A.C. "Quantitative PCB Standards for Election Capture Gas Chromatography," *Journal of Chromatographic Science, 11,* 366 (1973).

17. "Method Detection Limit and Analytical Curve Studies, EPA Methods 606, 607, and [illegible]," Special letter report for EPA Contract [illegible]-03-2606, U.S. Environmental Protection Agency, Environmental Monitoring and Support Laboratory, Cincinnati, Ohio 45268.

18. "EPA Method Validation Study 18, Method 608 (Organochlorine Pesticides and PCBs)," Report for EPA Contract 68-03-2606 (In preparation).

TABLE 1.—CHROMATOGRAPHIC CONDITIONS AND METHOD DETECTION LIMITS

Parameter	Retention time (min)		Method detection limit (µg/L)
	Col. 1	Col. 2	
α-BHC	1.35	1.82	0.003
γ-BHC	1.70	2.13	0.004
β-BHC	1.90	1.97	0.006
Heptachlor	2.00	3.35	0.003
δ-BHC	2.15	2.20	0.009
Aldrin	2.40	4.10	0.004
Heptachlor epoxide	3.50	5.00	0.083
Endosulfan I	4.50	6.20	0.014
4,4'-DDE	5.13	7.15	0.004
Dieldrin	5.45	7.23	0.002
Endrin	6.55	8.10	0.008
4,4'-DDD	7.83	9.08	0.011
Endosulfan II	8.00	8.28	0.004
4,4'-DDT	9.40	11.75	0.012
Endrin aldehyde	11.82	9.30	0.023
Endosulfan sulfate	14.22	10.70	0.066
Chlordane	mr	mr	0.014
Toxaphene	mr	mr	0.24
PCB-1016	mr	mr	nd
PCB-1221	mr	mr	nd
PCB-1232	mr	mr	nd

TABLE 1.—CHROMATOGRAPHIC CONDITIONS AND METHOD DETECTION LIMITS—Continued

Parameter	Retention time (min)		Method detection limit (µg/L)
	Col. 1	Col. 2	
PCB-1242	mr	mr	0.065
PCB-1248	mr	mr	nd
PCB-1254	mr	mr	nd
PCB-1260	mr	mr	nd

Column 1 conditions: Supelcoport (100/120 mesh) coated with 1.5% SP-2250/1.95% SP-2401 packed in a 1.8 m long × 4 mm ID glass column with 5% methane/95% argon carrier gas at 60 mL/min flow rate. Column temperature held isothermal at 200 °C, except for PCB-1016 through PCB-1248, should be measured at 160 °C.

Column 2 conditions: Supelcoport (100/120 mesh) coated with 3% OV-1 packed in a 1.8 m long × 4 mm ID glass column with 5% methane/95% argon carrier gas at 60 mL/min flow rate. Column temperature held isothermal at 200 °C for the pesticides; at 140 °C for PCB-1221 and 1232; and at 170 °C for PCB-1016 and 1242 to 1268.

mr = Multiple peak response. See Figures 2 thru 10.

nd = Not determined.

TABLE 2.—DISTRIBUTION OF CHLORINATED PESTICIDES AND PCBS INTO FLORISIL COLUMN FRACTIONS [2]

Parameter	Percent recovery by fraction [1]		
	1	2	3
Aldrin	100		
α-BHC	100		
β-BHC	97		
δ-BHC	98		
γ-BHC	100		
Chlordane	100		
4,4'-DDD	99		
4,4'-DDE	98		
4,4'-DDT	100		
Dieldrin	0	100	
Endosulfan I	37	64	
Endosulfan II	0	7	91
Endosulfan sulfate	0	0	106
Endrin	4	96	
Endrin aldehyde	0	68	26
Heptachlor	100		
Heptachlor epoxide	100		
Toxaphene	96		
PCB-1016	97		
PCB-1221	97		
PCB-1232	95	4	
PCB-1242	97		
PCB-1248	103		
PCB-1254	90		
PCB-1260	95		

[1] Eluant composition:
Fraction 1-6% ethyl ether in hexane.
Fraction 2-15% ethyl ether in hexane.
Fraction 3-50% ethyl ether in hexane.

TABLE 3.—QC ACCEPTANCE CRITERIA—METHOD 608

Parameter	Test conc. (µg/L)	Limit for s (µg/L)	Range for X̄ (µg/L)	Range for P, P_s(%)
Aldrin	2.0	0.42	1.08-2.24	42-122
α-BHC	2.0	0.48	.98-2.44	37-134
β-BHC	2.0	0.64	0.78-2.60	17-147
δ-BHC	2.0	0.72	1.01-2.37	19-140
γ-BHC	2.0	0.46	0.86-2.32	32-127
Chlordane	50	10.0	27.6-54.3	45-119
4,4'-DDD	10	2.8	4.8-12.6	31-141
4,4'-DDE	2.0	0.55	1.08-2.60	30-145

TABLE 3.—QC ACCEPTANCE CRITERIA—METHOD 608—Continued

Parameter	Test conc. (µg/L)	Limit for s (µg/L)	Range for X̄ (µg/L)	Range for P, P_s(%)
4,4'-DDT	10	3.6	4.6-13.7	25-160
Dieldrin	2.0	0.76	1.15-2.49	36-146
Endosulfan I	2.0	0.49	1.14-2.82	45-153
Endosulfan II	10	6.1	2.2-17.1	D-202
Endosulfan Sulfate	10	2.7	3.8-13.2	26-144
Endrin	10	3.7	5.1-12.6	30-147
Heptachlor	2.0	0.40	0.86-2.00	34-111
Heptachlor epoxide	2.0	0.41	1.13-2.63	37-142
Toxaphene	50	12.7	27.8-55.6	41-126
PCB-1016	50	10.0	30.5-51.5	50-114
PCB-1221	50	24.4	22.1-75.2	15-178
PCB-1232	50	17.9	14.0-98.5	10-215
PCB-1242	50	12.2	24.8-69.6	39-150
PCB-1248	50	15.9	29.0-70.2	38-158
PCB-1254	50	13.8	22.2-57.9	29-131
PCB-1260	50	10.4	18.7-54.9	8-127

s = Standard deviation of four recovery measurements, in µg/L (Section 8.2.4).

X̄ = Average recovery for four recovery measurements, in µg/L (Section 8.2.4).

P, P_s = Percent recovery measured (Section 8.3.2, Section 8.4.2).

D = Detected; result must be greater than zero.

Note.—These criteria are based directly upon the method performance data in Table 4. Where necessary, the limits for recovery have been broadened to assure applicability of the limits to concentrations below those used to develop Table 4.

TABLE 4. METHOD ACCURACY AND PRECISION AS FUNCTIONS OF CONCENTRATION—METHOD 608

Parameter	Accuracy, as recovery, X' (µg/L)	Single analyst precision, s_r (µg/L)	Overall precision, S' (µg/L)
Aldrin	0.81C+0.04	0.16X̄-0.04	0.20X̄-0.01
α-BHC	0.84C+0.03	0.13X̄+0.04	0.23X̄-0.00
β-BHC	0.81C+0.07	0.22X̄-0.02	0.33X̄-0.95
δ-BHC	0.81C+0.07	0.18X̄+0.09	0.25X̄+0.03
γ-BHC	0.82C-0.05	0.12X̄+0.06	0.22X̄+0.04
Chlordane	0.82C-0.04	0.13X̄+0.13	0.18X̄+0.18
4,4'-DDD	0.84C+0.30	0.20X̄-0.18	0.27X̄-0.14
4,4'-DDE	0.85C+0.14	0.13X̄+0.06	0.28X̄-0.09
4,4'-DDT	0.93C-0.13	0.17X̄+0.39	0.31X̄-0.21
Dieldrin	0.90C+0.02	0.12X̄+0.19	0.16X̄+0.16
Endosulfan I	0.97C+0.04	0.10X̄+0.07	0.18X̄+0.08
Endosulfan II	0.93C+0.34	0.41X̄-0.65	0.47X̄-0.20
Endosulfan Sulfate	0.89C-0.37	0.13X̄+0.33	0.24X̄+0.35
Endrin	0.89C-0.04	0.20X̄+0.25	0.24X̄+0.25
Heptachlor	0.69C+0.04	0.06X̄+0.13	0.16X̄+0.08
Heptachlor epoxide	0.89C+0.10	0.18X̄-0.11	0.25X̄-0.08
Toxaphene	0.80C+1.74	0.09X̄+3.20	0.20X̄+0.22
PCB-1016	0.81C+0.50	0.13X̄+0.15	0.15X̄+0.45
PCB-1221	0.96C+0.65	0.29X̄-0.76	0.35X̄-0.62
PCB-1232	0.91C+10.79	0.21X̄-1.93	0.31X̄+3.50
PCB-1242	0.93C+0.70	0.11X̄+1.40	0.21X̄+1.52
PCB-1248	0.87C+1.08	0.17X̄+0.41	0.25X̄-0.37
PCB-1254	0.76C+2.07	0.15X̄+1.66	0.17X̄+3.62
PCB-1260	0.68C+3.76	0.22X̄-2.37	0.39X̄-4.86

X' = Expected recovery for one or more measurements of a sample containing a concentration of C, in µg/L.

s_r = Expected single analyst standard deviation of measurements at an average concentration found of X̄, in µg/L.

S' = Expected interlaboratory standard deviation of measurements at an average concentration found of X̄, in µg/L.

C = True value for the concentration, in µg/L.

X̄ = Average recovery found for measurements of samples containing a concentration of C, in µg/L.

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from the EICP of the primary characteristic m/z given in Table 4. If the sample produces an interference for the primary m/z, use a secondary characteristic m/z to quantitate.

Calculate the concentration in the sample using the response factor (RF) determined in Section 7.3.3 and Equation 2.

Equation 2

$$\text{Concentration } (\mu g/L) = \frac{(A_s)(C_{is})}{(A_{is})(RF)}$$

where,

A_s = Area of the characteristic m/z for the parameter or surrogate standard to be measured.

A_{is} = Area of the characteristic m/z for the internal standard.

C_{is} = Concentration of the internal standard.

13.2 Report results in µg/L without correction for recovery data. All QC data obtained should be reported with the sample results.

14. Method Performance

14.1 The method detection limit (MDL) is defined as the minimum concentration of a substance that can be measured and reported with 99% confidence that the value is above zero.[1] The MDL concentrations listed in Table 1 were obtained using reagent water.[11] Similar results were achieved using representative wastewaters. The MDL actually achieved in a given analysis will vary depending on instrument sensitivity and matrix effects.

14.2 This method was tested by 15 laboratories using reagent water, drinking water, surface water, and industrial wastewaters spiked at six concentrations over the range 5–600 µg/L.[12] Single operator precision, overall precision, and method accuracy were found to be directly related to the concentration of the parameter and essentially independent of the sample matrix. Linear equations to describe these relationships are presented in Table 5.

References

1. 40 CFR Part 136, Appendix B.

2. Bellar, T.A., and Lichtenberg, J.J. "Determining Volatile Organics at Microgram-per-Litre Levels by Gas Chromatography." *Journal American Water Works Association, 66*, 739 (1974).

3. Bellar, T.A., and Lichtenberg, J.J. "Semi-Automated Headspace Analysis of Drinking Waters and Industrial Waters for Purgeable Volatile Organic Compounds." Measurement of Organic Pollutants in Water and Wastewater, C.E. Van Hall, editor, American Society for Testing and Materials, Philadelphia, PA. Special Technical Publication 686, 1978.

4. "Carcinogens—Working With Carcinogens." Department of Health, Education, and Welfare, Public Health Service, Center for Disease Control, National Institute for Occupational Safety and Health, Publication No. 77-206, August 1977.

5. "OSHA Safety and Health Standards, General Industry," (29 CFR 1910), Occupational Safety and Health Administration, OSHA 2206 (Revised, January 1976).

6. "Safety in Academic Chemistry Laboratories," American Chemical Society Publication, Committee on Chemical Safety, 3rd Edition, 1979.

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TABLE 1.—CHROMATOGRAPHIC CONDITIONS AND METHOD DETECTION LIMITS

Parameter	Retention time (min)	Method detection limit (µg/L)
Chloromethane	2.3	nd
Bromomethane	3.1	nd
Vinyl chloride	3.8	nd
Chloroethane	4.6	nd
Methylene chloride	6.4	2.8
Trichlorofluoromethane	8.3	nd
1,1-Dichloroethene	9.0	2.8
1,1-Dichloroethane	10.1	4.7
trans-1,2-Dichloroethene	10.8	1.6
Chloroform	11.4	1.6
1,2-Dichloroethane	12.1	2.8
1,1,1-Trichloroethane	13.4	3.8
Carbon tetrachloride	13.7	2.8
Bromodichloromethane	14.3	2.2
1,2-Dichloropropane	15.7	6.0
cis-1,3-Dichloropropene	15.9	5.0
Trichloroethene	16.5	1.9
Benzene	17.0	4.4
Dibromochloromethane	17.1	3.1
1,1,2-Trichloroethane	17.2	5.0
trans-1,3-Dichloropropene	17.2	nd
2-Chloroethylvinyl ether	18.6	nd
Bromoform	19.8	4.7
1,1,2,2-Tetrachloroethane	22.1	6.9
Tetrachloroethene	22.2	4.1
Toluene	23.5	6.0
Chlorobenzene	24.6	6.0
Ethyl benzene	26.4	7.2
1,3-Dichlorobenzene	33.9	nd
1,2-Dichlorobenzene	35.0	nd
1,4-Dichlorobenzene	35.4	nd

Column conditions: Carbopak B (60/80 mesh) coated with 1% SP-1000 packed in a 6 ft by 0.1 in ID glass column with helium carrier gas at 30 mL/min flow rate. Column temperature held at 45°C for 3 min, then programmed at 8°C/min to 220°C and held for 15 min.

nd = not determined

TABLE 2.—BFB KEY M/Z ABUNDANCE CRITERIA

Mass	m/z Abundance criteria
50	15 to 40% of mass 95
75	30 to 60% of mass 95
95	Base Peak, 100% Relative Abundance
96	5 to 9% of mass 95
173	<2% of mass 174
174	>50% of mass 95.
175	5 to 9% of mass 174
176	>95% but < 101% of mass 174
177	5 to 9% of mass 176

TABLE 3.—SUGGESTED SURROGATE AND INTERNAL STANDARDS

Compound	Retention time (min)*	Primary m/z	Secondary masses
Benzene d-6	17.0	84	
4-Bromofluorobenzene	28.3	95	174, 176
1,2-Dichloroethene d-4	12.1	102	
1,4-Difluorobenzene	19.6	114	63, 88
Ethylbenzene d-5	26.4	111	
Ethylbenzene d-10	26.4	98	
Fluorobenzene	18.4	96	70
Pentafluorobenzene	23.5	168	
Bromochloromethane	9.3	128	49, 130, 51
2-Bromo-1-chloropropane	19.2	77	79, 156
1, 4-Dichlorobutane	25.8	55	90, 92

*For chromatographic conditions, see Table 1

TABLE 4.—CHARACTERISTIC MASSES FOR PURGEABLE ORGANICS

Parameter	Primary	Secondary
Chloromethane	50	52.
Bromomethane	94	96.
Vinyl chloride	62	64.
Chloroethane	64	66.
Methylene chloride	84	49, 51, and 86.
Trichlorofluoromethane	101	103.
1,1-Dichloroethene	96	61 and 98.
1,1-Dichloroethane	63	65, 83, 85, 98, and 100.
trans-1,2-Dichloroethene	96	61 and 98.
Chloroform	83	85.
1,2-Dichloroethane	98	62, 64, and 100.
1,1,1-Trichloroethane	97	99, 117, and 119.
Carbon tetrachloride	117	119 and 121.
Bromodichloromethane	127	83, 85, and 129.
1,2-Dichloropropane	112	63, 65, and 114.
trans-1,3-Dichloropropene	75	77.
Trichloroethene	130	95, 97, and 132.
Benzene	78	
Dibromochloromethane	127	129, 208, and 206.
1,1,2-Trichloroethane	97	83, 85, 99, 132, and 134
cis-1,3-Dichloropropene	75	77
2-Chloroethylvinyl ether	106	63 and 65.

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be obtained only from a properly equipped laboratory through the use of EPA Method 613 or other approved alternate test procedures.

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TABLE 1.—BASE/NEUTRAL EXTRACTABLES

Parameter	STORET No.	CAS No.
Acenaphthene	34205	83-32-9
Acenaphthylene	34200	208-96-8
Anthracene	34220	120-12-7
Aldrin	39330	309-00-2
Benzo(a)anthracene	34526	56-55-3
Benzo(b)fluoranthene	34230	205-99-2
Benzo(k)fluoranthene	34242	207-08-9
Benzo(a)pyrene	34247	50-32-8
Benzo(ghi)perylene	34521	191-24-2
Benzyl butyl phthalate	34292	85-68-7
β-BHC	39338	319-85-7
δ-BHC	34259	319-86-8
Bis(2-chloroethyl)ether	34273	111-44-4
Bis(2-chloroethoxy)methane	34278	111-91-1
Bis(2-ethylhexyl)phthalate	39100	117-81-7
Bis(2-chloroisopropyl)ether	34283	108-60-1
4-Bromophenyl phenyl ether	34636	101-55-3
Chlordane	39350	57-74-9
2-Chloronaphthalene	34581	91-58-7
4-Chlorophenyl phenyl ether	34641	7005-72-3
Chrysene	34320	218-01-9
4,4'-DDD	39310	72-54-8
4,4'-DDE	39320	72-55-9
4,4'-DDT	39300	50-29-3
Dibenzo(a,h)anthracene	34556	53-70-3
Di-n-butylphthalate	39110	84-74-2
1,3-Dichlorobenzene	34566	541-73-1
1,2-Dichlorobenzene	34536	95-50-1
1,4-Dichlorobenzene	34571	106-46-7
3,3'-Dichlorobenzidine	34631	91-94-1
Dieldrin	39380	60-57-1
Diethyl phthalate	34336	84-66-2
Dimethyl phthalate	34341	131-11-3
2,4-Dinitrotoluene	34611	121-14-2
2,6-Dinitrotoluene	34626	606-20-2
Di-n-octylphthalate	34596	117-84-0
Endosulfan sulfate	34351	1031-07-8
Endrin aldehyde	34366	7421-93-4
Fluoranthene	34376	206-44-0
Fluorene	34381	86-73-7
Heptachlor	39410	76-44-8
Heptchlor epoxide	39420	1024-57-3
Hexachlorobenzene	39700	118-74-1
Hexachlorobutadiene	34391	87-68-3
Hexachloroethane	34396	67-72-1
Indeno(1,2,3-cd)pyrene	34403	193-39-5
Isophorone	34408	78-59-1
Naphthalene	34696	91-20-3
Nitrobenzene	34447	98-95-3
N-Nitrosodi-n-propylamine	34428	621-64-7
PCB-1016	34671	12674-11-2
PCB-1221	39488	11104-28-2
PCB-1232	39492	11141-16-5
PCB-1242	39496	53469-21-9
PCB-1248	39500	12672-29-6
PCB-1254	39504	11097-69-1
PCB-1260	39508	11096-82-5
Phenanthrene	34461	85-01-8
Pyrene	34469	129-00-0
Toxaphene	39400	8001-35-2
1,2,4-Trichlorobenzene	34551	120-82-1

TABLE 2.—ACID EXTRACTABLES

Parameter	STORET No.	CAS No.
4-Chloro-3-methylphenol	34452	59-50-7
2-Chlorophenol	34586	95-57-8
2,4-Dichlorophenol	34601	120-83-2
2,4-Dimethylphenol	34606	105-67-9
2,4-Dinitrophenol	34616	51-28-5
2-Methyl-4,6-dinitrophenol	34657	534-52-1
2-Nitrophenol	34591	88-75-5
4-Nitrophenol	34646	100-02-7
Pentachlorophenol	39032	87-86-5
Phenol	34694	108-95-2
2,4,6-Trichlorophenol	34621	88-06-2

TABLE 3.—ADDITIONAL EXTRACTABLE PARAMETERS[a]

Parameter	STORET No.	CAS No.	Method
Benzidine	39120	92-87-5	605
β-BHC	39337	319-84-6	608
δ-BHC	39340	58-89-9	608
Endosulfan I	34361	959-98-8	608
Endosulfan II	34356	33213-65-9	608
Endrin	39390	72-20-8	608
Hexachlorocyclopentadiene	34386	77-47-4	612
N-Nitrosodimethylamine	34438	62-75-9	607
N-Nitrosodiphenylamine	34433	86-30-6	607

[a] See Section 1.2.

TABLE 4.—CHROMATOGRAPHIC CONDITIONS, METHOD DETECTION LIMITS, AND CHARACTERISTIC MASSES FOR BASE/NEUTRAL EXTRACTABLES

Parameter	Retention time (min)	Method detection limit (µg/L)	Characteristic masses					
			Electron impact			Chemical ionization		
			Primary	Secondary	Secondary	Methane	Methane	Methane
1,3-Dichlorobenzene	7.4	1.9	146	148	113	146	148	150
1,4-Dichlorobenzene	7.8	4.4	146	148	113	146	148	150
Hexachloroethane	8.4	1.6	117	201	199	199	201	203
Bis(2-chloroethyl) ether	8.4	5.7	93	63	95	63	107	109
1,2-Dichlorobenzene	8.4	1.9	146	148	113	146	148	150
Bis(2-chloroisopropyl) ether	9.3	5.7	45	77	79	77	135	137
N-Nitrosodi-n-propylamine			130	42	101			
Nitrobenzene	11.1	1.9	77	123	65	124	152	154
Hexachlorobutadiene	11.4	0.9	225	223	227	223	225	227
1,2,4-Trichlorobenzene	11.6	1.9	180	182	145	181	183	208
Isophorone	11.9	2.2	82	95	138	139	167	178
Naphthalene	12.1	1.6	128	129	127	129	157	169
2-chloroethoxy) methane	12.2	5.3	93	95	123	65	107	137
Hexachlorocyclopentadiene[a]	13.9		237	235	272	235	237	239
2-Chloronaphthalene	15.9	1.9	162	164	127	163	191	203
Acenaphthylene	17.4	3.5	152	151	153	152	153	181

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TABLE 4.—CHROMATOGRAPHIC CONDITIONS, METHOD DETECTION LIMITS, AND CHARACTERISTIC MASSES FOR BASE/NEUTRAL EXTRACTABLES—Continued

Parameter	Retention time (min)	Method detection limit (µg/L)	Characteristic masses					
			Electron impact			Chemical ionization		
			Primary	Secondary	Secondary	Methane	Methane	Methane
Acenaphthene	17.8	1.9	154	153	152	154	155	183
Dimethyl phthalate	18.3	1.6	163	194	164	151	163	164
2,6-Dinitrotoluene	18.7	1.9	165	89	121	183	211	223
Fluorene	19.5	1.9	166	165	167	166	167	195
4-Chlorophenyl phenyl ether	19.5	4.2	204	206	141			
2,4-Dinitrotoluene	19.8	5.7	165	63	182	183	211	223
Diethylphthalate	20.1	1.9	149	177	150	177	223	251
N-Nitrosodiphenylamine*	20.5	1.9	169	168	167	169	170	198
Hexachlorobenzene	21.0	1.9	284	142	249	284	286	288
β-BHC*	21.1		183	181	109			
4-Bromophenyl phenyl ether	21.2	1.9	248	250	141	249	251	277
δ-BHC*	22.4		183	181	109			
Phenanthrene	22.8	5.4	178	179	176	178	179	207
Anthracene	22.8	1.9	178	179	176	178	179	207
β-BHC	23.4	4.2	181	183	109			
Heptachlor	23.4	1.9	100	272	274			
δ-BHC	23.7	3.1	183	109	181			
Aldrin	24.0	1.9	66	263	220			
Dibutyl phthalate	24.7	2.5	149	150	104	149	205	279
Heptachlor epoxide	25.6	2.2	353	355	351			
Endosulfan I*	26.4		237	336	341			
Fluoranthene	26.5	2.2	202	101	100	203	231	243
Dieldrin	27.2	2.5	79	263	279			
4,4'-DDE	27.2	5.6	246	248	176			
Pyrene	27.3	1.9	202	101	100	203	231	243
Endrin*	27.9		81	263	82			
Endosulfan II*	28.6		237	339	341			
4,4'-DDD	28.6	2.8	235	237	165			
Benzidine*	28.8	44	184	92	185	185	213	225
4,4'-DDT	29.3	4.7	235	237	165			
Endosulfan sulfate	29.8	5.6	272	387	422			
Endrin aldehyde			67	345	250			
Butyl benzyl phthalate	29.9	2.5	149	91	206	149	299	327
Bis(2-ethylhexyl) phthalate	30.6	2.5	149	167	279	149		
Chrysene	31.5	2.5	228	226	229	228	229	257
Benzo(a)anthracene	31.5	7.8	228	229	226	228	229	257
3,3'-Dichlorobenzidine	32.2	16.5	252	254	126			
Di-n-octyl phthalate	32.5	2.5	149					
Benzo(b)fluoranthene	34.9	4.8	252	253	125	252	253	281
Benzo(k)fluoranthene	34.9	2.5	252	253	125	252	253	281
Benzo(a)pyrene	36.4	2.5	252	253	125	252	253	281
Indeno(1,2,3-c,d)pyrene	42.7	3.7	276	138	277	276	277	305
Dibenzo(a,h)anthracene	43.2	2.5	278	139	279	278	279	307
Benzo(ghi)perylene	45.1	4.1	276	138	277	276	277	305
N-Nitrosodimethylamine*			42	74	44			
Chlordane*	19–30		373	375	377			
Toxaphene*	25–34		159	231	233			
PCB 1016*	18–30		224	260	294			
PCB 1221*	15–30	30	190	224	260			
PCB 1232*	15–32		190	224	260			
PCB 1242*	15–32		224	260	294			
PCB 1248* *	12–34		294	330	262			
PCB 1254*	22–34	36	294	330	362			
PCB 1260*	23–32		330	362	394			

* See Section 1.2.
* These compounds are mixtures of various isomers. (See figures 2 thru 12.)

Column conditions: Supelcoport (100/120 mesh) coated with 3% SP-2250 packed in a 1.8 m long x 2mm ID glass column with helium carrier gas at 30 mL/min flow rate. Column temperature held isothermal at 50 °C for 4 min, then programmed at 8 °C/min to 270 °C and held for 30 min.

TABLE 5.—CHROMATOGRAPHIC CONDITIONS, METHOD DETECTION LIMITS, AND CHARACTERISTIC MASSES FOR ACID EXTRACTABLES

Parameter	Retention time (min)	Method detection limit (µg/L)	Characteristic masses					
			Electron impact			Chemical ionization		
			Primary	Secondary	Secondary	Methane	Methane	Methane
2-Chlorophenol	5.9	3.3	128	64	130	129	131	157
2-Nitrophenol	6.5	3.6	139	65	109	140	168	122
Phenol	8.0	1.5	94	65	66	95	123	135
2,4-Dimethylphenol	9.4	2.7	122	107	121	123	151	163
2,4-Dichlorophenol	9.8	2.7	162	164	98	163	165	167
2,4,6-Trichlorophenol	11.8	2.7	196	198	200	197	199	201
4-Chloro-3-methylphenol	13.2	3.0	142	107	144	143	171	183
2,4-Dinitrophenol	15.9	42	184	63	154	185	213	225
2-Methyl-4,6-dinitrophenol	16.2	24	198	182	77	199	227	239
Pentachlorophenol	17.5	3.6	266	264	268	267	265	269
4-Nitrophenol	20.3	2.4	65	139	109	140	168	122

Column conditions: Supelcoport (100/120 mesh) coated with 1% SP-1240DA packed in a 1.8 m long x 2mm ID glass column with helium carrier gas at 30 mL/min flow rate. Column temperature held isothermal at 70 °C for 2 min then programmed at 8 °C/min to 200 °C.

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REFERENCE NO. 33

1ST SAMPLING REPORT
SEPTEMBER 1990
TUTU WELLS SITE QUARTERLY SAMPLING
ST. THOMAS, U.S. VIRGIN ISLANDS

January 1991

Prepared for

Tutu Environmental Investigation Committee

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TABLES

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2. Summary of Inorganics Analysis of Ground-Water Samples Collected From Water Supply Wells, September 1990 Sampling Event, Tutu Wells Site, St. Thomas, USVI.

3. Proposed Sampling Effort for the 2nd Sampling Event (February 1991), Tutu Wells Site, St. Thomas, USVI.

FIGURE

1. Well Sampling Locations, Tutu Wells Site Sampling, Analysis, and Monitoring Plan, St. Thomas, USVI.

APPENDIX

A. Data Validation Summary Report for the Tutu Wells Site, September 1990 Quarterly Sampling, St. Thomas, USVI.

1ST SAMPLING REPORT
SEPTEMBER 1990
TUTU WELLS SITE QUARTERLY SAMPLING
ST. THOMAS, U.S. VIRGIN ISLANDS

INTRODUCTION

The Tutu Wells Site 1st Quarter (September 1990) Sampling Report was prepared by Geraghty & Miller, Inc. for both the Tutu Environmental Investigation Committee (TEIC), which is comprised of Texaco Caribbean Inc. (Texaco) and Esso U.S. Virgin Islands (Esso), and L'Henri, Inc. (O'Henry). This report was prepared in accordance with the requirements detailed in the "Sampling, Analysis, and Monitoring Plan (SAMP) for Wells, Tutu Wells Site, St. Thomas, U.S. Virgin Islands," September 1990, which was approved by the U.S. Environmental Protection Agency (USEPA) in its September 21, 1990 letter to TEIC and the Administrative Order (Order) effective March 22, 1990.

The objectives of the SAMP are to identify, quantify, and monitor the occurrence of gasoline constituents and tetrachloroethene (commonly referred to as perchloroethylene and abbreviated as PCE), and its breakdown products, in certain wells in the vicinity of Route 38 within the Tutu Wells Site (Figure 1).

SAMPLING AND ANALYTICAL PROCEDURES

The sampling was conducted from September 24 through October 3, 1990 by Soil Tech and Geraghty & Miller. USEPA representatives were present for the sampling conducted through September 28, 1990. Additionally, representatives of the USEPA's Monitoring Management Branch (MMB) were present in an audit capacity on September 24 and 25, 1990. A representative of the Virgin Islands Department of Planning and Natural Resources (DPNR) was present throughout the sampling event.

Sampling and analysis were performed as described in the SAMP, with the exception of the few deviations outlined in the following section.In brief, the wells were sampled and analyzed for the Target Compound List (TCL) and Target Analyte List (TAL) constituents, with the exception of polychlorinated biphenyls (PCBs), under the Contract Laboratory Program (CLP). Volatile organic compound (VOC) analyses were performed in accordance with a modified version of EPA Method 524.2 in order to achieve lower detection levels. The modifications to EPA Method 524.2 which were adopted are described in Appendix A of the SAMP.

The samples were collected in 23 of the 24 wells sampled for the September 1990 sampling event utilizing the permanent pumps and piping systems. These wells were evacuated prior to sampling by pumping the wells for a minimum of 15 minutes. One well (Gassett), which is not outfitted with a permanent pump, was evacuated and sampled using a peristaltic pump. The analytical data was validated by Geraghty & Miller in accordance with the USEPA Standard Operating Procedures (SOP) No. HW-2, February 1990 for inorganic compounds and the USEPA SOP No. HW-6, March 1990 for organic compounds. The data validation summary and the complete data set (tabulated) are provided in Appendix A.

Details of the sampling and analysis procedures, data validation requirements, and reporting requirements are provided in the SAMP.

Procedural Deviations

Deviations from the scope of work and procedures as presented in the SAMP are outlined below.

1. Four Winds Well No. 1 was not sampled during the September 1990 sampling event when it was discovered that the pump, which was thought to be in good working order, was inoperable at the start of the sampling event.

2. The well sampled on the Gassett property (formerly Hartman 1) during the September 1990 sampling event was the same well which was formerly sampled by USEPA and was proposed to be sampled in the SAMP. The well is located near the fence on the north side of the Gassett property. When USEPA and TEIC representatives examined the well in August 1990, it became clear that the integrity of the well had been compromised based on the report of the USEPA Technical Assistance Team (TAT) member who previously sampled the well. It was decided, and approved by USEPA, to sample a newer well located on the Gassett property, in its place. The new well is located behind the building and consists of 6-inch diameter PVC which extends several feet above ground surface. However, during the September 1990 sampling event, the old well near the fence was sampled. Additionally, the sample from the well was collected using a peristaltic pump, instead of a Teflon™ bailer. Due to problems associated with sounding and evacuating the well, the well volume could not be determined, and it is unlikely that 3 well volumes were removed prior to sampling.

3. The 1:1 hydrochloric acid (HCl) used to acidify the VOC samples was reagent grade and not ultra pure grade. The sampling team attempted to obtain ultra-pure grade HCl, but was unable to do so due to shipping problems.

4. The samples for cyanide analysis were preserved by adding sodium hydroxide (NaOH). However, for some of the samples, the pH was not raised to greater than 12. While this requirement was not stated in the plan, it is recognized as a requirement and will be met in subsequent cyanide analyses.

5. One sample (Smith) was analyzed for VOCs using EPA Method 624, instead of Method 524.2 in order to perform the analysis within the holding time.

6. Although the analysis for PCBs was not required for this project, they were analyzed for; the analytical results are provided in this report.

7. The Tillett well was pumped for a minimum of 15 minutes prior to sampling, as specified in the SAMP. However, due to logistical problems associated with containing the evacuated water, the water was pumped at a low rate and only approximately 110 gallons were removed prior to sampling. Data provided by the U.S. Geological Survey (USGS) indicates that the Tillett wells is 100 feet deep and 6 inches in diameter. Assuming a depth to water of 20 feet, it is calculated that 3 well volumes is equal to approximately 360 gallons.

RESULTS AND DISCUSSION

A summary of the organic analytical results is provided in Table 1. Table 1 includes only the organic compounds which were detected; the complete organics analytical results are provided in tabulated form in Appendix A. The inorganic analytical results are summarized in Table 2.

Data Quality Provisions

A discussion of the data validation findings is provided in Appendix A. In general, the overall quality of the data set is acceptable and meets the project data quality objectives. For some data, however, there are some provisions which should be noted.

As discussed in USEPA's MMB CERCLA Limited Technical Systems Audit for the September 1990 sampling, air bubbles were found to be present in several of the VOC sample bottles. When the VOC bottles were originally filled, no bubbles were apparent; the bubbles came out of solution later. While every effort was made to avoid this condition, a few of the samples (Eglin 1, LaPlace, Tillett, and Tillett Replicate) analyzed by the laboratory contained air bubbles. In this event, the data validation SOP requires that all

positive detections be assumed to be minimum values and that all non-detections be rejected based on the assumption that all VOCs in the water would diffuse into the air bubble, and consequently escape analysis and detection. In reality, it is likely that any volatile organic compound present would stabilize in both the air and water at concentrations related to the compound vapor pressure. In any event, the compounds which were consistently detected in the four affected samples (PCE, trichloroethene [TCE], and 1,2-dichloroethene [1,2-DCE]) were also consistently detected throughout the data set and comprise the constituents of concern at the site. It is unlikely that the undetected compounds in the four affected samples are present in ground water at the site.

Holding time violations resulted in the rejection of some of the mercury analytical results. In most instances, the mercury holding time of 28 days was exceeded by only 1 or 2 days; for one sample the holding time was exceeded significantly.

Unsatisfactory instrument calibrations resulted in the rejection of some results. For some samples, non-detection of acetone, 2-butanone, 2-hexanone, trans-1,3-dichloropropene, and vinyl acetate were rejected due to poor instrument response factors and continuing calibration performance. Poor sensitivity for acetone and similar compounds is not unusual at low detection levels. Moreover, these compounds are not constituents of concern at the site.

Spike recovery values outside of quality control limits contributed to the rejection of some data. The acid fraction of the Tillett Replicate analysis was rejected because the acid surrogate recoveries were out of control limits, and the thallium data was rejected because the matrix spike recoveries were out of control limits. The laboratory suggested that the thallium recoveries may be affected by the high natural dissolved solids concentrations in site ground water. Additionally, some of the antimony and mercury data was rejected for several samples because the recovery for the laboratory standard for one run was out of control limits.

Many constituent concentrations are estimated due to quality control inadequacies related to holding times, sample preservation, calibration performance, spike recoveries, and quality control studies. Although many of the constituent concentrations are estimated, their identification and quantitation were subject to strict quality control requirements and therefore, the reported values are likely to be within a reasonable range of the true values. The overall quality of the data set is acceptable; there was good reproducibility between replicate samples and the chief constituents of concern were consistently detected.

Organic Analytical Results

As indicated in Table 1, VOCs constitute the chief analyte group of concern at the Tutu Wells Site. The compounds which were consistently detected in site samples are PCE, TCE, and 1,2-DCE. All three compounds were detected in the following wells: Eglin 1, 2, and 3; Hartman 2; Smith; Four Winds 2; Four Winds 2 Replicate; Steele; LaPlace; Matthias; Tillet; and the Tillett Replicate. Additionally, one or two of these compounds were detected in wells Hartman 3, Harvey, Ramsey, and VIHA 1.

VOC tentatively identified compounds (TICs) were identified in 12 out of the 24 site samples. Eight compounds were tentatively identified and unknown compounds were detected. Total estimated VOC TIC concentrations ranged from 3 to 435 micrograms per liter (ug/L).

The presence of methylene chloride and acetone in site and blank samples is attributed to laboratory contamination. Other VOC compounds which were detected in site samples include chloroform in well VIHA 3 (3 ug/L), and vinyl chloride (17 ug/L) and benzene (32 ug/l) in both the Tillett and Tillett Replicate sample.

No semi-volatile (base-neutral and acid extractable organic compounds) or pesticide organic compounds were detected in any of the site samples. One library search semi-volatile compound (penta-chlorofluorobenzene; 4 ug/l) was detected in the Tillett Replicate sample and unknown semi-volatile organic compounds were detected in several samples.

In general, the wells in which VOCs were detected are located in the central Tutu valley. No VOCs were detected in wells outside the central valley. The wells in which no VOCs were detected include: the Dimitri and Leonard wells located significantly upgradient of the central Tutu valley; the Bryan well which is located in the next drainage subbasin to the west; and the Devcon 1 and 3, Dench, and Dede wells located significantly downgradient from the central Tutu valley (see Figure 1). Additionally, no VOCs were detected in the Gassett (Hartman 1) or Rodriguez wells which are located at the southern end of the central Tutu valley.

Inorganic Analytical Results

The inorganics analytical results are provided in Table 2. The inorganic concentrations were within acceptable ranges. While some cation concentrations (calcium, magnesium, potassium, and sodium) were elevated in relation to potable water quality typical of North America, the concentrations were within the range of concentrations commonly detected in ground water pumped from domestic, commercial, and public supply wells in the U.S. Virgin Islands. The heavy metal concentrations detected were all below the Federal Primary Drinking Water Standards, where applicable. Lead concentrations, which were of particular interest due of the possibility of past gasoline releases, were all below the Federal Primary Drinking Water Standard.

RECOMMENDATIONS

The 1st Quarter results meet the prescribed objectives of the SAMP. It is recommended to continue to implement the plan with a few minor changes. First, the deviations from the sampling and analysis procedures detailed in the SAMP will be rectified for the remaining quarterly sampling events. Second, it is recommended that the analytical problems associated with the thallium and antimony analyses be reviewed so that subsequent analyses will provide acceptable data. It may be necessary to alter the analytical method in order to achieve this; if so, all revisions will be approved by USEPA before implementation. Furthermore, it is recommended to resample for mercury for the samples which were analyzed after the holding time elapsed.

Proposed analyses for the 2nd sampling event, which is tentatively scheduled to begin on February 4, 1991, are based on the results of this report. The proposed sampling effort for February 1991 is detailed in Table 3. For VOC analysis, it is proposed to sample only those wells in which VOCs other than laboratory contaminants (methylene chloride and acetone) were detected in the 1st Sampling Report. Additionally, it is proposed to sample the Gassett well for VOCs because the September 1990 sampling procedure used for this well was not in keeping with the procedures described in the SAMP. It is also proposed to sample for thallium, antimony, mercury, and selenium in the wells for which these data were rejected due to quality control inadequacies. Sampling and analysis

for semivolatile organic compounds, pesticides, and PCBs are not proposed for the 2nd, 3rd, or 4th sampling events because these compounds were not detected in any of the wells.

Respectfully Submitted,

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Table 1. Summary of Organics Analysis of Ground-Water Samples Collected from Water Supply Wells, September 1990 Sampling Event, Tutu Well Site, St. Thomas, USVI.

Sample Identification:	Dede	Dench	Devcon 1	Devcon 3	Eglin 1	Eglin 2	Eglin 3	Hartman 2	Hartman 3	Harvey	Leonard	Rodriguez	Rodriguez Replicate
VOLATILE ORGANIC COMPOUNDS													
Methylene chloride	ND	ND	1 ND J	8 ND J	R	5 ND J	10 ND J	1 ND J	3 ND J	150 ND J	ND	1 ND J	2 ND J
Chloroethane	ND	1 J	ND	ND	R	ND	ND	ND	ND	ND	ND	ND	ND
Acetone	R	R	R	R	R	R	22 J	R	R	R	R	R	R
1,2-Dichloroethene	ND	ND	ND	ND	68 J	120 J	52 J	5 J	2	ND	ND	ND	ND
Trichloroethene	ND	ND	ND	ND	10 J	22 J	14	1 J	ND	ND	ND	ND	ND
Tetrachloroethene	ND	ND	ND	ND	32 J	71 J	44 J	7 J	1 J	890	ND	ND	ND
Tentatively Identified VOCs	ND		ND							ND	ND		ND
Propane, 2-methoxy-2-methyl					6 JN								
unknown compound		6 JN		2 JN	3 JN	220 JN	5 JN	3 JN	4 JN			1 JN	
SEMIVOLATILE ORGANIC COMPOUNDS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Tentatively Identified SVOCs		ND		ND		ND	ND	ND	ND	ND	ND	ND	ND
unknown compound	4 JN		4 JN		12 JN								
PESTICIDE / PCBs	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

Analytical results are reported in micrograms per liter (ug/l); equivalent to parts per billion.

VOCs Volatile organic compounds.

SVOCs Semivolatile organic compounds.

ND Compound not detected.

J Estimated concentration. For tentatively identified compounds, all concentrations are estimated. For other compounds, this data qualifier indicates that either the compound is present but at concentrations lower than the contract required quantitation limit, or that due to quality control problems, the data is provisional and therefore the concentrations are estimated.

R Data rejected.

N Compound is a tentatively identified compound.

TUT 001 1555

Table 1. Summary of Organics Analysis of Ground-Water Samples Collected from Water Supply Wells, September 1990 Sampling Event, Tutu Well Site, St. Thomas, USVI.

Sample Identification:	Smith	Four Winds 2	Four Winds 2 Rep.	Trip Blank 9/24	Trip Blank 9/25	Trip Blank 9/26	Steele	Dimitri	Bryan
VOLATILE ORGANIC COMPOUNDS									
Methylene chloride	12 ND J	14 ND J	10 ND J	25 J	34 J	24 J	140 ND J	2 ND J	2 ND J
Chloromethane	ND	ND	ND	ND	ND	ND	ND	ND	ND
Acetone	25 ND J	R	R	12 J	42 J	4 J	R	R	R
1,2-Dichloroethene	58	75 J	61 J	ND	ND	ND	120	ND	ND
Trichloroethene	20	6 J	4 J	ND	ND	ND	48	ND	ND
Tetrachloroethene	330 J	25 J	18 J	ND	ND	ND	130 J	ND	ND
Total Xylenes	ND	ND	ND	8	7	ND	ND	ND	ND
Toluene	ND	ND	ND	ND	1	ND	ND	ND	ND
Tentatively Indentified VOCs								ND	ND
1,1,2-Trichloro-1,2,2-trifluoroethane				5 JN	3 JN	7 JN			
Propane, 2-methoxy-2-methyl	88 JN		7.5 JN				42 JN		
Dichlorobenzene isomer					1 JN				
unknown compound		15 JN			7 JN				
SEMIVOLATILE ORGANIC COMPOUNDS	ND	ND	ND	NA	NA	NA	ND	ND	ND
Tentatively Identified SVOCs	ND	ND	ND	NA	NA	NA	ND	ND	ND
PESTICIDE / PCBs	ND	ND	ND	NA	NA	NA	ND	ND	ND

Analytical results are reported in micrograms per liter (ug/l); equivalent to parts per billion.

VOCs Volatile organic compounds.

SVOCs Semivolatile organic compounds.

ND Compound not detected.

NA Compound not analyzed.

J Estimated concentration. For tentatively identified compounds, all concentrations are estimated. For other compounds, this data qualifier indicates that either the compound is present but at concentrations lower than the contract required quantitation limit, or that due to quality control problems, the data is provisional and therefore the concentrations are estimated.

Rep. Replicate.

R Data rejected.

N Compound is a tentatively identified compound.

Table 1. Summary of Organics Analysis of Ground-Water Samples Collected from Water Supply Wells, September 1990 Sampling Event, Tutu Well Site, St. Thomas, USVI.

Sample Identification:	Trip Blank 9/27	Trip Blank 10/1	Trip Blank 10/2	Trip Blank 10/3	Ramsey	Laplace	Gassett (Hartman 1)	Matthias	VIHA 1	VIHA 3	Tillett	Tillett Replicate
VOLATILE ORGANIC COMPOUNDS												
Methylene chloride	16 J	13 J	14 J	ND	17 ND J	R	1 ND J	9 ND J	2 ND J	2 ND J	R	44 ND J
Acetone	R	6 J	7 J	R	R	R	R	R	R	R	ND	52 ND J
1,2-Dichloroethene	ND	ND	ND	ND	ND	140 J	ND	22	6 J	ND	280 J	270 J
Trichloroethene	ND	ND	ND	ND	ND	24 J	ND	11	ND	ND	56 J	47 J
Tetrachloroethene	ND	ND	ND	ND	3 J	98 J	ND	120 J	5 J	ND	120 J	98 J
Vinyl chloride	ND	ND	ND	ND	ND	R	ND	ND	ND	ND	17 J	12 J
Benzene	ND	ND	ND	ND	ND	R	ND	ND	ND	ND	32 J	26 J
Chloroform	ND	ND	ND	ND	ND	R	ND	ND	ND	3	R	R
Tentatively Indentified VOCs	ND											
1,1,2-Trichloro-1,2,2-trifluoroethane			3 JN						ND			
Propane, 2-methoxy-2-methyl				1.5 JN		130 JN					240 JN	270 JN
Aliphatic hydrocarbon											6 JN	
C3-Benzene isomer											6 JN	
C5H12 isomer											121 JN	230 JN
C6H12 isomer											35 JN	
C9H12 isomer											6 JN	
unknown compound		1 JN			2 JN		2 JN	16 JN		1 JN	21 JN	39 JN

Analytical results are reported in micrograms per liter (ug/l); equivalent to parts per billion.

VOCs Volatile organic compounds.

ND Compound not detected.

NA Compound not analyzed.

J Estimated concentration. For tentatively identified compounds, all concentrations are estimated. For other compounds, this data qualifier indicates that either the compound is present but at concentrations lower than the contract required quantitation limit, or that due to quality control problems, the data is provisional and therefore the concentrations are estimated.

R Data rejected.

N Compound is a tentatively identified compound.

TUT 001 1357

Table 1. Summary of Organics Analysis of Ground-Water Samples Collected from Water Supply Wells, September 1990 Sampling Event, Tutu Well Site, St. Thomas, USVI.

Sample Identification:	Trip Blank 9/27	Trip Blank 10/1	Trip Blank 10/2	Trip Blank 10/3	Ramsey	Laplace	Gassett (Hartman 1)	Matthias	VIHA 1	VIHA 3	Tillet	Tillett Replicate
SEMIVOLATILE ORGANIC COMPOUNDS	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND
Tentatively Identified SVOCs	NA	NA	NA	NA	ND				ND	ND		
Benzene, pentachlorofluoro												4 JN
unknown compound						42 JN	12 JN	4 JN			37 JN	82 JN
PESTICIDE / PCBs	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND

Analytical results are reported in micrograms per liter (ug/l); equivalent to parts per billion.

SVOCs Semivolatile organic compounds.

ND Compound not detected.

NA Compound not analyzed.

J Estimated concentration. For tentatively identified compounds, all concentrations are estimated. For other compounds, this data qualifier indicates that either the compound is present but at concentrations lower than the contract required quantitation limit, or that due to quality control problems, the data is provisional and therefore the concentrations are estimated.

N Compound is a tentatively identified compound.

TUT 001 1558

Table 2. Summary of Inorganics Analysis of Ground-Water Samples Collected from Water Supply Wells, September 1990 Sampling Event, Tutu Well Site, St. Thomas, USVI.

Sample Identification:	Dede	Deech	Devcon 1	Devcon 3	Eglin 1	Eglin 2	Eglin 3	Gassett (Hartman 1)	Hartman 2	Hartman 3
INORGANIC ANALYTES										
Aluminum	136 BJ	278 J	139 BJ	411	149 B	69 BJ	156 BJ	526	269 J	278
Antimony	R	R	R	R	ND	R	R	ND	R	R
Arsenic	ND	ND	ND	ND	ND	ND	3 ND	ND	ND	ND
Barium	8 B	19 B	21 B	15 B	ND	23 B	57 B	7 B	12 B	15 B
Beryllium	3 BJ	4 BJ	5 BJ	4 BJ	4 B	3 BJ	4 BJ	4 B	3 BJ	4 BJ
Cadmium	5	3 B	ND	ND	ND	11	ND	ND	8	ND
Calcium	23500	24200	41600	43800	35300	47900	81400	31200	38100	41100
Chromium (Total)	16 J	22 J	4 ND J	4 ND J	12	17 J	10 J	4 B	11 J	11 J
Cobalt	60 J	44 BJ	ND	59 J	ND	32 BJ	30 BJ	ND	30 BJ	25 BJ
Copper	32	52	ND	53	14 BJ	36	9 B	10 BJ	34	30
Iron	43 B	163	34 B	40 B	20 ND J	86 B	56 B	418J	23 B	31 B
Lead	3.7 J	7.8 J	8.2 J	11.8 J	2 BJ	2.1 BJ	1 ND J	1.4 BJ	10.4 J	1.8 BJ
Magnesium	25600	25000	39500	41000	28700	35400	54600	26300	33400	28300
Manganese	201	545	241	91	56	8 B	53	853	ND	3 B
Mercury	ND	ND	ND	ND	R	ND	ND	R	ND	ND
Nickel	ND	73	13 B	41	26 BJ	67	24 B	ND	95	52
Potassium	2000 B	1690 B	2970 B	2050 B	920 B	1620 B	2250 B	880 B	1040 B	1690 B
Selenium	1 ND J	1 ND J	1.6 BJ	1.4 BJ	10 ND J	1.2 BJ	1.2 BJ	10 ND J	1.6 BJ	1 ND J
Silver	7 ND J	7 ND J	7 ND J	7 ND J	ND	7 ND J	18 J	7 B	7 ND J	7 ND J
Sodium	324000	328000	330000	384000	190000	247000	398000	236000	285000	217000
Thallium	R	R	R	R	R	R	R	R	R	R
Vanadium	21 B	28 B	32 B	20 B	34 BJ	47 B	9 B	26 BJ	52	124
Zinc	12 BJ	41 J	6 BJ	6 BJ	13 BJ	75 J	49 J	5 BJ	9 BJ	13 BJ
Cyanide	ND	6.8 B	5 ND J	5 ND J	ND	6.8 B	7.4 B	ND	ND	ND

Analytical results are reported in micrograms per liter (ug/l); equivalent to parts per billion.

ND Compound not detected.

B Reported value obtained from a reading that was less than the contract required detection limit but greater than the instrument detection limit.

J Estimated concentration.

R Data rejected.

Table 2. Summary of Inorganics Analysis of Ground-Water Samples Collected from Water Supply Wells, September 1990 Sampling Event, Tutu Well Site, St. Thomas, USVI.

Sample Identification:	Smith	Four Winds 2	Four Winds 2 Rep.	Steele	Dimitri	Bryan	Leonard	Rodriguez	Rodriguez Rep.
INORGANIC ANALYTES									
Aluminum	234 J	162 BJ	304 J	492 J	163 BJ	149 B	93 BJ	58 BJ	431
Antimony	R	R	R	R	52 ND J	ND	R	R	R
Arsenic	ND	ND	ND	ND	3 ND J	3 ND J	ND	ND	ND
Barium	15 B	15 B	11 B	27 B	3 ND J	ND	11 B	8 B	ND
Beryllium	3 BJ	3 BJ	4 BJ	3 BJ	4 BJ	3 B	3 BJ	3 BJ	3 BJ
Cadmium	ND	5	6	4 B	3 BJ	4 BJ	ND	ND	ND
Calcium	50200	46100	54300	44000	37500 J	54300	38300	40000	47400
Chromium (Total)	14 J	32 J	14 J	9 BJ	4 BJ	7 B	15 J	14 J	40 J
Cobalt	ND	29 BJ	43 BJ	55 J	18 ND J	ND	37 BJ	34 BJ	39 BJ
Copper	13 B	37	5 B	21 B	17 BJ	17 BJ	31	22 B	29
Iron	158	55 B	57 B	26 B	115 J	63 BJ	37 BJ	50 B	45 B
Lead	10.9 J	8 J	8.7 J	13.2 J	2.6 BJ	4.6 J	1.8 BJ	2 BJ	12.1 J
Magnesium	45500	34000	38800	40500	27800 J	49100	24400	38700	41400
Manganese	41	28	31	23	7 BJ	2 B	ND	122	129
Mercury	ND	ND	ND	ND	R	R	ND	ND	ND
Nickel	57	36 B	44	45	14 BJ	ND	ND	22 B	39 B
Potassium	1540 B	2190 B	2060 B	1180 B	2000 BJ	1000 B	1210 B	1610 B	1730 B
Selenium	R	1.2 BJ	1 ND J	1.4 BJ	10 ND J	2 ND J	1.4 BJ	1 ND J	1 ND J
Silver	7 ND J	7 ND J	7 ND J	7 ND J	7 ND J	ND	17 J	7 ND J	7 ND J
Sodium	410000	215000	249000	313000	328000 J	283000	318000	281000	296000
Thallium	R	R	R	R	R	R	R	R	R
Vanadium	ND	75	83	27 B	92 J	37 BJ	135	19 B	8 B
Zinc	179 J	85 J	88J	12 BJ	4 ND J	30	7 BJ	17 BJ	16 BJ
Cyanide	ND	8.5 B	ND	6.3 B	5 ND J	ND	6.3 B	21 J	5 ND J

Analytical results are reported in micrograms per liter (ug/l); equivalent to parts per billion.

ND Compound not detected.

B Reported value obtained from a reading that was less than the contract required detection limit but greater than the instrument detection limit.

Rep. Replicate.

J Estimated concentration.

R Data rejected.

N-16

Table 2. Summary of Inorganics Analysis of Ground-Water Samples Collected from Water Supply Wells, September 1990 Sampling Event, Tutu Well Site, St. Thomas, USVI.

Sample Identification:	VIHA 1	VIHA 3	Laplace	Matthias	Ramsey	Harvey	Tillett	Tillett Replicate
INORGANIC ANALYTES								
Aluminum	154 B	182 BJ	146 B	227	187 B	1280	153 BJ	159 B
Antimony	54 BJ	R	57 B	ND	ND	R	52 ND J	ND
Arsenic	ND	ND	ND	3 ND J	3 ND J	ND	3 ND J	4.4 B
Barium	5 B	14 B	ND	6 B	ND	35 B	43 BJ	40 B
Beryllium	3 B	3 BJ	4 B	3 B	3 B	3 BJ	4 BJ	4 B
Cadmium	4 BJ	ND	4 BJ	ND	3 BJ	ND	4 BJ	3 BJ
Calcium	49400	43300	41000	36300	43100	53700	54800J	48600
Chromium (Total)	10	5 BJ	8 B	5 B	11	18 J	8 BJ	7 B
Cobalt	ND	ND	ND	ND	ND	38 BJ	18 ND J	ND
Copper	10 B	29	49 J	18 BJ	15 BJ	59	48 J	32 J
Iron	29 BJ	149	55 BJ	20 ND J	20 BJ	3360	953 J	2660 J
Lead	9 J	3.7 J	2.3 BJ	1.8 BJ	2.6 BJ	32.6 J	1.5 BJ	8.5 J
Magnesium	33900	28800	32600	34900	34400	46200	38300 J	34500
Manganese	ND	11 B	2 B	ND	ND	191	1260 J	1100
Mercury	R	ND	R	R	R	ND	R	R
Nickel	15 B	43	18 BJ	20 BJ	21 BJ	58	33 BJ	15 BJ
Potassium	2000 B	1030 B	1140 B	1410 B	1140 B	2000 B	760 BJ	1190 B
Selenium	1.4 BJ	1.5 BJ	10 ND J	2 ND J	10 ND J	1.2 BJ	10 ND J	10 ND J
Silver	16 J	7 ND J	ND	ND	ND	11 J	7 ND J	ND
Sodium	252000	162000	250000	379000	209000	233000	192000 J	169000
Thallium	R	R	R	R	R	R	R	R
Vanadium	67J	33 B	39 BJ	21 BJ	43 BJ	59	25 BJ	50J
Zinc	16 B	17 BJ	13 BJ	4 BJ	7 BJ	248 J	162 J	124 J
Cyanide	9.7 B	8 BJ	ND	ND	ND	7.4 B	52 ND J	ND

Analytical results are reported in micrograms per liter (ug/l); equivalent to parts per billion.

ND Compound not detected.

B Reported value obtained from a reading that was less than the contract required detection limit but greater than the instrument detection limit.

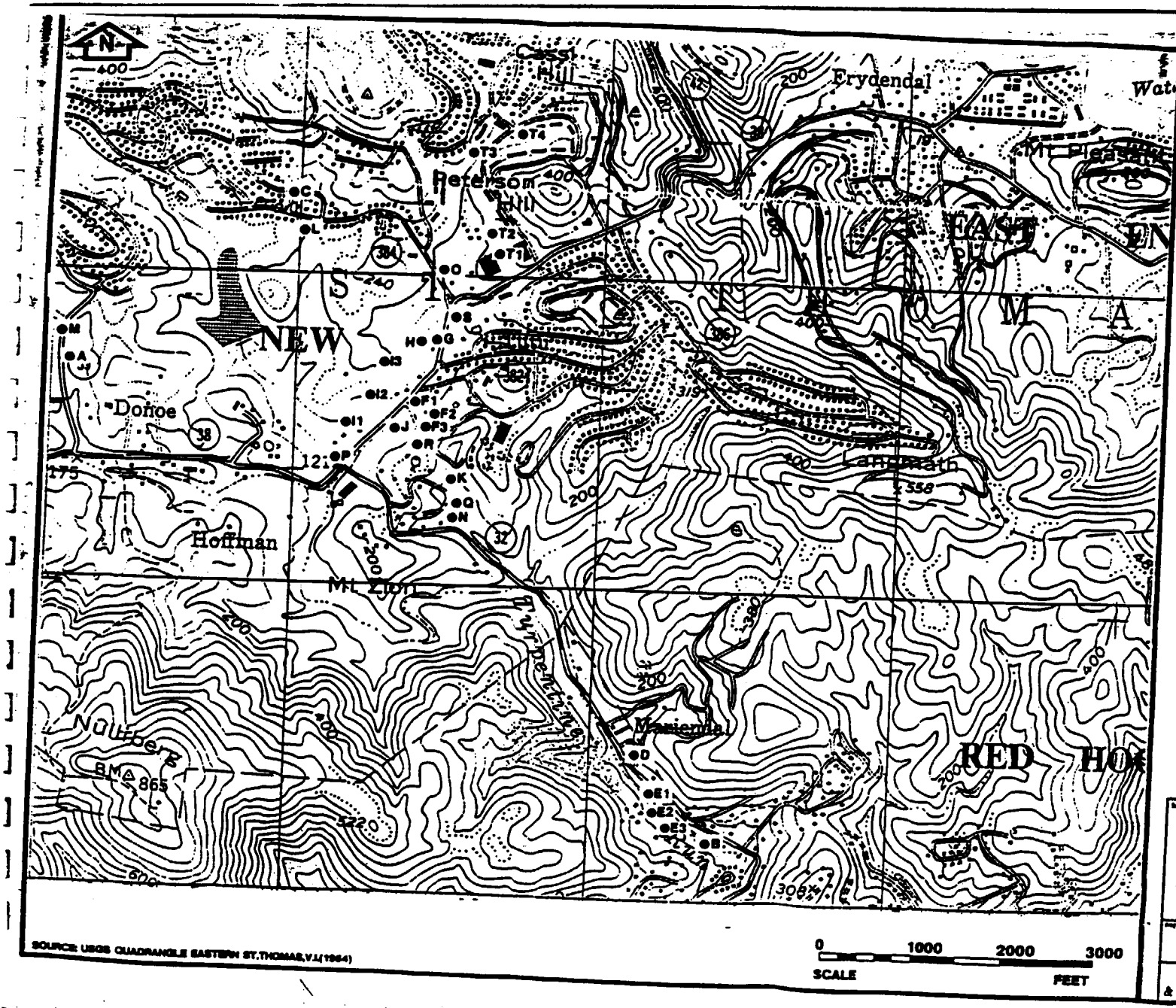
J Estimated concentration.

R Data rejected.

Table 3. Proposed Sampling Effort for the 2nd Sampling Event (February 1991), Tutu Wells Site, St. Thomas, USVI.

Well	Proposed Analytes
Bryan	thallium, mercury
Dede	antimony, thallium
Dimitri	thallium, mercury
Dench	VOCs, antimony, thallium
Devcon 1	antimony, thallium
Devcon 3	antimony, thallium
Eglin 1	VOCs, thallium, mercury
Eglin 2	VOCs, antimony, thallium
Eglin 3	VOCs, antimony, thallium
Four Winds No. 1	VOCs
Four Winds No. 2	VOCs, antimony, thallium
Gassett	VOCs, thallium, mercury
Hartman 2	VOCs, antimony, thallium
Hartman 3	VOCs, antimony, thallium
Harvey	VOCs, antimony, thallium
LaPlace	VOCs, thallium, mercury
Leonard	antimony, thallium
Matthias	VOCs, thallium, mercury
Ramsey	VOCs, thallium, mercury
Rodriguez	antimony, thallium
Smith	VOCs, antimony, thallium, selenium
Steele	VOCs, antimony, thallium
Tillett	VOCs, thallium, mercury
VIHA 1	VOCs, thallium mercury
VIHA 3	antimony, thallium

MF:gv
#PR00801/1stqtr.rpt



LEGEND

- RESIDENTIAL WELL
- A BRYAN
- B DEDE
- C DEMITRI
- D DENCH
- E1 DEVCON 1
- E2 DEVCON 2 (ALTERNATE)
- E3 DEVCON 3
- F1 EGLIN 1
- F2 EGLIN 2
- F3 EGLIN 3
- G FOUR WINDS No.1
- H FOUR WINDS No.2
- I1 GASSETT
- I2 HARTMAN CRUSHER
- I3 HARTMAN ESTATE
- J HARVEY
- K LaPLACE
- L LEONARD
- M LOCKHART (ALTERNATE)
- N MATTHIAS
- O RAMSEY
- P RODRIGUES
- Q SMITH
- R STEELE
- S TILLETT
- T1 VIHA No.1
- T2 VIHA No.2 (ALTERNATE)
- T3 VIHA No.3
- T4 VIHA No.4 (ALTERNATE)

WELL SAMPLING LOCATIONS,
TUTU WELLS SITE SAMPLING
ANALYSIS, AND MONITORING PLAN,
ST. THOMAS, USVI

TEIC

Geraghty & Miller, Inc.			
	PAGULAY	BROWN	1
	PAOLA	5/99	
	PAGULAY		

TUT 001 1363

DATA VALIDATION SUMMARY REPORT

for the

TUTU WELLS SITE

September 1990 Quarterly Sampling

USEPA REGION II
Standard Operating Procedures HW-2 and HW-6
for the
Contract Laboratory Program
Organic and Inorganic
Data Review

Sample Delivery Group 900731 (Dede)

January 1991

Prepared for

Tutu Environmental Investigation Committee

Geraghty & Miller, Inc.
International Group
290 Vincent Avenue
Hackensack, New Jersey 07601

TUT 001 1364

SOP NO. HW-6
Revision #7

CLP ORGANICS DATA REVIEW AND PRELIMINARY REVIEW

BY: _____ Date: 3-22-90
Leon Lazarus, Environmental Scientist
Toxic and Hazardous Waste Section

CONCURRED BY: _____ Date: 3/27/90
Louis Bevilacqua, Chief
Toxic and Hazardous Waste Section

APPROVED BY: _____ Date: 3/26/90
Gerard F. McKenna, Chief
Monitoring Management Branch

INTRODUCTION TO DATA VALIDATION

.0 Scope

1.1 This procedure is applicable to organic data obtained from contractor laboratories working for the Contract Laboratory Program (CLP).

1.2 The data validation is based upon analytical and quality assurance requirements specified in the Statement of Work (SOW).

.0 Responsibilities

Data reviewers will complete the following tasks as assigned by the Data Review Coordinator:

2.1 Data Assessment - The reviewer must answer every question on the checklist. All response shall be in ink.

2.2 Data Assessment Narrative (Attachment 1) - Data reviewer is required to use these forms and must match the action in the narrative with the action taken on the Form I(s).

2.3 Rejection Summary Form (Attachment 2) - Fill in the total number of analytes measured by different analyses and the number of analytes rejected or flagged as estimated due to corresponding quality control criteria. Place an "X" in the boxes where analyses were not performed or criteria do not apply.

2.4 Organic Regional Data Assessment - Data reviewer is also required to fill out Organic Regional Data Assessment Form (Attachment 3).

2.5 Telephone Record Log - The data reviewer should enter the bare facts of inquiry before initiating any authorized telephone conversation with a CLP laboratory. After the case review has been completed, mail the white copy of the Telephone Record Log to the laboratory and the pink copy to SMO. File the yellow copy in the Telephone Record Log folder and attach a photocopy of the Telephone Record Log to the completed Data Assessment Narrative.

2.6 Forwarded Paperwork - Upon completion of the review, the following are to be forwarded to the Regional Sample Control Center (RSCC) located in the Surveillance and Monitoring Branch:

a. data package
b. completed assessment checklist
c. SMO Contract Compliance Screening (CCS)

Forward four (4) copies of the completed Data Assessment Narrative along with four (4) copies of the Organic Data Assessment Form: one each for the appropriate Regional DPO, the Sample Management Office (SMO), and to the last two addresses of the Data Reviewers Mailing List.

2.7 Filed Paperwork - Upon completion of the review, the following are to be filed within the Monitoring and Management Branch (MMB) files:

a. Telephone record Log (copy)
b. Record of Communication (original)
c. Rejection Summary Form

1.0 Rejection of Data - All values determined to be unacceptable on the Organic Analysis Dat Sheet (Form I) must be flagged with an "R". As soon as review criteria causes data to b rejected, that data can be eliminated from any further review or consideration.

2.0 Acceptance Criteria - In order that the reviews be consistent among reviewers, this Standard Operating Procedure (SOP) should be used. Additional guidance can be found in the Functional Guidelines.

3.0 SMO Contract Compliance Screening (CCS) - This is intended to aid the reviewer in locating any problems, both corrected and uncorrected. However, the validation should be carried out even if CCS is not present. Resubmittals received from the laboratory in response to CCS must be used by the reviewer.

PACKAGE COMPLETENESS AND DELIVERABLES

CASE NUMBER: 900731

LAB: CEIMIC CORP

SITE: TUTU WELLS, ST. THOMAS

.0 Data Completeness and Deliverables	YES	NO	N/A
1.1 Have any missing deliverables been received and added to the data package.	☑		
ACTION: Call lab for explanation / resubmittal of any missing deliverables. If lab cannot provide them, note the effect on review of the package under the "Contract Problems/Non-compliance" section of reviewer narrative.			
1.2 Was SMO CCS checklist included with package?	☐		✓
.0 Cover Letter/Case Narrative			
2.1 Is the Narrative or Cover Letter present?	☑		
2.2 Are Case Number and/or SAS number contained in the Narrative or Cover Letter?	☑		

.0 Data Validation Checklist

The following checklist is divided into three parts. Part A is filled out if the data package contains any VOA analyses, Part B for any BNA analyses and Part C for Pesticide/PCBs.

Does this package contain:		
VOA data?	✓	
BNA data?	✓	
Pesticide/PCB data?	✓	

ACTION: Complete corresponding parts of checklist.

	YES	NO	N/A

PART A: VOA ANALYSES

.0 Traffic Reports and Laboratory Narrative

1.1 Are the Traffic Report Forms present for all samples? ☑

ACTION: If no, contact lab for replacement of missing or illegible copies.

1.2 Do the Traffic Reports or Lab Narrative indicate any problems with sample receipt, condition of samples, analytical problems or special notations affecting the quality of the data? ☑

ACTION: Use professional judgement to evaluate the effect on the quality of the data.

ACTION: If any sample analyzed as a soil contains more than 50% water, all data should be flagged as estimated (J).

ACTION: If both VOA vials for a sample have air bubbles, flag all positive results "J" and all non-detects "R".

.0 Holding Times

2.1 Have any VOA holding times, determined from date of collection to date of analysis, been exceeded? ☑

If unpreserved, aqueous aromatic volatiles must be analyzed within 7 days of collection and non-aromatic volatiles must be analyzed within 14 days. If preserved with hydrochloric acid and stored at 4°C, then both aromatic and non-aromatic volatiles must be analyzed within 14 days. If uncertain about preservation, contact the sampler to determine whether the samples were preserved.

A ten-day holding time for soil samples is recommended.

Table of Holding Time Violations

Sample	Sample Matrix	Preserved ?	(See Traffic Report) Date Sampled	Date Lab Received	Date Analyzed

ACTION: If holding times are exceeded, flag all positive results as estimated ("J") and sample quantitation limits as estimated ("UJ"), and document in the narrative that holding times were exceeded.

	YES	NO	N/A

If analyses were done more than 14 days beyond holding time, either on the first analysis or upon reanalysis, the reviewer must use professional judgement to determine the reliability of the data and the effects of additional storage on the sample results. The reviewer may determine that non-detect data are unusable ("R").

3.0 Surrogate Recovery (Form II)

3.1 Are the VOA Surrogate Recovery Summaries (Form II) present for each of the following matrices:

a. Low Water	☑	—	—
b. Med Water	☐	—	✓
c. Low Soil	☐	—	✓
d. Med Soil	☐	—	✓

3.2 Are all the VOA samples listed on the appropriate Surrogate Recovery Summaries for each of the following matrices:

a. Low Water	☑	—	—
b. Med Water	☐	—	✓
c. Low Soil	☐	—	✓
d. Med Soil	☐	—	✓

ACTION: Call lab for explanation / resubmittals. If missing deliverables are unavailable, document effect on data under "Conclusions" section of reviewer narrative.

3.3 Were outliers marked correctly with an asterisk?	☑	—	—

ACTION: Circle all outliers in red.

3.4 Was one or more VOA surrogate recovery outside of contract specifications for any sample or method blank?	✓	☐	—
If yes, were samples reanalyzed?	☐	✓	—
Were method blanks reanalyzed?	☐	✓	—

ACTION: If surrogate recoveries are > 10% but all do not meet SOW specifications:

1. Flag all positive results as estimated ("J").
2. Flag all non-detects as estimated detection limits ("UJ").

	YES	NO	N/A
If any surrogate has a recovery of <10% :			
1. Flag all positive results as estimated ("J").			
2. Flag all non-detects as unusable ("R").			
Professional judgement should be used to qualify data that have method blank surrogate recoveries out of specification in both original and re-analyses. Check the internal standard areas.			
3.5 Are there any transcription/calculation errors between raw data and Form II?		✓	
ACTION: If large errors exist, call lab for explanation / resubmittal, make any necessary corrections and note errors under "Conclusions".			
.0 Matrix Spikes (Form III)			
4.1 Is the Matrix Spike Duplicate/Recovery Form (Form III) present?	✓		
4.2 Were matrix spikes analyzed at the required frequency for each of the following matrices:			
a. Low Water	✓		
b. Med Water			✓
c. Low Soil			✓
d. Med Soil			✓
ACTION: If any matrix spike data are missing, take the action specified in 3.2 above.			

4.3 How many VOA spike recoveries are outside QC limits?

Water	Soils
2 out of 10	N/A out of 10

4.4 How many RPD's for matrix spike and matrix spike duplicate recoveries are outside QC limits?

Water	Soils
0 out of 5	N/A out of 5

ACTION: If MS and MSD both have less than 10% recovery for an analyte, negative results for that analyte should be rejected, and positive results should be flagged "J". The above applies only to the sample used for the MS/MSD analysis. Use professional judgement in applying this criterion to other samples in the package.

	YES	NO	N/A
5.0 Blanks (Form IV)			
5.1 Is the Method Blank Summary (Form IV) present?	☑		
5.2 Frequency of Analysis: for the analysis of VOA TCL compounds, has a reagent/method blank been analyzed for each set of samples or every 20 samples of similar matrix (low water, med water, low soil, medium soil), whichever is more frequent?	☑		
5.3 Has a VOA instrument blank been analyzed at least once every twelve hours for each GC/MS system used?	☑		
ACTION: If any method blank data are missing, call lab for explanation / resubmittal. If not available, reject all associated positive data ("R").			
5.4 Chromatography: review the blank raw data - chromatograms (RICs), quant reports or data system printouts and spectra.			
Is the chromatographic performance (baseline stability) for each instrument acceptable for VOAs?	☑		
ACTION: Use professional judgement to determine the effect on the data.			
6.0 Contamination			
NOTE: "Water blanks" and "distilled water blanks" are validated like any other sample and are not used to qualify data. Do not confuse them with the other QC blanks discussed below.			
6.1 Do any method/instrument/reagent blanks have positive results (TCL and/or TIC) for VOAs? When applied as described below, the contaminant concentration in these blanks are multiplied by the sample Dilution Factor.	☑	☐	
6.2 Do any field/trip/rinse blanks have positive VOA results (TCL and/or TIC)?	☑	☐	
ACTION: Prepare a list of the samples associated with each of the contaminated blanks. (Attach a separate sheet.)			
NOTE: Only field/rinse blanks taken the same day as the samples are used to qualify data. Trip blanks are used to qualify only those samples with which they were shipped. Blanks may not be qualified because of contamination in another blank. Blanks may be qualified for surrogate, spectral, tuning or calibration QC problems.			

YES NO N/A

ACTION: Follow the directions in the table below to qualify TCL results due to contamination. Use the largest value from all the associated blanks.

	Sample conc > CRQL but < 10x blank	Sample conc < CRQL & is < 10x blank value	Sample conc > CRQL value & >10x blank value
Methylene chloride Acetone Toluene 2-butanone	Flag sample result with a 'U'; cross out 'B' flag	Reject sample result and report CRQL; cross out 'B' flag	No qualification is needed

	Sample conc > CRQL but < 5x blank	Sample conc < CRQL & is < 5x blank value	Sample conc > CRQL value & > 5 blank value
Other Contaminants	Flag sample result with a 'U'; cross out 'B' flag	Reject sample result and report CRQL; cross out 'B' flag	No qualification is needed

ACTION: For TIC compounds, if the concentration in the sample is less than five times the concentration in the most contaminated associated blank, flag the sample data "R" (unusable).

6.3 Are there field/rinse/equipment blanks associated with every sample? [ ] ___ [✓]

ACTION: For low level samples, note in data assessment that there is no associated field/rinse/equipment blank. Exception: samples taken from a drinking water tap do not have associated field blanks.

.0 GC/MS Tuning and Mass Calibration (Form V)

7.1 Are the GC/MS Tuning and Mass Calibration Forms (Form V) present for Bromofluorobenzene (BFB)? [✓] ___ ___

7.2 Are the enhanced bar graph spectrum and mass/charge (m/z) listing for the BFB provided for each twelve hour shift? [✓] ___ ___

7.3 Has a tuning performance compound been analyzed for every twelve hours of sample analysis per instrument? [✓] ___ ___

ACTION: If any tuning data are missing, take action specified in 3.2 above.

ACTION: List date, time, instrument ID, and sample analyses for which no associated GC/MS tuning data are available.

			YES	NO	N/A
DATE	TIME	INSTRUMENT	SAMPLE NUMBERS		

ACTION: If lab cannot provide missing data, reject ("R") all data generated outside an acceptable twelve hour calibration interval.

7.4 Have the ion abundance criteria been met for each instrument used? ☑ — —

ACTION: List all data which do not meet ion abundance criteria (attach a separate sheet).

ACTION: If tuning calibration is in error, flag all associated sample data as unusable ("R"). However, if expanded ion criteria are met (See 1988 Functional Guidelines), the data reviewer may accept data with appropriate qualifiers.

7.5 Are there any transcription / calculation errors between mass lists and Form Vs? (Check at least two values but if errors are found, check more.) — ☑ —

7.6 Have the appropriate number of significant figures (two) been reported? (Check at least two values, but if errors are found check more values.) ☑ — —

ACTION: If large errors exist, call lab for explaration / resubmittal, make necessary corrections and note errors under "Conclusions".

7.7 Are the spectra of the mass calibration compound acceptable? ☑ — —

ACTION: Use professional judgement to determine whether associated data should be accepted, qualified, or rejected.

3.0 Target Compound List (TCL) Analytes

8.1 Are the Organic Analysis Data Sheets (Form I VOA) present with required header information on each page, for each of the following:

a. Samples and/or fractions as appropriate ☑ — —

b. Matrix spikes and matrix spike duplicates ☑ — —

c. Blanks ☑ — —

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	YES	NO	N/A
8.2 Are the VOA Reconstructed Ion Chromatograms, the mass spectra for the identified compounds, and the data system printouts (Quant Reports) included in the sample package for each of the following?			
a. Samples and/or fractions as appropriate	☑	—	—
b. Matrix spikes and matrix spike duplicates (Mass spectra not required)	☑	—	—
c. Blanks	☑	—	—
ACTION: If any data are missing, take action specified in 3.2 above.			
8.3 Are the response factors shown in the Quant Report?	☐	☑	—
8.4 Is chromatographic performance acceptable with respect to:			
Baseline stability	☑	—	—
Resolution	☑	—	—
Peak shape	☑	—	—
Full-scale graph (attenuation)	☑	—	—
Other:_____	☐	—	☑
ACTION: Use professional judgement to determine the acceptability of the data.			
8.5 Are the lab-generated standard mass spectra of the identified VOA compounds present for each sample?	☑	—	—
ACTION: If any mass spectra are missing, take action specified in 3.2 above. If Lab does not generate their own standard spectra, make note in "Contract Problems/Non-compliance".			
8.6 Is the RRT of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?	☑	—	—
8.7 Are all ions present in the standard mass spectrum at a relative intensity greater than 10% also present in the sample mass spectrum?	☑	—	—
8.8 Do sample and standard relative ion intensities agree within 20%?	☑	—	—
ACTION: Use professional judgement to determine acceptability of data. If it is determined that incorrect identifications were made, all such data should be rejected, flagged "N" (presumptive evidence of the presence of the compound) or changed to not detected (at the calculated detection limit).			

	YES	NO	N/A
9.0 Tentatively Identified Compounds (TIC)			
9.1 Are all Tentatively Identified Compound Forms (Form I, Part B) present; and do listed TICs include scan number or retention time, estimated concentration and "J" qualifier?	☑		
9.2 Are the mass spectra for the tentatively identified compounds and associated "best match" spectra included in the sample package for each of the following:			
a. Samples and/or fractions as appropriate	☑		
b. Blanks	☑		
ACTION: If any TIC data are missing, take action specified in 3.2 above.			
ACTION: Add "J" qualifier if missing and "N" qualifier to all identified TIC compounds on Form I, Part B.			
9.3 Are any TCL compounds (from any fraction) listed as TIC compounds (example: 1,2-dimethylbenzene is xylene—a VOA TCL—and should not be reported as a TIC)?		☑	
ACTION: Flag with "R" any TCL compound listed as a TIC.			
9.4 Are all ions present in the reference mass spectrum with a relative intensity greater than 10% also present in the sample mass spectrum?	☑		
9.5 Do TIC and "best match" standard relative ion intensities agree within 20%?	☑		
ACTION: Use professional judgement to determine acceptability of TIC identifications. If it is determined that an incorrect identification was made, change identification to "unknown" or to some less specific identification (example: "Cl substituted benzene") as appropriate.			
10.0 Compound Quantitation and Reported Detection Limits			
10.1 Are there any transcription / calculation errors in Form I results? Check at least two positive values. Verify that the correct internal standard, quantitation ion, and RRF were used to calculate Form I result. Were any errors found?		☑	
10.2 Are the CRQLs adjusted to reflect sample dilutions and, for soils, sample moisture?	☑		

	YES	NO	N/A

ACTION: If errors are large, call lab for explanation / resubmittal, make any necessary corrections and note errors under "Conclusions".

ACTION: When a sample is analyzed at more than one dilution, the lowest CRQLs are used (unless a QC exceedance dictates the use of the higher CRQL data from the diluted sample analysis). Replace concentrations that exceed the calibration range in the original analysis by crossing out the "E" value on the original Form I and substituting it with data from the analysis of diluted sample. Specify which Form I is to be used, then draw a red "X" across the entire page of all Form I's that should not be used, including any in the summary package.

11.0 Standards Data (GC/MS)

11.1 Are the Reconstructed Ion Chromatograms, and data system printouts (Quant. Reports) present for initial and continuing calibration? [✓] — —

ACTION: If any calibration standard data are missing, take action specified in 3.2 above.

12.0 GC/MS Initial Calibration (Form VI)

12.1 Are the Initial Calibration Forms (Form VI) present and complete for the volatile fraction? [✓] — —

ACTION: If any calibration standard forms are missing, take action specified in 3.2 above.

12.2 Are response factors stable for volatiles over the concentration range of the calibration (RSD <30%)? [ ] ✓ —

ACTION: Circle all outliers in red.

ACTION: When RSD >30%, non-detects may be qualified using professional judgement. Flag all positive results "J". When RSD >90%, flag all non-detects as unusable ("R"). (Region II policy.)

12.3 Do any compounds have an average RRF < 0.05? ✓ [ ] —

ACTION: Circle all outliers in red.

ACTION: If any volatile compound has an average RRF < 0.05, flag positive results for that compound as estimated ("J"), and flag non-detects for that compound as unusable ("R").

	YES	NO	N/A
12.4 Are there any transcription / calculation errors in the reporting of average response factors (RRF) or %RSD? (Check at least two values but if errors are found, check more.)	—	[✓]	—

ACTION: Circle errors in red.

ACTION: If errors are large, call lab for explanation / resubmittal, make any necessary corrections and note errors under "Conclusions".

13.0 GC/MS Continuing Calibration (Form VII)

13.1 Are the Continuing Calibration Forms (Form VII) present and complete for the volatile fraction?	[✓]	—	—
13.2 Has a continuing calibration standard been analyzed for every twelve hours of sample analysis per instrument?	[✓]	—	—

ACTION: List below all sample analyses that were not within twelve hours of the previous continuing calibration analysis.

_____

_____

_____

ACTION: If any forms are missing or no continuing calibration standard has been analyzed within twelve hours of every sample analysis, call lab for explanation / resubmittal. If continuing calibration data are not available, flag all associated sample data as unusable ("R").

13.3 Do any continuing calibration standard compounds have a RRF < 0.05?	✓	[ ]	—

ACTION: Circle all outliers in red.

ACTION: If any volatile compound has a RRF < 0.05, flag positive results for that compound as estimated ("J"), and flag non-detects for that compound as unusable ("R").

13.4 Do any compounds have a % difference between initial and continuing calibration RRF > 25%?	✓	[ ]	—

ACTION: Circle all outliers in red and qualify associated sample data as outlined in the table below:

YES NO N/A

% DIFFERENCE

25-50	50-90	>90
'J' positive results, no action for non detects	'J' positive results, 'UJ' non detects	'J' positive results, "R" non detects

13.5 Are there any transcription / calculation errors in the reporting of average response factors (RRF) or difference (%D) between initial and continuing RRFs? (Check at least two values but if errors are found, check more.) ___ [✓] ___

ACTION: Circle errors in red.

ACTION: If errors are large, call lab for explanation / resubmittal, make any necessary corrections and note errors under "Conclusions".

14.0 Internal Standards (Form VIII)

14.1 Are the internal standard areas (Form VIII) of every sample and blank within the upper and lower limits for each continuing calibration? [✓] ___ ___

ACTION: List all the outliers below.

Sample #	Internal Std	Area	Lower Limit	Upper Limit

(Attach additional sheets if necessary.)

ACTION: If the internal standard area count is outside the upper or lower limit, flag with "J" all positive results and non-detects (U values) quantitated with this internal standard. If extremely low area counts are reported, or if performance exhibits a major abrupt drop off, flag all associated non-detects as unusable ("R").

14.2 Are the retention times of the internal standards within 30 seconds of the associated calibration standard? [✓] ___ ___

ACTION: Professional judgement should be used to qualify data if the retention times differ by more than 30 seconds.

	YES	NO	N/A
15.0 Field Duplicates			
15.1 Were any field duplicates submitted for VOA analysis?	☑	—	—

ACTION: Compare the reported results for field duplicates and calculate the relative percent difference.

ACTION: Any gross variation between field duplicate results must be addressed in the reviewer narrative. However, if large differences exist, identification of field duplicates should be confirmed by contacting the sampler.

	YES	NO	N/A

PART B: BNA ANALYSES

..0 Traffic Reports and Laboratory Narrative

1.1 Are the Traffic Report Forms present for all samples? [✓] ___ ___

ACTION: If no, contact lab for replacement of missing or illegible copies.

1.2 Do the Traffic Reports or Lab Narrative indicate any problems with sample receipt, condition of samples, analytical problems or special notations affecting the quality of the data? ___ [✓] ___

ACTION: Use professional judgement to evaluate the effect on the quality of the data.

ACTION: If any sample analyzed as a soil contains more than 50% water, all data should be flagged as estimated (J).

:.0 Holding Times

2.1 Have any BNA holding times, determined from date of collection to date of extraction, been exceeded? ___ [✓] ___

Samples for BNA analysis, both soils and waters, must be extracted within seven days of the date of collection. Extracts must be analyzed within 40 days of the date of extraction.

Table of Holding Time Violations

Sample	Sample Matrix	Date Sampled	(See Traffic Report) Date Lab Received	Date Extracted	Date Analyzed

ACTION: If holding times are exceeded, flag all positive results as estimated ("J") and sample quantitation limits as estimated ("UJ"), and document in the narrative that holding times were exceeded.

	YES	NO	N/A

If analyses were done more than 14 days beyond holding time, either on the first analysis or upon reanalysis, the reviewer must use professional judgement to determine the reliability of the data and the effects of additional storage on the sample results. The reviewer may determine that non-detect data are unusable ("R").

3.0 Surrogate Recovery (Form II)

3.1 Are the BNA Surrogate Recovery Summaries (Form II) present for each of the following matrices:

a. Low Water	✓	—	—
b. Med Water		—	✓
c. Low Soil		—	✓
d. Med Soil		—	✓

3.2 Are all the BNA samples listed on the appropriate Surrogate Recovery Summaries for each of the following matrices:

a. Low Water	✓	—	—
b. Med Water		—	✓
c. Low Soil		—	✓
d. Med Soil		—	✓

ACTION: Call lab for explanation / resubmittals. If missing deliverables are unavailable, document effect on data under "Conclusions" section of reviewer narrative.

3.3 Were outliers marked correctly with an asterisk?	✓	—	—

ACTION: Circle all outliers in red.

3.4 Were two or more base-neutral OR acid surrogate recoveries out of specification for any sample or method blank?	—	✓	—
If yes, were samples reanalyzed?		—	✓
Were method blanks reanalyzed?		—	✓

ACTION: If all BNA surrogate recoveries are > 10% but two within the base-neutral or acid fraction do not meet SOW specifications, for the affected fraction only (i.e. base-neutral OR acid compounds):

1. Flag all positive results as estimated ("J").
2. Flag all non-detects as estimated detection limits ("UJ").

	YES	NO	N/A
If any base-neutral or acid surrogate has a recovery of <10% : 1. Flag all positive results for that fraction (i.e. all acid or base-neutral compounds) "J". 2. Flag all non-detects for that fraction "R". Professional judgement should be used to qualify data that have method blank surrogate recoveries out of specification in both original and re-analyses. Check the internal standard areas.			
3.5 Are there any transcription/calculation errors between raw data and Form II?	___	[✓]	___
ACTION: If large errors exist, call lab for explanation / resubmittal, make any necessary corrections and note errors under "Conclusions".			
4.0 Matrix Spikes (Form III)			
4.1 Is the Matrix Spike Duplicate/Recovery Form (Form III) present?	[✓]	___	___
4.2 Were matrix spikes analyzed at the required frequency for each of the following matrices:			
a. Low Water	[✓]	___	___
b. Med Water	[ ]	___	✓
c. Low Soil	[ ]	___	✓
d. Med Soil	[ ]	___	✓
ACTION: If any matrix spike data are missing, take the action specified in 3.2 above.			

4.3 How many BNA spike recoveries are outside QC limits?

Water	Soils
0 out of 22	N/A out of 22

4.4 How many RPD's for matrix spike and matrix spike duplicate recoveries are outside QC limits?

Water	Soils
0 out of 11	N/A out of 11

ACTION: If MS and MSD both have less than 10% recovery for an analyte, negative results for that analyte should be rejected, and positive results should be flagged "J". The above applies only to the sample used for MS/MSD analysis. Use professional judgement in applying this criterion to other samples.

	YES	NO	N/A
5.0 Blanks (Form IV)			
5.1 Is the Method Blank Summary (Form IV) present?	[✓]	—	—
5.2 Frequency of Analysis: for the analysis of BNA TCL compounds, has a reagent/method blank been analyzed for each set of samples or every 20 samples of similar matrix (low water, med water, low soil, medium soil), whichever is more frequent?	[✓]	—	—
5.3 Has a BNA instrument blank been analyzed for each GS/MS system used.	[ ]	—	✓
ACTION: If any method blank data are missing, call lab for explanation/resubmittal. If not available, reject all associated positive data ("R").			
5.4 Chromatography: review the blank raw data - chromatograms (RICs), quant reports or data system printouts and spectra.			
Is the chromatographic performance (baseline stability) for each instrument acceptable for VOAs?	[✓]	—	—
ACTION: Use professional judgement to determine the effect on the data.			
6.0 Contamination			
NOTE: "Water blanks" and "distilled water blanks" are validated like any other sample and are not used to qualify data. Do not confuse them with the other QC blanks discussed below.			
6.1 Do any method/instrument/reagent blanks have positive results (TCL and/or TIC) for BNAs? When applied as described below, the contaminant concentration in these blanks are multiplied by the sample Dilution Factor.	—	[✓]	—
6.2 Do any field/rinse blanks have positive BNA results (TCL and/or TIC)?	—	[✓]	—
ACTION: Prepare a list of the samples associated with each of the contaminated blanks. (Attach a separate sheet.)			
NOTE: Only field/rinse blanks taken the same day as the samples are used to qualify data. Blanks may not be qualified because of contamination in another blank. Blanks may be qualified for surrogate, spectral, tuning or calibration QC problems.			

YES NO N/A

ACTION: Follow the directions in the table below to qualify TCL results due to contamination. Use the largest value from all the associated blanks.

	Sample conc > CRQL but < 10x blank	Sample conc < CRQL & is < 10x blank value	Sample conc > CRQL value & >10x blank value
Common Phthalate Esters	Flag sample result with a 'U'; cross out 'B' flag	Reject sample result and report CRQL; cross out 'B' flag	No qualification is needed

	Sample conc > CRQL but < 5x blank	Sample conc < CRQL & is < 5x blank value	Sample conc > CRQL value & > 5 blank value
Other Contaminants	Flag sample result with a 'U'; cross out 'B' flag	Reject sample result and report CRQL; cross out 'B' flag	No qualification is needed

ACTION: For TIC compounds, if the concentration in the sample is less than five times the concentration in the most contaminated associated blank, flag the sample data "R" (unusable).

6.3 Are there field/rinse/equipment blanks associated with every sample? [ ] ___ ✓

ACTION: For low level samples, note in data assessment that there is no associated field/rinse/equipment blank. Exception: samples taken from a drinking water tap do not have associated field blanks.

'.0 GC/MS Tuning and Mass Calibration (Form V)

7.1 Are the GC/MS Tuning and Mass Calibration Forms (Form V) present for Decafluorotriphenylphosphine (DFTPP)? [✓] ___ ___

7.2 Are the enhanced bar graph spectrum and mass/charge (m/z) listing for the DFTPP provided for each twelve hour shift? [✓] ___ ___

7.3 Has a tuning performance compound been analyzed for every twelve hours of sample analysis per instrument? [✓] ___ ___

ACTION: If any tuning data are missing, take action specified in 3.2 above.

ACTION: List date, time, instrument ID, and sample analyses for which no associated GC/MS tuning data are available.

DATE	TIME	INSTRUMENT	SAMPLE NUMBERS

YES NO N/A

ACTION: If lab cannot provide missing data, reject ("R") all data generated outside an acceptable twelve hour calibration interval.

7.4 Have the ion abundance criteria been met for each instrument used? ☑ ___ ___

ACTION: List all data which do not meet ion abundance criteria (attach a separate sheet).

ACTION: If tuning calibration is in error, flag all associated sample data as unusable ("R"). However, if expanded ion criteria are met (See 1988 Functional Guidelines), the data reviewer may accept data with appropriate qualifiers.

7.5 Are there any transcription / calculation errors between mass lists and Form Vs? (Check at least two values but if errors are found, check more.) ___ ☑ ___

7.6 Have the appropriate number of significant figures (two) been reported? (Check at least two values, but if errors are found check more values.) ☑ ___ ___

ACTION: If large errors exist, call lab for explanation / resubmittal, make necessary corrections and note errors under "Conclusions".

7.7 Are the spectra of the mass calibration compound acceptable? ☑ ___ ___

ACTION: Use professional judgement to determine whether associated data should be accepted, qualified, or rejected.

8.0 Target Compound List (TCL) Analytes

8.1 Are the Organic Analysis Data Sheets (Form I BNA) present with required header information on each page, for each of the following:

a. Samples and/or fractions as appropriate ☑ ___ ___

b. Matrix spikes and matrix spike duplicates ☑ ___ ___

c. Blanks ☑ ___ ___

	YES	NO	N/A
8.2 Are the BNA Reconstructed Ion Chromatograms, the mass spectra for the identified compounds, and the data system printouts (Quant Reports) included in the sample package for each of the following?			
a. Samples and/or fractions as appropriate	[✓]	—	—
b. Matrix spikes and matrix spike duplicates (Mass spectra not required)	[✓]	—	—
c. Blanks	[✓]	—	—
ACTION: If any data are missing, take action specified in 3.2 above.			
8.3 Are the response factors shown in the Quant Report?	[ ]	✓	—
8.4 Is chromatographic performance acceptable with respect to:			
Baseline stability	[✓]	—	—
Resolution	[✓]	—	—
Peak shape	[✓]	—	—
Full-scale graph (attenuation)	[✓]	—	—
Other:_____	[ ]	—	✓
ACTION: Use professional judgement to determine the acceptability of the data.			
8.5 Are the lab-generated standard mass spectra of the identified BNA compounds present for each sample?	[ ]	—	✓
ACTION: If any mass spectra are missing, take action specified in 3.2 above. If Lab does not generate their own standard spectra, make note in "Contract Problems/Non-compliance".			
8.6 Is the RRT of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?	[ ]	—	✓
8.7 Are all ions present in the standard mass spectrum at a relative intensity greater than 10% also present in the sample mass spectrum?	[ ]	—	✓
8.8 Do sample and standard relative ion intensities agree within 20%?	[ ]	—	✓
ACTION: Use professional judgement to determine acceptability of data. If it is determined that incorrect identifications were made, all such data should be rejected, flagged "N" (presumptive evidence of the presence of the compound) or changed to not detected (at the calculated detection limit).			

	YES	NO	N/A
9.0 Tentatively Identified Compounds (TIC)			
9.1 Are all Tentatively Identified Compound Forms (Form I, Part B) present; and do listed TICs include scan number or retention time, estimated concentration and "J" qualifier?	[✓]	—	—
9.2 Are the mass spectra for the tentatively identified compounds and associated "best match" spectra included in the sample package for each of the following:			
a. Samples and/or fractions as appropriate	[✓]	—	—
b. Blanks	[ ]	—	✓
ACTION: If any TIC data are missing, take action specified in 3.2 above.			
ACTION: Add "J" qualifier if missing and "N" qualifier to all identified TIC compounds on Form I, Part B.			
9.3 Are any TCL compounds (from any fraction) listed as TIC compounds (example: 1,2-dimethylbenzene is xylene—a VOA TCL—and should not be reported as a TIC)?	—	[✓]	—
ACTION: Flag with "R" any TCL compound listed as a TIC.			
9.4 Are all ions present in the reference mass spectrum with a relative intensity greater than 10% also present in the sample mass spectrum?	[ ]	—	✓
9.5 Do TIC and "best match" standard relative ion intensities agree within 20%?	[ ]	—	✓
ACTION: Use professional judgement to determine acceptability of TIC identifications. If it is determined that an incorrect identification was made, change identification to "unknown" or to some less specific identification (example: "C3 substituted benzene") as appropriate.			
10.0 Compound Quantitation and Reported Detection Limits			
10.1 Are there any transcription / calculation errors in Form I results? Check at least two positive values. Verify that the correct internal standard, quantitation ion, and RRF were used to calculate Form I result. Were any errors found?	—	[ ]	✓
10.2 Are the CRQLs adjusted to reflect sample dilutions and, for soils, sample moisture?	[ ]	—	✓

	YES	NO	N/A

ACTION: If errors are large, call lab for explanation / resubmittal, make any necessary corrections and note errors under "Conclusions".

ACTION: When a sample is analyzed at more than one dilution, the lowest CRQLs are used (unless a QC exceedance dictates the use of the higher CRQL data from the diluted sample analysis). Replace concentrations that exceed the calibration range in the original analysis by crossing out the "E" value on the original Form I and substituting it with data from the analysis of diluted sample. Specify which Form I is to be used, then draw a red "X" across the entire page of all Form I's that should not be used, including any in the summary package.

11.0 Standards Data (GC/MS)

11.1 Are the Reconstructed Ion Chromatograms, and data system printouts (Quant. Reports) present for initial and continuing calibration? [✓] — —

ACTION: If any calibration standard data are missing, take action specified in 3.2 above.

12.0 GC/MS Initial Calibration (Form VI)

12.1 Are the Initial Calibration Forms (Form VI) present and complete for the BNA fraction? [✓] — —

ACTION: If any calibration standard forms are missing, take action specified in 3.2 above.

12.2 Are response factors stable for BNAs over the concentration range of the calibration (RSD <30%)? [ ] ✓ —

ACTION: Circle all outliers in red.

ACTION: When RSD >30%, non-detects may be qualified using professional judgement. Flag all positive results "J". When RSD >90%, flag all non-detects as unusable ("R"). (Region II policy.)

12.3 Do any compounds have a RRF < 0.05? — [✓] —

ACTION: Circle all outliers in red.

ACTION: If any BNA compound has an average RRF < 0.05, flag positive results for that compound as estimated ("J"), and flag non-detects for that compound as unusable ("R").

	YES	NO	N/A
12.4 Are there any transcription / calculation errors in the reporting of average response factors (RRF) or %RSD? (Check at least two values but if errors are found, check more.)	___	[✓]	___

ACTION: Circle errors in red.

ACTION: If errors are large, call lab for explanation / resubmittal, make any necessary corrections and note errors under "Conclusions".

13.0 GC/MS Continuing Calibration (Form VII)

13.1 Are the Continuing Calibration Forms (Form VII) present and complete for the BNA fraction?	[✓]	___	___
13.2 Has a continuing calibration standard been analyzed for every twelve hours of sample analysis per instrument?	[ ]	___	___

ACTION: List below all sample analyses that were not within twelve hours of the previous continuing calibration analysis.

_____

_____

_____

ACTION: If any forms are missing or no continuing calibration standard has been analyzed within twelve hours of every sample analysis, call lab for explanation / resubmittal. If continuing calibration data are not available, flag all associated sample data as unusable ("R").

13.3 Do any continuing calibration standard compounds have a RRF < 0.05?	___	[✓]	___

ACTION: Circle all outliers in red.

ACTION: If any BNA compound has a RRF < 0.05, flag positive results for that compound as estimated ("J"), and flag non-detects for that compound as unusable ("R").

13.4 Do any compounds have a % difference between initial and continuing calibration RRF > 25%?	✓	[ ]	___

ACTION: Circle all outliers in red and qualify associated sample data as outlined in the table below:

YES NO N/A

% DIFFERENCE

25-50	50-90	>90
'J' positive results, no action for non detects	'J' positive results, 'UJ' non detects	'J' positive results, "R" non detects

13.5 Are there any transcription / calculation errors in the reporting of average response factors (RRF) or difference (%D) between initial and continuing RRFs? (Check at least two values but if errors are found, check more.) ___ [✓] ___

ACTION: Circle errors in red.

ACTION: If errors are large, call lab for explanation / resubmittal, make any necessary corrections and note errors under "Conclusions".

14.0 Internal Standards (Form VIII)

14.1 Are the internal standard areas (Form VIII) of every sample and blank within the upper and lower limits for each continuing calibration? [✓] ___ ___

ACTION: List all the outliers below.

Sample #	Internal Std	Area	Lower Limit	Upper Limit

(Attach additional sheets if necessary.)

ACTION: If the internal standard area count is outside the upper or lower limit, flag with "J" all positive results and non-detects (U values) quantitated with this internal standard. If extremely low area counts are reported, or if performance exhibits a major abrupt drop off, flag all associated non-detects as unusable ("R").

14.2 Are the retention times of the internal standards within 30 seconds of the associated calibration standard? [✓] ___ ___

ACTION: Professional judgement should be used to qualify data if the retention times differ by more than 30 seconds.

	YES	NO	N/A
15.0 Field Duplicates			
15.1 Were any field duplicates submitted for BNA analysis?	[✓]	___	___

ACTION: Compare the reported results for field duplicates and calculate the relative percent difference.

ACTION: Any gross variation between field duplicate results must be addressed in the reviewer narrative. However, if large differences exist, identification of field duplicates should be confirmed by contacting the sampler.

	YES	NO	N/A

PART C: PESTICIDE/PCB ANALYSES

1.0 Traffic Reports and Laboratory Narrative

1.1 Are the Traffic Report Forms present for all samples? [✓] — —

ACTION: If no, contact lab for replacement of missing or illegible copies.

1.2 Do the Traffic Reports or Lab Narrative indicate any problems with sample receipt, condition of samples, analytical problems or special notations affecting the quality of the data? — [✓] —

ACTION: Use professional judgement to evaluate the effect on the quality of the data.

ACTION: If any sample analyzed as a soil contains more than 50% water, all data should be flagged as estimated (J).

2.0 Holding Times

2.1 Have any PEST/PCB holding times, determined from date of collection to date of extraction, been exceeded? — [✓] —

Samples for PEST/PCB analysis, both soils and waters, must be extracted within seven days of the date of collection. Extracts must be analyzed within 40 days of the date of extraction.

3.0 Surrogate Recovery (Form II)

3.1 Are the PEST/PCB Surrogate Recovery Summaries (Form II) present for each of the following matrices:

a. Low Water [✓] — —
b. Med Water [ ] — ✓
c. Low Soil [ ] — ✓
d. Med Soil [ ] — ✓

3.2 Are all the PEST/PCB samples listed on the appropriate Surrogate Recovery Summaries for each of the following matrices:

a. Low Water [✓] — —
b. Med Water [ ] — ✓
c. Low Soil [ ] — ✓
d. Med Soil [ ] — ✓

	YES	NO	N/A
ACTION: Call lab for explanation / resubmittals. If missing deliverables are unavailable, document effect on data under "Conclusions" section of reviewer narrative.			
3.3 Were outliers marked correctly with an asterisk?	☑	—	—
ACTION: Circle all outliers in red.			
3.4 Was surrogate (DBC) recovery outside of the contract specification for any sample or blank?	✓	☐	—
ACTION: No qualification is done if surrogates are diluted beyond detection. If recovery is below contract limit (but above zero), flag all results for that sample "J". If recovery is zero, flag positive results "J" and non-detects "R". If recovery for the blank is zero, flag non-detects for all associated samples "R". If recovery is above contract limit, flag all positive results for that sample "J", unless in the reviewers professional judgement the high recovery is due to co-eluting interference (check the associated blank - if recovery is high there also, flag the sample data).			
3.5 Are there any transcription/calculation errors between raw data and Form II?	—	☑	—
ACTION: If large errors exist, call lab for explanation / resubmittal, make any necessary corrections and note errors under "Conclusions".			

4.0 Matrix Spikes (Form III)

4.1 Is the Matrix Spike Duplicate/Recovery Form (Form III) present?	☑	—	—
4.2 Were matrix spikes analyzed at the required frequency for each of the following matrices:			
a. Low Water	☑	—	—
b. Med Water	☐	—	✓
c. Low Soil	☐	—	✓
d. Med Soil	☐	—	✓
ACTION: If any matrix spike data are missing, take the action specified in 3.2 above.			

4.3 How many PEST/PCB spike recoveries are outside QC limits?

Water	Soils
0 out of 12	N/A out of 12

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	YES	NO	N/A
4.4 How many RPD's for matrix spike and matrix spike duplicate recoveries are outside QC limits?			

Water	Soils
0 out of 6	N/A out of 6

ACTION: If MS and MSD both have less than zero recovery for an analyte, negative results for that analyte should be rejected, and positive results should be flagged "J". The above applies only to the sample used for MS/MSD analysis. Use professional judgement in applying this criterion to other samples.

Blanks (Form IV)

5.1 Is the Method Blank Summary (Form IV) present?	☑		
5.2 Frequency of Analysis: for the analysis of Pesticide TCL compounds, has a reagent/method blank been analyzed for each set of samples or every 20 samples of similar matrix (low water, med water, low soil, medium soil), whichever is more frequent?	☑		
5.3 Chromatography: review the blank raw data -- chromatograms, quant reports or data system printouts. Is the chromatographic performance (baseline stability) for each instrument acceptable for PEST/PCBs?	☑		

ACTION: Use professional judgement to determine the effect on the data.

5.0 Contamination

NOTE: "Water blanks" and "distilled water blanks" are validated like any other sample and are not used to qualify data. Do not confuse them with the other QC blanks discussed below.

6.1 Do any method/instrument/reagent blanks have positive results for PEST/PCBs? When applied as described below, the contaminant concentration in these blanks are multiplied by the sample Dilution Factor.		☑	
6.2 Do any field/rinse blanks have positive PEST/PCB results?		☐	☑

ACTION: Prepare a list of the samples associated with each of the contaminated blanks. (Attach a separate sheet.)

YES NO N/A

NOTE: Only field/rinse blanks taken the same day as the samples are used to qualify data. Blanks may not be qualified because of contamination in another blank. Blanks may be qualified for surrogate, spectral, tuning or calibration QC problems.

ACTION: Follow the directions in the table below to qualify TCL results due to contamination. Use the largest value from all the associated blanks.

Sample conc > CRQL but < 5x blank	Sample conc < CRQL & is < 5x blank value	Sample conc > CRQL & > 5x blank value
Flag sample result with a "U"; cross out "B" flag	Reject sample result and report CRQL; cross out "B" flag	No qualification is needed

6.3 Are there field/rinse/equipment blanks associated with every sample? [ ] — [✓]

ACTION: For low level samples, note in data assessment that there is no associated field/rinse/equipment blank. Exception: samples taken from a drinking water tap do not have associated field blanks.

7.0 Calibration and QC Performance

7.1 Are the following Gas Chromatograms and Data System Printouts for both Primary and Confirmation (confirmation standards not required if there are no positive results above CRQL) column present:

a. Evaluation Standard Mix A [✓] — —

b. Evaluation Standard Mix B [✓] — —

c. Evaluation Standard Mix C [✓] — —

d. Individual Standard Mix A [✓] — —

e. Individual Standard Mix B [✓] — —

f. Multi-component Pesticides Toxaphene & Chlordane [✓] — —

g. Aroclors 1016/1260 [✓] — —

h. Aroclors 1221, 1232, 1242, 1248, and 1254 [✓] — —

ACTION: If no, take action specified in 3.2 above

	YES	NO	N/A
7.2 Is Form VIII Pest-1 present and complete for each GC column (primary and confirmation) and each 72 hour sequence of analyses?	☑		

ACTION: If no, take action specified in 3.2 above.

	YES	NO	N/A
7.3 Are there any transcription/calculation errors between raw data and Form VIII?		☑	

ACTION: If large errors exist, call lab for explanation / resubmittal, make any necessary corrections and note errors under "Conclusions".

	YES	NO	N/A
7.4 Has the total breakdown on quantitation or confirmation column exceeded 20% for DDT?		☑	
- for Endrin?		☑	
or if Endrin aldehyde and 4,4'-DDD co-elute and there is a peak at their retention time, has the combined DDT and Endrin breakdown exceeded 20%?		☑	

ACTION:

a. If DDT breakdown is greater than 20% on quantitation column beginning with the samples following the last in control standard:

1. Flag all positive DDT results "J".
2. If DDT was not detected but DDD and/or DDE are positive, flag the DDT non-detect "R".
3. Flag positive DDD and DDE results "JN".
4. If DDT breakdown is > 20% on confirmation column and DDT is identified on quantitation column but not on confirmation column, use professional judgement to determine whether DDT should be reported on Form I (if reported, flag result "N").

b. If Endrin breakdown is > 20% on quantitation column, beginning with the samples following the last in control standard:

1. Flag all positive Endrin results "J".
2. If Endrin was not detected, but Endrin Aldehyde and/or Endrin Ketone are positive, flag the Endrin non-detect "R".
3. Flag Endrin Ketone positive results "JN".
4. If Endrin breakdown is > 20% on confirmation column and Endrin is identified on quantitation column but not on confirmation column, use professional judgement to determine whether Endrin should be reported on Form I (if reported, flag result "N").

c. If the combined breakdown is used (it can only be used if the conditions in 7.4 above are met) and is > 20% on quantitation column beginning with the last in control standard, take the actions specified in 7.4 a and b above. If the combined breakdown is >20% on confirmation column and Endrin or DDT is identified on quantitation column but not on confirmation column, use professional judgement to determine whether Endrin or DDT should be reported on Form I (if reported, flag result "N").

	YES	NO	N/A
7.5 Is the linearity check RSD of all four calibration factors <10% for the quantitation column?	☑		
ACTION: If no, flag positive hits for all pesticide and PCB analytes "J" for all associated samples. Do not flag toxaphene or DDT if they are quantified from a 3-point calibration curve.			
7.6 Is the % difference between the EVAL A and each analysis (quantitation and confirmation) DBC retention time within QC limits (2% for packed column, 0.3% for capillary [I.D. < 0.32 mm], 1% for megabore [0.32 < I.D. < 2 mm]) ?	☑		
ACTION: DBC retention time cannot be evaluated if DBC is not detected. If it is present and has a retention time out of QC limits, then use professional judgement to determine the reliability of the analysis and flag results "R", if appropriate.			
7.7 Was the proper analytical sequence followed for each 72 hour period of analyses (page PEST D-36 in 8/87 SOW).	☑		
ACTION: If no, use professional judgement to determine the severity of the effect on the data and accept or reject it accordingly. Generally, the effect is negligible unless the sequence was grossly altered or the calibration was also out of limits.			
8.0 Pesticide/PCB Standards Summary			
8.1 Is Form IX present and complete for each GC column and 72 hr sequence of analyses?	☑		
ACTION: If no, take action specified in 3.2 above.			
8.2 Are there any transcription/calculation errors between raw data and Form IX?		☑	
ACTION: If large errors exist, call lab for explanation / resubmittal, make any necessary corrections and note errors under "Conclusions".			
8.3 Is DDT retention time for packed columns > 12 min (except OV-1 and OV-101 columns)?	☑		
ACTION: If no, check that there is adequate resolution between individual components. If not, flag results for compounds that interfere with each other (co-elute) "R".			
8.4 Do all standard retention times fall within the windows established for the first IND A and IND B analyses?	☑		

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	YES	NO	N/A
ACTION: Beginning with the samples following the last in control standard, check to see if the chromatograms contain peaks within an expanded window surrounding the expected retention times. If no peaks are found and, DBC is visible non-detects are valid. If peaks are present and cannot be identified through "pattern recognition" or a consistent shift in standard retention times, flag all affected compound results "R".			
8.5 Are the continuing calibration standard calibration factors within 15% (for quantitation column) or 20% (for confirmation column) of the initial (at beginning of 72 hr sequence) calibration factors?	☑	—	—
ACTION: If no, flag all associated positive results "J". Use professional judgement to determine whether or not to flag non-detects.			
9.0 Pesticide/PCB Identification			
9.1 Is Form X complete for every sample in which a pesticide or PCB was detected?	☐	—	☑
ACTION: If no, take action specified in 3.2 above.			
9.2 Are there any transcription errors between raw data and Form X?	—	☐	☑
ACTION: If large errors exist, call lab for explanation / resubmittal, make any necessary corrections and note errors under "Conclusions".			
9.3 Are retention times of sample compounds within the calculated retention time windows for both quantitation and confirmation analyses?	☐	—	☑
Was GC/MS confirmation provided when required (when compound concentration is > 10 ug/ml in final extract)?	☐	—	☑
ACTION: Reject ("R") all positive results (meeting quantitation column criteria, but missing confirmation by a second column or GC/MS (if appropriate). Also, reject ("R") all positive results not meeting retention time window criteria unless associated standard compounds are similarly biased (i.e. base on RRT to DBC).			
9.4 Check chromatograms for false negatives, especially for the multiple peak components toxaphene and PCB's. Were there any false negatives?	—	☐	☑
ACTION: If appropriate PCB standards were not analyzed, or if the lab performed no confirmation analysis, flag the appropriate data with an "R".			

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	YES	NO	N/A
10.0 Compound Quantitation and Reported Detection Limits			
10.1 Are there any transcription / calculation errors in Form I results? Check at least two positive values. Were any errors found?	—	[ ]	✓
NOTE: Simple peak pesticide results can be checked for rough agreement between quantitative results obtained on the two GC columns. The reviewer should use professional judgement to decide whether a much larger concentration obtained on one column versus the other indicates the presence of an interfering compound. If an interfering compound is indicated, the lower of the two values should be reported and qualified as presumptively present at an estimated quantity ("JN"). This necessitates a determination of an estimated concentration on the confirmation column. The narrative should indicate that the presence of interferences has obscured the attempt at a second column confirmation.			
10.2 Are the CRQLs adjusted to reflect sample dilutions and, for soils, sample moisture?	—	[ ]	✓
ACTION: If errors are large, call lab for explanation / resubmittal, make any necessary corrections and note errors under "Conclusions".			
ACTION: When a sample is analyzed at more than one dilution, the lowest CRQLs are used (unless a QC exceedance dictates the use of the higher CRQL data from the diluted sample analysis). Replace concentrations that exceed the calibration range in the original analysis by crossing out the "E" value on the original Form I and substituting it with data from the analysis of diluted sample. Specify which Form I is to be used, then draw a red "X" across the entire page of all Form I's that should not be used, including any in the summary package.			
11.0 Chromatogram Quality			
11.1 Were baselines stable?	[✓]	—	—
11.2 Were any electropositive displacement (negative peaks) or unusual peaks seen?	—	[✓]	—
11.3 Were early eluting peaks (for early eluting analytes) resolved to baseline?	[✓]	—	—
ACTION: For 11.1 and 11.2, comment only. For 11.3, reject ("R") those analytes that are not sufficiently resolved.			

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12.0 Field Duplicates	YES	NO	N/A
12.1 Were any field duplicates submitted for PEST/PCB analysis?	☑		

ACTION: Compare the reported results for field duplicates and calculate the relative percent difference.

ACTION: Any gross variation between field duplicate results must be addressed in the reviewer narrative. However, if large differences exist, identification of field duplicates should be confirmed by contacting the sampler.

SDG # 900731 Dede
Tutu Wells Site

Contaminated Volatile Method Blanks and Their Associated Samples

Method Blank	Associated Samples
VBLK01	Devcon I, Hartman II, Rodriguez (P)
VBLK02	Eglin III, Four Winds II, Harvey, Tutu
VBLK03	Smith
VBLK04	Rodriguez (PD)
VBLK05	Eglin II
VBLK06	Hartman III, Leonard, Steele, Trip Blank 9/26, VIHA III, Steele MS, Steele MSD
VBLK07	Dede, Dench, Devcon III, Trip Blank 9/24, Trip Blank 9/25

SDG # 900731 Dede
Tutu Wells Site

Contaminated Trip Blanks and Their Associated Samples

Trip Blank	Associated Samples
Trip Blank 9/26 (770-15)	Eglin II, Eglin III
Trip Blank 9/24 (731-05)	Devcon I, Devcon III, Rodriguez (P), Rodriguez (PD)
Trip Blank 9/25 (731-10)	Dede, Dench, Smith, Steele, Steele MD, Steele MSD
Trip Blank 9/26 (731-18)	Hartman II, Hartman III, Four Winds II, Tutu, Harvey, Leonard, VIHA III

ATTACHMENT 1
SOP NO. HW-6

TOTAL REVIEW

CLP DATA ASSESSMENT

Functional Guidelines for Evaluating Organics Analysis

Case No. 900731 SDG No. Tutu LABORATORY Ceimic SITE Tutu Well Sit

DATA ASSESSMENT:

The current functional guidelines (1988) for evaluating organic data have been applied.

All data are valid and acceptable except those analytes which have been qualified with a "J" (estimated), "U" (non-detects), "R" (unusable),or "JN" (presumptive evidence for the presence of the material at an estimated value). All action is detailed on the attached sheets.

Two facts should be noted by all data users. First, the "R" flag means that the associated value is unusable. In other words, due to significant QC problems the analysis is invalid and provides no information as to whether the compound is present or not. "R" values should not appear on data tables because they cannot be relied upon, even as a last resort. The second fact to keep in mind is that no compound concentration, even if it has passed all QC tests, is guaranteed to be accurate. Strict QC serves to increase confidence in data but any value potentially contains error.

Reviewer's Signature: Donna M. Leach Date: 01/07/1991

Verified By: Tom E. Joyce Date: 1/14/1991

ATTACHMENT 1
SOP NO. HW-6

DATA ASSESSMENT:

1. HOLDING TIME:

The amount of an analyte in a sample can change with time due to chemical instability, degradation, volatilization, etc. If the specified holding time is exceeded, the data may not be valid. Those analytes detected in the samples whose holding time has been exceeded with be qualified as estimated, "J". The non-detects (sample quantitation limits) will be flagged as estimated, "UJ", or unusable, "R", if the holding times are grossly exceeded.

The following action was taken in the samples and analytes shown due to excessive holding time.

The volatile and semivolatile organic compounds and pesticides/PCBs were analyzed within holding times for all samples.

ATTACHMENT 1
SOP NO. HW-6

DATA ASSESSMENT:

2. BLANK CONTAMINATION:

Quality assurance (QA) blanks, i.e., method, trip, field, rinse, and water blanks are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activities. Method blanks measure laboratory contamination. Trip blanks measure cross-contamination of samples during shipment. Field blanks measure contamination of samples during field operations. If the concentration of the analyte is less than 5 times the blank contaminant level (10 times for the common lab contaminants), the analytes are qualified as non-detects, "U". The following analytes in the samples shown were qualified with "U" for these reasons:

A) Method blank contamination

Volatile Organic Compounds

Method blank VBLK01 is reported to contain a tentatively identified compound (TIC) with a retention time (RT) of 3.78 minutes at a concentration of 8.0 micrograms per liter (ug/L). The samples Devcon I, Hartman II, and Rodriguez(P) are associated with this method blank and contain the same TIC contamination. These TIC concentration values are qualified as non-detects because they are less than 5 times the contamination in the method blank and therefore the values are not reported.

Method blank VBLK02 is reported to contain methylene chloride at a concentration of 3 ug/L and a TIC with a RT of 3.83 at a concentration of 4 ug/L. The samples Eglin III, Four Winds II, Harvey, and Tutu are associated with this method blank and have methylene chloride concentrations above the CRQL and the same TIC contamination. The methylene chloride concentration values are qualified with "U" because they are less than 10 times the common contaminant concentration in the method blank. The TIC values are not reported for reasons stated above.

Method blank VBLK03 is reported to contain methylene chloride at a concentration of 5 ug/L. Sample Smith, which has a dilution factor of 2.5, is associated with this method blank and has a methylene chloride concentration of 11 ug/L. This concentration value is raised to 12 ug/L, the CRQL, and qualified with "U" because the value is less than 10 times the common contaminant concentration in the method blank. Please note that this sample

ATTACHMENT 1
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DATA ASSESSMENT:

was analyzed using Method 624 due to high compound concentrations and as a result the CRQL is higher for this sample.

Method blank VBLK04 is reported to contain methylene chloride at a concentration of 3 ug/L and a TIC with a RT of 3.83 at a concentration of 4 ug/L. Sample Rodriguez(PD) is associated with this method blank and contains 2 ug/L of methylene chloride and 3 ug/L of the same TIC. The methylene chloride concentration value is qualified with "U" and the TIC value is not reported for reasons previously stated.

Method blank VBLK05 is reported to contain 5 ug/L of methylene chloride, 2 ug/L of acetone, and 2 ug/L of a TIC with a RT of 3.78. Sample Eglin II is associated with this method blank and has a 5 ug/L of methylene chloride. This value is qualified with "U".

Method blank VBLK06 is reported to contain 5 ug/L of methylene chloride, and 7 ug/L of a TIC with a RT of 3.83. Samples Hartman III, Leonard, Steele, and VIHA III are associated with this method blank and have methylene chloride concentrations above the CRQL and the same TIC contamination. The methylene chloride concentration values are qualified with "U" and the TIC values are not reported for reasons stated above.

Method blank VBLK07 is reported to contain 3 ug/L of methylene chloride and 2 ug/L of a TIC with a RT of 3.83. Samples Dede, Dench, and Devcon III are associated with this method blank and have the same TIC contamination. These TIC values are not reported for reasons stated above. Samples Dede and Devcon III have methylene chloride concentrations above the CRQL. These values are qualified with "U".

Semivolatile Organic Compounds

No contaminants are detected in the method blank.

Pesticides/PCBs

No contaminants are detected in the method blank.

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DATA ASSESSMENT:

B) Field or rinse blank contamination ("water blanks" or "distilled water blanks" are validated like any other sample).

All samples were taken directly from a drinking water tap into a collection bottle, therefore no field blanks were necessary.

C) Trip blank contamination (VOCs only).

Trip blank 9/24 is reported to contain 25 ug/L of methylene chloride, 12 ug/L of acetone, 8 ug/L of xylenes, and 5 ug/L of a TIC with a RT of 3.83. The samples Devcon I, Devcon III, Rodriguez(P), and Rodriguez(PD) are associated with this trip blank. Devcon I and Rodriguez(P) have methylene chloride concentrations above the CRQL and the same TIC contamination. The methylene chloride concentration values are qualified with "U" because they are less than 10 times the concentration in the trip blank. The methylene chloride concentration values are already qualified in Devcon III and Rodriguez(PD) due to method blank contamination. The TIC concentration values for the four samples are already qualified due to method blank contamination. Devcon III and Rodriguez(PD) have acetone concentrations above the CRQL. These values are qualified with "U" because they are less than 10 times the common contaminant concentration in the trip blank.

Trip blank 9/25 is reported to contain 34 ug/L of methylene chloride, 42 ug/L of acetone, 1 ug/L of toluene,7 ug/L of xylenes, 3 ug/L of a TIC with a RT of 3.82, 7 ug/L of a TIC with a RT of 8.7, and 1 ug/L of a TIC with a RT of 21.52. Samples Steele, Smith, Dede, and Dench are associated with this trip blank. Sample Smith contains 25 ug/L of acetone. This value is qualified with "U" for reasons stated above. All four samples have methylene chloride concentration values above the CRQL which are qualified with "U" for reasons stated above. Samples Steele, Dede, and Dench contain the same TIC contamination. The TIC values are not reported for reasons stated above.

Trip blank 9/26 is reported to contain 24 ug/L of methylene chloride, 4 ug/L of acetone, and 7 ug/L of a TIC with a RT of 3.82. The samples Hartman III, Hartman II, Four Winds II, Tutu, Leonard, Harvey, and VIHA III are

ATTACHMENT 1
SOP NO. HW-6

DATA ASSESSMENT:

associated with this trip blank. Sample Hartman II contains methylene chloride at a concentration above the CRQL. This value is qualified "U" for reasons stated above. Samples Fourwinds II and Leonard both contain acetone at concentrations above the CRQL. These values are qualified with "U" for reasons stated above. Hartman III, Fourwinds II, Tutu, Leonard, Harvey, and VIHA III have methylene chloride concentration values above the CRQL which are already qualified due to method blank contamination. The TIC concentration values for the above samples are already qualfied due to method blank contamination.

Trip blank 9/27 is reported to contain 16 ug/L of methylene chloride. Samples Eglin II and Eglin III are associated with this trip blank and have methylene chloride concentrations at or above the CRQL. These values are qualified as "U" for reasons stated above.

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DATA ASSESSMENT:

3. MASS SPECTROMETER TUNING:

Tuning and performance criteria are established to ensure adequate mass resolution, proper identification of compounds, and to some degree, sufficient instrument sensitivity. These criteria are not sample specific. Instrument performance is determined using standard materials. Therefore, these criteria should be met in all circumstances. The tuning standard for volatile organics is bromofluorobenzene (BFB) and for semi-volatiles is decafluorotriphenyl-phosphine (DFTPP).

If the mass calibration is in error, all associated data will be classified as unusable, "R".

All mass calibrations are acceptable for both the volatile and semivolatile analyses.

Two BFB tunes have a sample out of the 12-hour limit by less than 12 minutes. Each succeeding tune is acceptable, therefore, in this reviewer's professional judgement, no qualifiers are necessary.

TUT 001 1410

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DATA ASSESSMENT:

4. CALIBRATION:

Satisfactory instrument calibration is established to ensure that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of giving acceptable performance at the beginning of an experimental sequence. The continuing calibration checks document that the instrument is giving satisfactory daily performance.

A) RESPONSE FACTOR:

The response factor measures the instrument's response to specific chemical compounds. The response factor for the Target Compound List (TCL) must be ≥ 0.05 (a ratio of areas) in both the initial and continuing calibrations. A value <0.05 indicates a serious detection and quantitation problem (poor sensitivity). Analytes detected in the sample will be qualified as estimated, "J". All non-detects for that compound will be rejected ("R").

Volatile Organic Compounds

The initial calibration performed on 9/19 has response factors >0.05 for all compounds. Sample Smith is associated with this calibration. No qualifiers are necessary.

The initial calibration performed on 9/28 has response factors <0.05 for acetone, 2-butanone, and 2-hexanone. All samples except Smith are associated with this calibration and are qualified with "R" for the compounds stated above.

The continuing calibrations performed on 9/29, 10/03, and 10/09 have response factors <0.05 for acetone, 2-butanone, and 2-hexanone. The continuing calibration performed on 10/01 has response factors <0.05 for acetone and 2-butanone. The continuing calibration performed on 10/08 has a reponse factor <0.05 for 2-butanone and 2-hexanone. These compounds are already qualified in the samples associated with the above continuing calibrations as a result of deficient initial calibration response factors.

The continuing calibration performed on 10/06 has a response factor <0.05 for acetone, 2-butanone, vinyl acetate, and 2-hexanone. The associated

ATTACHMENT 1
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DATA ASSESSMENT:

samples are Devcon III, Trip blank 9/24, Dede, Dench, and Trip blank 9/25. The acetone, 2-butanone, and 2-hexanone concentration values are already qualified as a result of deficient initial calibration response factors. The vinyl acetate concentration values are qualified with "R" based on this continuing calibration.

Semivolatile Organic Compounds

All response factors are greater than or equal to 0.05 in both the initial and continuing calibrations.

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DATA ASSESSMENT:

5. CALIBRATION:

A) PERCENT RELATIVE STANDARD DEVIATION (%RSD) AND PERCENT DIFFERENCE (%D):

Percent RSD is calculated from the initial calibration and is used to indicate the stability of the specific compound response factor over increasing concentration. Percent D compares the response factor of the continuing calibration check to the mean response factor from the initial calibration. Percent D is a measure of the instrument's daily performance. Percent RSD must be <30% and %D must be <25%. A value outside of these limits indicates potential detection and quantitation errors. For these reasons, all positive results are flagged as estimated, "J" and non-detects are flagged "UJ" (if %D or RSD > 50%). If there is a gross deviation of %RSD and %D, the non-detects may be rejected ("R").

For the PCB/PESTICIDE fraction, %RSD for aldrin, endrin, DDT, and dibutylchlorendate must not exceed 10%. Percent D must be within 15% on the quantitation column and 20% on the confirmation column.

Volatile Organic Compounds

The initial calibration performed on 9/19 has a %RSD greater than 30% for chloromethane(35%). Smith is the only sample associated with this initial calibration. Chloromethane is a non-detect in this sample, therefore no action is necessary.

The initial calibration performed on 9/28 has a %RSD greater than 30% for methylene chloride(66.948%) and acetone(71.280%). All samples except Smith are associated with this initial calibration. The methylene chloride concentration values are qualified with "J" for all positive hits and "UJ" for all non-detects. The acetone concentration values are already qualified as a result of deficient response factors.

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DATA ASSESSMENT:

The continuing calibration performed on 10/02 has a %D greater than 25% for the following compounds:

Compound	%D
Methylene Chloride	-52.4
2-Butanone	44.4
Vinyl Acetate	-36.7
trans-1,3-Dichloropropene	-99.9
4-Methyl-2-pentanone	39.1
2-Hexanone	-58.0

Sample Smith is associated with this calibration. The trans-1,3-dichloropropene concentration is qualified with "R" because it is a non-detect and the %D is is greater than 90%. The 2-butanone, vinyl acetate, and 4-methyl-2-pentanone are non-detects, therefore no qualifiers are necessary. 2-Hexanone is a non-detect, but the %D is greater than 50%, therefore the quantitation limit is qualified with "UJ". The methylene chloride concentration is already qualified due to deficient initial calibration %RSD.

The continuing calibration performed on 9/29 has a %D greater than 25% for the following compounds:

Compound	%D
Methylene Chloride	43.38
Acetone	27.13
Carbon Tetrachloride	28.68
Bromoform	25.15

The samples Devcon I, Rodriguez(P), and Hartman II are associated with this calibration. Carbon tetrachloride and bromoform are not detected in these samples, therefore no action is necessary. Methylene chloride concentration values are already qualified due to a deficient initial calibration %RSD. Acetone is already qualified due to a deficient response factor.

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DATA ASSESSMENT:

The continuing calibration performed on 10/01 has a %D greater than 25% for the following compounds:

Compound	%D
1,2-Dichloroethane	42.31
2-Butanone	47.03
Bromodichloromethane	25.24
trans-1,3-Dichloropropene	28.28
Dibromochloromethane	41.51
1,1,2-Trichloroethane	39.96
Bromoform	26.97
2-Hexanone	34.13
4-Methyl-2-Pentanone	56.49
1,1,2,2-Tetrachloroethane	39.33

Rodriguez(PD) is the only sample associated with this calibration. 4-Methyl-2 -pentanone concentration value is qualified with "UJ" because it is a non-detect and the %D is greater than 50%. The 2-butanone and 2-hexanone concentration values are already qualified due to deficient response factors. The remaining compounds are non-detects and have %Ds less than 50%, therefore no qualifiers are necessary.

The continuing calibration performed on 10/03 has a %D greater than 25% for the following compounds:

Compound	%D
Chloromethane	26.36
Methylene Chloride	39.16
Acetone	34.95
2-Hexanone	29.35

Samples Four Winds II, Tutu, Harvey, and Eglin III are associated with this calibration. Chloromethane is not detected in any of these samples, therefore no action is necessary. Methylene chloride concentration values are already qualified due to deficient initial calibration %RSD. Acetone and 2-hexanone concentration values are already qualified due to deficient initial calibration

ATTACHMENT 1
SOP NO. HW-6

DATA ASSESSMENT:

response factors.

The continuing calibration performed on 10/06 has a %D greater than 25% for the following compounds:

Compound	%D
Vinyl Chloride	33.45
Methylene Chloride	44.78
Acetone	48.44
Vinyl Acetate	66.87
1,1,2,2-Tetrachloroethane	30.11

Samples Devcon III, Trip blank 9/24, Dede, Dench, and Trip blank 9/25 are associated with this calibration. Vinyl chloride and 1,1,2,2-Tetrachloroethane are not detected in these samples, therefore no qualifiers are necessary. The methylene chloride concentration values are already qualified due to a deficient initial calibration %RSD. Acetone and vinyl acetate are already qualified due to deficient initial response factors.

The continuing calibration performed on 10/08 has a %D greater than 25% for the acetone(93.97) and 2-butanone(82.37). Samples Steele, Hartman III, Leonard, VIHA III, and Trip blank 9/26 are associated with this calibration. These compounds are already qualified as a result of deficient initial calibration response factors.

The continuing calibration performed on 10/09 has a %D greater than 25% for the following compounds:

Compound	%D
Chloromethane	28.83
Bromomethane	27.13
Methylene Chloride	33.67
2-Butanone	75.79
Vinyl Acetate	46.25
4-Methyl-2-Pentanone	38.55

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DATA ASSESSMENT:

Sample Eglin II is associated with this calibration. Methylene chloride is already qualified due to deficient initial calibration %RSD. 2-Butanone is already qualified due to a deficient initial calibration response factor. The remaining compounds are non-detects and have %Ds less than 50%, therefore no qualifiers are necessary.

Semivolatile Organic Compounds

No semivolatile organic compounds were detected in any of the samples. Therefore, the CRQLs will be qualified with "UJ" only when calibrations have %RSDs or %Ds greater than 50%.

The continuing calibration performed on 10/13 has a %D greater than 25% for 2,4-dinitrophenol(61.8%). The sample Steele is associated with this calibration. The non-detect value is qualified with "UJ".

Pesticides/PCBs

The %RSD for aldrin, endrin, DDT, and dibutylchlorendate did not exceed 10%. The %D was within 15% on the quantitation column.

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DATA ASSESSMENT:

6. SURROGATES:

All samples are spiked with surrogate compounds prior to sample preparation to evaluate overall laboratory performance and efficiency of the analytical technique. If the measured surrogate concentrations were outside contract specifications, qualifications were applied to the samples and analytes as shown below.

Volatile Organic Compounds

For the Method 624 analysis, all surrogate recoveries are within quality (QC) limits.

As specified in Method 524.2, only two surrogate compounds were used, bromofluorobenzene (BFB) and trans-1,2-dichlorobenzene-d4 (t-DCB). The recovery of BFB is outside the QC limits (86-115%) in the following sample analyses:

Sample	%BFB Recovered
Dench	60
Eglin II	84
Four Winds II	128
Leonard	118
Rodriguez(PD)	68
TUTU	126
VBLK01	84
VBLK04	68
VBLK06	120

These samples were not re-analyzed. For each affected sample, the concentration values for all compounds are qualified "J" for positive hits, and "UJ" for all non-detects. No QC limits are established for the recovery of t-DCB; however, when the BFB recovery is within QC limits, the t-DCB recovery is in the range of 84% to 122%.

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DATA ASSESSMENT:

Semivolatile Organic Compounds

The surrogate compound 2-fluorophenol is out of QC limits (21-100%) in the sample analysis of Dench. No action is necessary when only one surrogate is out of QC limits.

Pesticides/PCBs

The Dibutylchlorandate (DBC) recovery was high for all samples except Leonard. No pesticides or PCBs were found in any of the samples, therefore no qualifiers are necessary.

ATTACHMENT 1
SOP NO. HW-6

DATA ASSESSMENT:

7. INTERNAL STANDARDS PERFORMANCE:

Internal standards (IS) performance criteria ensure that the GC/MS sensitivity and response are stable during every experimental run. The internal standard area count must not vary by more than a factor of 2 (-50% to +100%) from the associated continuing calibration standard. The retention time of the internal standard must not vary by more than ± 30 seconds from the associated continuing calibration standard. If the area count is outside the (-50% to +100%) range of the associated standard, all of the positive results for compounds quantitated using that IS are qualified as estimated, "J", and all non-detects as "UJ", or "R" if there is a severe loss of sensitivity.

If an internal standard retention time varies by more than 30 seconds, the reviewer will use professional judgement to determine either partial or total rejection of the data for that sample fraction.

All internal standard area counts and retention times are within QC limits for both volatile and semivolatile compound analyses.

ATTACHMENT 1
SOP NO. HW-6

DATA ASSESSMENT:

8. COMPOUND IDENTIFICATION:

A) VOLATILE AND SEMI-VOLATILE FRACTIONS:

TCL compounds are identified on the GC/MS by using the analyte's relative retention time (RRT) and by comparison to the ion spectra obtained from known standards. For the results to be a positive hit, the sample peak must be within $\pm$ 0.06 RRT units of the standard compound and have an ion spectra which has a ratio of the primary and secondary m/e intensities within 20% of that in the standard compound. For the tentatively identified compounds (TIC) the ion spectra must match accurately. In the cases where there is not an adequate ion spectrum match, the laboratory may have provided false positive identifications.

Volatile organic compounds are properly identified on the GC/MS and all TICs accurately match their ion spectra.

No semivolatile target compounds were found in any sample.

B) PESTICIDE FRACTION:

The retention times of reported compounds must fall within the calculated retention time windows for the two chromatographic columns and a GC/MS confirmation is required if the concentration exceeds 10 nanograms per liter (ng/ml) in the final sample extract.

No pesticides or PCBs were found in any sample.

ATTACHMENT 1
SOP NO. HW-6

DATA ASSESSMENT:

9. MATRIX SPIKE/SPIKE DUPLICATE, MS/MSD:

The MS/MSD data are generated to determine the long-term precision and accuracy of the analytical method in various matrices. The MS/MSD may be used in conjunction with other CC criteria for some additional qualification of the data.

All MS/MSD % recoveries are within QC limits for volatile, semivolatile organic compounds and pesticides and PCBs.

TUT 001 1422

ATTACHMENT 1
SOP NO. HW-6

DATA ASSESSMENT:

10. OTHER QC DATA OUT OF SPECIFICATION:

A) Method Detection Limit Study

Method 524.2 state that a method detection limit (MDL) study must be performed prior to sample analyses.

The MDL study consists of seven repeat analyses of target compounds at concentrations of 1 ppb. The QC limits for mean accuracy (% recovery) and %RSD are 80-120% and 20%, respectively. The MDL study must be repeated if these standards are not met. The MDL study associated with SDG Dede results was performed in April 1990 and has the following deficiencies (*):

Compound	Mean Accuracy,%	% RSD
1,1-Dichloroethene	72*	7.2
Methylene Chloride	148*	12.0
1,2-Dichloroethane	121*	7.9
Tetrachloroethene	76*	9.5
Bromoform	88	28.0 *
1,1,2,2-Tetrachloroethane	122*	7.3

In addition, the following compounds were not included in the MDL study: acetone, carbon disulfide, 2-butanone, vinyl acetate, 4-methyl-2-pentanone, 2-hexanone. The above compounds are flagged "J" for all samples, except where compounds are qualified "R" for other deficiencies.

B) Laboratory Fortified Blanks

QC requirements established in Method 524.2 and the Sampling, Analysis, and Monitoring Plan (Appendix A) state that laboratory fortified blanks (LFBs) must be analyzed immediately following each continuing calibration and the accuracy must be between 80% to 120% recovery. The provided data indicate that the recoveries were out of QC limits for volatile compounds in each LFB. The LFBs were not always analyzed immediately after the calibrations. The affected samples and compounds are qualified "J" to reflect these deficiencies.

ATTACHMENT 1
SOP NO. HW-6

DATA ASSESSMENT:

11. SYSTEM PERFORMANCE AND OVERALL ASSESSMENT

The compounds of primary importance in this project are the volatile organics. SDG Tutu has several QC criteria out of specification.

The MDL study had % recoveries out of QC limits as well as compounds which were not included in the study at all. The FLBs also had several compounds out of QC Limits and twice was not run immediately after the continuing calibrations. All target compounds were present in the FLBs. These MDL and FLB deficiencies indicate that the laboratory instrumentation has difficulties recovering certain compounds at such low concentrations (1 ppb). As a result, the affected compounds are qualified with "J" in the associated samples.

The volatile surrogate recoveries are out of QC limits in several samples as well as three (out of seven) method blanks. For the affected samples, the identification of the compounds is acceptable, but for positive hits and non-detects the quantitation must be considered as estimated only. The concentration values and quantitation limits for the six affected samples have been qualified as such.

The volatile calibrations are deficient for compounds which were either common lab contaminants or compounds not detected in any sample. The majority of the data is not seriously affected by these deficiencies.

During the process of validation, the compound quantitation performed by the reviewer did not agree with the quantitation performed by the lab. The lab was notified and the laboratory personnel determined that the incorrect response factors were used to quantitate the compound concentrations for samples Hartman III, Leonard, Steele, and VIHA III. The lab corrected the problem and sent revised Form I(s) and quant Hation reports. These revisions are included with the data package.

Overall, the volatile organic data is consistent although QC problems do exist as discussed above.

The semivolatile data is acceptable. One qualifier was needed due to calibration deficiencies.

ATTACHMENT 1
SOP NO. HW-6

DATA ASSESSMENT:

The pesticide/PCB data is acceptable. The surrogate recovery was high for all but one sample, but no pesticides or PCBs were found, therefore it has no effect on the data.

TUT 001 1425

ATTACHMENT 1
SOP NO. HW-6

DATA ASSESSMENT:

12. CONTRACT PROBLEMS

The MDL study failed to include six target compounds. Several results were out of QC limits established in Method 524.2 and the Sampling, Analysis, and Monitoring Plan.

The LFBs were not analyzed immediately after the calibrations and many % recoveries are not within QC limits.

The volatile organic analyses have several samples and three blanks with the surrogate BFB out of QC limits. The lab has failed to perform satisfactorily because there is no evidence of reanalysis for any sample or blank.

Sample Smith was originally analyzed using Method 524.2. The compound concentration values were not within the calibration range of the instrumentation. In order to analyze the sample within holding time the laboratory defaulted to Method 624. This was a breach of contract. The Sampling, Analyses, and Monitoring Plan calls for all samples to be analyzed using Method 524.2 in order to reach low detection limits.

TUT 001 1426

ATTACHMENT 1
SOP NO. HW-6

DATA ASSESSMENT:

13. This package contains sample re-extractions, re-analyses or dilutions. Upon reviewing the QA results, the appropriate following form I(s) have been used.

    Form I(s) for sample re-extraction, re-analysis, or multiple dilutions are not included in this package because all original analyses were accepted.

SOP NO. HW-2

Evaluation of Metals Data for the Contract Laboratory Program (CLP)

based on

SOW. 7/88
REV: 2/89

(SOP Revision X)

PREPARED BY: Hanif Sheikh DATE: 2-16-90
Hanif Sheikh, Quality Assurance Chemist
Toxic and Hazardous Waste Section

CONCURRED BY: Louis Bevilacqua DATE: 2/16/90
Louis Bevilacqua, Section Chief
Toxic and Hazardous Waste Section

APPROVED BY: L Bevilacqua for (GFM) DATE: 2/16/90
Gerard F. McKenna, Chief
Monitoring Management Branch

STANDARD OPERATING PROCEDURE

Title: Evaluation of Inorganic Data for the Contract Laboratory Program

Date: Feb. 199?
Number: HW-2
Revision: 10

1.0 Scope

1.1 This procedure is applicable to inorganic data obtained from contractor laboratories working for Hazardous Waste Site Contract Laboratory Program (CLP).

1.2 The data validation is based upon analytical and quality assurance requirements specified in Statement of Work (SOW) 7/88.

2.0 Responsibilities - Data reviewers will complete the following tasks as assigned by the Da Review Coordinator:

2.1. For a total review:

2.1.1 Data Assessment - "Total Review-Inorganics" Checklist Appendix (A.1). The reviewer must answer every question on the checklist.

2.1.2 Data Assessment - Data Assessment Narrative (Appendix A.2) The answer on the checklist must match the action in the narrative (appendix A.2) and on Form I's. Do not use pencil to write the narrative.

2.1.3 Contract Non-Compliance - SMO Report (Appendix A.3) This report is to be completed only when a serious contract violation is encountered, or upon the request of the Data Review Manager or Deputy Project Officer (DPO). Forward 5 copies: one each for internal files, appropriate Regional DPO, Sample Management Office (SMO) and last two addresses of Mailing List for Data Reviewers (Appendix A.4). In other cases, all contract violations should be appended to end of Data Assessment Narrative (Sec. A.2.2).

2.1.4 Data Summary Sheet - Summary of Inorganic Quality Control Data (Appendix A.5). Enter in ink on Data Summary Sheet required QC values from Forms I through IX. Cir all values that require data qualification "Action".

2.1.5 CLP Data Assessment Summary Forms

2.1.5.1 Appendix A.6
Fill in the total number of analytes analyzed by different analyses and the number of analytes rejected or flagged as estimated due to corresponding quality control criteria. Place an "X" in boxes where analyses were not performed, or criteria do not apply.

2.1.5.2 Appendix A.7
Data reviewer is also required to fill out Inorganic Regional Data Assessment form (Appendix A.7) provided by EPA Headquarters. Codes listed on the form will be used to describe the Data Assessment Summary.

2.1.6 Data Review Log: It is recommended that each data reviewer should maintain a log of reviews completed to include:
a. date of start of case review
b. date of completion of case review
c. site
d. case number
e. contract laboratory
f. number of samples
g. matrix
h. hours worked
i. reviewer's initials

2.1.7 Telephone Record Log - the data reviewer should enter the bare facts of inquiry, before initiating any phone conversation with CLP laboratory. After the case review has been completed, mail white copy of Telephone Record Log to the laboratory and pink copy to SMO. File yellow copy in the Telephone Record Log folder, and attach a xerox copy of the Telephone Record Log to the completed Data Assessment Narrative (Appendix A.2).

2.1.8 Forwarded Paperwork

2.1.8.1 Upon completion of review, the following are to be forwarded to the Regional Sample Control Center (RSCC) located in the Surveillance and Monitoring Branch:
a. data package
b. completed data assessment checklist (Appendix A.1,original)
c. SMO Contract Compliance Screening (CCS)
d. Data Summary Sheet (Appendix A.5) along with completed Data Assessment Narrative (Appendix A.2)
e. Record of Communication (copy)
f. CLP Reanalysis Request/Approval Record (original + 3 copies)
g. Appendix A.7 (original).

2.1.8.2 Forward 4 copies of completed Data Assessment Narrative (Appendix A.2) along with 2 copies of the Inorganic Data Assessment Form (Appendix A.7) and Telephone Record Log , if any,: one each for appropriate Regional DPO, Sample Management Office (SMO), and last two addressees of Mailing List for Data Reviewers (Appendix A.4) (the Inorganic Data Assessment form does not go to the last two addressees).

2.1.9 Filed Paperwork - Upon completion of review, the following are to be filed within M+B files:

a. Four copies of completed Data Assessment Narrative (Appendix A.2) each carrying Appendix A.7.
b. Telephone Record Log (copy)
c. S+D Report (copy Appendix A-3)
d. CLP Data Assessment Summary Form (Appendix A.6).
e. CLP Reanalysis Request/Approval Record (copy)

3.0 Data Completeness
Indicate incomplete data package on the computer tracking sheet located in M+B office. Authorized contractor personnel may contact the laboratory after discovery of an incomplete data package. If a laboratory will not return phone calls or does not respond to requests notify M+B coordinator of Region II for resolution.

4.0 Rejection of Data - All values determined to be unacceptable on the Inorganic Analysis Data Sheet (Form I) must be lined over with a red pencil. As soon as any review criteria cause data to be rejected, that data can be eliminated from any further review or consideration

5.0 Acceptance Criteria - In order that reviews be consistent among reviewers, acceptance criteria as stated in Appendix A.1 (pages 4-25) should be used. Additional guidance can be found in the National Inorganic Functional Guidelines of October 1, 1989.

6.0 SMO Contract Compliance Screening (CCS) - This is intended to aid reviewer in locating all problems, both corrected and uncorrected. However, the validation should be carried out even if CCS is not present. Resubmittals received from laboratory in response to CCS must be used by the reviewer.

7.0 Request for Reanalysis - Data reviewers must note all items of contract non-compliance within Data Assessment Narrative. If holding times and sample storage times have not been exceeded, DPO may request reanalysis if items of non-compliance are critical to data assessment. Requests are to be made on "CLP Re-Analysis Request/Approval Record".

8.0 Record of Communication - Provided by the Regional Sample Control Center (RSCC) to indicate which data packages have been received and are ready to be reviewed.

9.0 Rounding off numbers - The data reviewer will follow the standard practice.

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Title: Evaluation of Metals Data for the Contract Laboratory Program
Appendix A.1: Data Assessment - Contract Compliance (Total Review - Inorganics)

Date: Feb. 1993
Number: HW-2
Revision: 10

	YES	NO	N/A
A.1.1 Contract Compliance Screening Report (CCS) - Present?	[ ]	--	✓
ACTION: If no, contact RSCC.			
A.1.2 Record of Communication (from RSCC) - Present?	[ ]	--	✓
ACTION: If no, request from RSCC.			
A.1.3 Trip Report - Present and complete?	[ ]	--	✓
ACTION: If no, contact RSCC for trip report.			
A.1.4 Sample Traffic Report - Present or on file?	[✓]	-	—
Legible?	[✓]	--	—
ACTION: If no, request from Regional Sample Control Center (RSCC).			
A.1.5 Cover Page - Present?	[✓]	--	—
Is cover page properly filled in and signed by the lab manager or the manager's designee?	[✓]	--	—
ACTION: If no, prepare Telephone Record Log, and contact laboratory.			
Do numbers of samples correspond to numbers on Record of Communication?	[✓]	—	—
Do sample numbers on cover page agree with sample numbers on:			
(a) Traffic Report Sheet?	[✓]	--	—
(b) Form I's?	[✓]	--	—
ACTION: If no for any of the above, contact RSCC for clarification.			

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Title: Evaluation of Metals Data for the Contract Laboratory Program
Appendix A.1: Data Assessment - Contract Compliance (Total Review - Inorganics)

Date: Feb. 1992
Number: HW-2
Revision: 10

	YES	NO	N/A
A.1.6 Form I (Final Data) - Are all Form I's present and complete?	[✓]		
ACTION: If no, prepare telephone record log and contact laboratory for submittal.			
Are correct units (ug/l for waters and mg/kg for soils) indicated on Form I's?	[✓]		
Are soil sample results for each parameter corrected for percent solids?	[ ]		✓
Are EPA sample # s and corresponding laboratory sample ID # s the same as on the Cover Page, Form I's and in the raw data?	[✓]		
Are computation/transcription errors less than 10% of reported values?	[✓]		
Are all "less than IDL" values properly coded with "U"?	[✓]		
Was a brief physical description of samples given on Form I's?	[✓]		
Were the result qualifiers used correctly with final data?	[✓]		
ACTION: If no for any of the above, prepare Telephone Record Log, and contract laboratory for corrected data.			
Were any samples diluted beyond requirements of contract?		[✓]	
If yes, were dilutions noted on Form I's?	[ ]		✓
ACTION: If no, note under Contract-Problem/Non-Compliance of the"Data Assessment Narrative".			

A.1.7 Holding Times - (aqueous and soil samples)

(Examine sample traffic reports and digestion/distillation logs.)

Mercury analysis (28 days). . . . . exceeded?		[✓]	
Cyanide distillation (14 days). . . . . exceeded?		[✓]	

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Title: Evaluation of Metals for the Contract Laboratory Program
Appendix A.1: Data Assessment - Contract Compliance (Total Review - Inorganics)

Date: Feb. 1994
Number: HW-2
Revision: 10

	YES	NO	N/S
Other Metals analysis (6 months). . . . exceeded?	___	[✓]	___

NOTE: Prepare a list of all samples and analytes for which holding times have been exceeded. Specify the number of days from date of collection to the date of preparation (from raw data). Attach to checklist.

ACTION: If yes, reject (red-line) values less than Instrument Detection Limit (IDL) and flag as estimated (J) the values above IDL even though sample(s) was preserved properly.

A.1.8 Raw Data

A.1.8.1	Digestion Log* for flame AA/ICP (Form XIII) present?	[✓]	__	___
	Digestion Log for furnace AA Form XIII present?	[✓]	__	✓
	Distillation Log for mercury Form XIII present?	[✓]	__	___
	Distillation Log for cyanides Form XIII present?	[✓]	__	___
	Are pH values (pH<2 for all metals, pH>12 for cyanide) present in Digestion/Distillation Logs?	[___]	✓	___
	*Weights, dilutions and volumes used to obtain values.			
	Percent solids calculation present for soils/sediments?	[___]	__	✓
	Are preparation dates present on Digestion Log?	[✓]	__	___
A.1.8.2	Measurement read out record present? ICP	[✓]	___	___
	Flame AA	[___]	__	✓
	Furnace AA	[✓]	___	___
	Mercury	[✓]	___	___
	Cyanides	[✓]	__	___

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Title: Evaluation of Metals Data for the Contract Laboratory Program
Appendix A.1: Data Assessment - Contract Compliance (Total Review - Inorganics)

Date: Feb. 199?
Number: HW-2
Revision: 10

		YES	NO	N/A
A.1.8.3	Are all raw data to support all sample analyses and QC operations present?	[✓]	--	--
	Legible?	[✓]	--	--
	Properly Labeled?	[✓]	--	--

ACTION: If no for any of the above, write Telephone Record Log and contact laboratory. Flag metal data as estimated if pH of sample is greater than 2. Flag cyanide data as estimated if pH sample is less than 12.

A.1.9 Data Validation and Verification

A.1.9.1 Calibration

A.1.9.1.1	Is record of at least 2 point calibration present for ICP analysis?	[✓]	--	--
	Is record of 5 point calibration present for Hg analysis?	[✓]	--	--

ACTION: If no for any of the above, write in the Contract Problem/Non-Compliance section of the "Data Assessment Narrative".

A.1.9.1.2	Is record of 4 point calibration present for: Flame AA?	[ ]	--	✓
	Furnace AA?	[✓]	--	--
	Cyanides?	[✓]	--	--

NOTE:
1. If less than 4 standards are measured in absorbance mode, then the remaining standards in concentration mode must be run immediately after calibration and be within ±10% of true value.
2. For all AA (except Hg) and Cyanide analyses, one calibration standard is at CRDL level. If not, write in the Contract-Problem/Non-Compliance section of the "Data Assessment Narrative".

STANDARD OPERATING PROCEDURE

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Title: Evaluation of Metals Data for the Contract Laboratory Program
Appendix A.1: Data Assessment - Contract Compliance (Total Review - Inorganics)

Date: Feb. 1993
Number: HW-2
Revision: 10

	YES	NO	N/A
ACTION: Flag associated data as estimated if standards are not within ±10% of true values (except CRDL calibration standard). Do not flag the data as estimated in linear range indicated by good recovery of standard.			
A.1.9.1.3 Is correlation *coefficient less than 0.995 for:			
Mercury Analysis?	___	[✓]	___
Cyanide Analysis?	___	[✓]	___
Atomic Absorption Analysis?	___	[✓]	___
ACTION: If yes, flag the associated data as estimated.			
A.1.9.2 Form II A (Initial and Continuing Calibration Verification)-			
A.1.9.2.1 Present and complete for every metal and cyanide?	[✓]	--	___
Present and complete for AA and ICP when both are used for same analyte?	[___]	--	✓
ACTION: If no for any of the above, prepare Telephone Record Log and contact laboratory.			
A.1.9.2.2 Circle all values on data summary sheet that are outside contract windows. Are all calibration standards (initial and continuing) within control limits?			
Metals 90-110%	[✓]	___	___
Hg - 80-120%	[✓]	___	___
Cyanides 85-115%	[✓]	___	___

* The reviewer will calculate correlation coefficient.

YES NO N/A

ACTION: Flag as estimated (J) all positive data (not flagged with a "U") analyzed between a calibration standard with %R between 75-89% (65-79% for Hg; 70-84% for CN) or 111-125% (121-135% for Hg; 116-130% for CN) recovery and nearest good calibration standard. Qualify results <IDL as estimated (UJ), if the ICV or CCV %R is 75-89% (CN, 70-84% ; HG, 65-79%). Reject (red-line) as unacceptable data if recovery of the ICV or CCV is outside the range 75-125% (CN, 70-130%; Hg, 65-135%). Qualify five samples on either side of verification standard out of control limits.

Was continuing calibration performed every 10 samples or every 2 hours? [✓]

ACTION: If no, flag the excess samples (eleventh and up) data as estimated (J).

Was ICV for cyanides distilled? [✓]

ACTION: If no, write in the Contract-Problem/Non-Compliance section of the "Data Assessment Narrative".

A.1.9.3 Form II B (CRDL Standards for AA and ICP) -

A.1.9.3.1 Was a CRDL standard (CRA) analyzed after initial calibration for all AA metals (except Hg)? [✓]

*Was a mid-range calib. verification standard distilled and analyzed for cyanide analysis? [✓]

Was a 2xCRDL (or 2xIDL when IDL>CRDL) analyzed (CRI) for each ICP run? [✓]
(Note: CRI for AL,Ba,Ca,Fe,Mg,Na,or K is not required.)

ACTION: If no for any of the above, flag as estimated all data falling within the affected ranges.
The affected ranges are:
AA Analysis - **True Value ± CRDL
ICP Analysis - **True Value ± 2CRDL
CN Analysis - **True Value ± 0.5 x True Value.

*Find the results of mid-range standard in the raw data.
**True value of CRA, CRI or mid-range standard. Substitute IDL for CRDL when IDL > CRDL.

		YES	NO	N/A
A.1.9.3.2	Was CRI analyzed after ICV/ICB and before the final CCV/CCB, and for every four hours of ICP run?	[✓]	—	—
	ACTION: If no, write in Contract Problem/Non-Compliance Section of the "Data Assessment Narrative".			
A.1.9.3.3	Circle all values on summary sheet that are outside acceptance windows.			
	Are CRA and CRI standards within control limits: Metals 80 - 120%R?	[—]	✓	—
	Is mid-range standard within control limits: Cyanide 80 - 120%R?	[✓]	—	—
	ACTION: Flag as estimated all data within the affected ranges if the recovery of the standard is between 50-79%; flag only positive data if the recovery is between 121-150%; reject (red line) all data if the recovery is less than 50%; reject only positive data if the recovery is greater than 150%.			
A.1.9.4	Form III (Initial and Continuing Calibration Blanks)			
A.1.9.4.1	Present and complete?	[✓]	—	—
	For both AA and ICP when both are used for same analyte?	[✓]	—	—
	Was an initial calibration blank analyzed?	[✓]	—	—
	Was a continuing calibration blank analyzed after every 10 samples or every 2 hours (whichever is more frequent)?	[✓]	—	—
	ACTION: If no, prepare Telephone Record Log, contact laboratory and write in the contract-problems/ non-compliance section of the Data Assessment Narrative.			

		YES	NO	N/A
A.1.9.4.2	Circle all calibration blank values on Data Summary Sheet that are above CRDL (or 2 x IDL when IDL > CRDL). Are all calibration blanks (when IDL<CRDL) less than or equal to Contract Required Detection Limits (CRDL)?	[✓]		
	Are all calibration blanks less than two times Instrument Detection Limit (when IDL>CRDL)?	[ ]		✓
	ACTION: If no for any of the above, flag as estimated (J) all positive data less than or equal to calibration blank values analyzed between calibration blank with value over CRDL (or 2xIDL) and nearest good calibration blank. Flag five samples on either side of the calibration blank.			
A.1.9.5	FORM III (Preparation Blank) -			
	(Note: The preparation blank for mercury is the same as the calibration blank.)			
A.1.9.5.1	Was one prep. blank analyzed for: each 20 samples?	[✓]		
	each batch?	[✓]		
	each matrix type?	[ ]		✓
	both AA and ICP when both are used for same analyte?	[✓]		
	ACTION: If no for any of the above, flag as estimated (J) all associated positive data <10 x IDLs for which prep. blank was not analyzed.			
	NOTE: If only one blank was analyzed for more than 20 samples, then first 20 samples analyzed do not have to be flagged as estimated (J).			
A.1.9.5.2	Is concentration of prep. blank greater than CRDL when IDL is less than or equal to CRDL?		[✓]	
	If yes, is the concentration of the sample with the least concentrated analyte less than 10 times the prep. blank value?		[ ]	✓

		YES	NO	N/A
	ACTION: If yes, reject (red-line) all associated data greater than CRDL concentration but less than ten times the prep. blank value found in the raw data.			
A.1.9.5.3	Do concentrations of prep. blank fall below two times IDL when IDL is greater than CRDL?	[ ]		✓
	ACTION: If no, reject (red-line) all positive data that has a concentration less than 10 times the prep. blank value in the raw data.			
A.1.9.5.4	Is concentration of prep. blank below the negative CRDL?		[✓]	
	ACTION: If yes, reject (red-line) all associated data that has a concentration less than 10xCRDL.			
A.1.9.6	Form IV (ICP Interference Check Sample)			
1.9.6.1	Present and complete?	[✓]		
	(NOTE: Not required for furnace AA, flame AA, mercury, cyanide and Ca, Mg, K and Na.)			
	Was ICS analyzed at beginning and end of run (or at least twice every 8 hours)?	[✓]		
	ACTION: If no, flag as estimated (J) all samples for which Al, Ca, Fe, or Mg is higher than in ICS.			
A.1.8.6.2	Circle all values on Data Summary Sheet that are more than + 20% of true or established mean value. Are all Interference Check Sample results inside of control limits (+ 20%)?	[✓]		
	If no, is concentration of Al, Ca, Fe, or Mg lower than in ICS?	[ ]		✓
	ACTION: If no, flag as estimated (J) those positive results for which ICS recovery is between 121-150%; flag all sample results as estimated if ICS recovery falls within 50-79%; reject (red-line) those sample results for which ICS recovery is less than 50%; if ICS recovery is above 150%, reject positive results only (not flagged with a "U").			

		YES	NO	N/A
A.1.9.7	Form V A (Spiked Sample Recovery - Pre-Digestion/Pre-Distillation)- (Note: Not required for Ca, Mg, K, and Na (both matrices), Al, and Fe (soil only.)			
A.1.9.7.1	Present and complete for: each 20 samples?	[✓]	__	__
	each matrix type?	[__]	__	✓
	each conc. range (i.e. low, med., high)?	[__]	__	✓
	For both AA and ICP when both are used for same analyte?	[__]	__	✓
	ACTION: If no for any of the above, flag as estimated (J) all positive data less than four times spiking level for which spiked sample was not analyzed.			
	NOTE: If one spiked sample was analyzed for more than 20 samples, then first 20 samples analyzed do not have to be flagged as estimated (J).			
A.1.9.7.2	Was field blank used for spiked sample?	__	[✓]	__
	ACTION: If yes, flag all positive data less than 4 x spike added as estimated (J) for which field blank was used as spiked sample.			
	NOTE: Matrix spike analysis should be performed on a field blank when it is the only aqueous sample in SDG.			
A.1.9.7.3	Circle all values on Data Summary Sheet that are outside control limits (75% to 125%). Are all recoveries within control limits?	[__]	✓	__
	If no, is sample concentration greater than or equal to four times spike concentration?	[__]	✓	__
	ACTION: If yes, disregard spike recoveries for analytes whose concentrations are greater than or equal to four times spike added. If no, circle those analytes on Form V for which sample concentration is less than four times the spike concentration.			

	YES	NO	N/A
Are results outside the control limits (75-125%) flagged with "N" on Form I's and Form VA?	[✓]	--	--

ACTION: If no, write in the Contract - Problem/Non - Compliance section of "Data Assessment Narrative".

A.1.9.7.4 Aqueous

Are any spike recoveries:

(a) less than 30%?	✓	[--]	--
(b) between 30-74%?	✓	[--]	--
(c) between 126-150%?	--	[✓]	--
(d) greater than 150%?	--	[✓]	--

ACTION: If less than 30%, reject all associated aqueous data; if between 30-74%, flag all associated aqueous data as estimated (J); if between 126-150%, flag as estimated (J) all associated aqueous data not flagged with a "U"; if greater than 150%, reject (red-line) all associated aqueous data not flagged with a "U".

NOTE: If pre-digestion spike result is rejectable due to coefficient of correlation of MSA, analytical spike recovery, or duplicate injections criteria, disregard spike recovery on Form V. Flag the associated data as estimated(J).

A.1.9.7.5 Soil/Sediment

Are any spike recoveries:

(a) less than 10%?	--	[--]	✓
(b) between 10-74%?	--	[--]	✓
(c) between 126-200%?	--	[--]	✓
(d) greater than 200%?	--	[--]	✓

ACTION: If less than 10%, reject all associated data; if between 10-74%, flag all associated data as estimated; if between 126-200%, flag as estimated all associated data was not flagged with a "U"; if greater than 200%, reject all associated data not flagged with a "U".

		YES	NO	N/A
A.1.9.8	Form VI (Lab Duplicates)			
A.1.9.8.1	Present and complete for: each 20 samples?	[✓]	___	___
	each matrix type?	[___]	___	✓
	each concentration range (i.e. low, med., high)?	[___]	___	✓
	both AA and ICP when both are used for same analyte?	[___]	___	✓

ACTION: If no for any the above, flag as estimated (J) all data >CRDL* for which duplicate sample was not analyzed.

Note: 1. If one duplicate sample was analyzed for more than 20 samples, then first 20 samples do not have to be flagged as estimated.
2. If percent solids for soil sample and its duplicate differ by more than 1%, prepare a Form VI for each duplicate pair, report concentrations in Mg/L on wet weight basis and calculate RPD or Difference for each analyte.

A.1.9.8.2	Was field blank used for duplicate analysis?	___	[✓]	___

ACTION: If yes, flag all data >CRDL* as estimated (J) for which field blank was used as duplicate.

NOTE: Duplicate analysis should be performed on a field blank when it is the only aqueous sample in SDG.

A.1.9.8.3	Are all values within control limits (RPD 20% or difference < ±CRDL)?	[___]	✓	___
	If no, are all results outside the control limits flagged with an * on Form I's and VI?	[✓]	___	___

ACTION: If no, write in the Contract - Problems/Non-Compliance section of "Data Assessment Narrative".

NOTE: 1. RPD is not calculable for an analyte of the sample - duplicate pair when both values are less than IDL.

* Substitute IDL for CRDL when IDL > CRDL.

	YES	NO	N/A
2. If lab duplicate result is rejectable due to coefficient of correlation of MSA, analytical spike recovery, or duplicate injections criteria, do not apply precision criteria.			
1.9.8.4 Is any value for sample duplicate pair less than CRDL* and other value greater than or equal to 10 x *CRDL?	___	[✓]	___
ACTION: If yes, flag the associated data as estimated (J).			
A.1.9.8.5 Aqueous Circle all values on Data Summary Sheet that are: RPD > 50%, or Difference > ± CRDL*			
Is any RPD greater than 50% where sample and duplicate are both greater than or equal to 5 times *CRDL?	___	[✓]	___
Is any **difference between sample and duplicate greater than *CRDL where sample and/or duplicate is less than 5 times *CRDL?	✓	[ ]	___
ACTION: If yes, flag the associated data as estimated.			
A.1.9.8.6 Soil/Sediment Circle all values on Data Summary Sheet that are: RPD > 100%, or Difference > 2 x CRDL*			
Is any RPD (where sample and duplicate are both greater than or equal to 5 times *CRDL) : > 100%?	___	[ ]	✓
Is any **difference between sample and duplicate (where sample and/or duplicate is less than 5x*CRDL) : > 2x*CRDL?	___	[ ]	✓

* Substitute IDL for CRDL when IDL > CRDL.
** Use absolute values of sample and duplicate to calculate the difference.

		YES	NO	N/A
	ACTION: If yes, flag the associated data as estimated.			
A.1.9.9	Field Duplicates			
A.1.9.9.1	Were field duplicates analyzed?	[✓]		
	ACTION: If yes, prepare a Form VI for each aqueous field duplicate pair. Prepare a Form VI for each soil duplicate pair, if percent solids for sample and its duplicate differ by more than 1%; report concentrations of soils in ug/l on wet weight basis and calculate RPDs or Difference for each analyte.			
	NOTE: 1. Do not calculate RPD when both values are less than IDL. 2. Flag all associated data only for field duplicate pair.			
A.1.9.9.2	Is any value for sample duplicate pair less than *CRDL and other value greater than or equal to 10 x *CRDL?		[✓]	
	ACTION: If yes, flag the associated data as estimated.			
A.1.9.9.3	Aqueous			
	Circle all values on Form VI for field duplicates that are: RPD > 50%, or Difference > ± CRDL*			
	Is any RPD greater than 50% where sample and duplicate are both greater than or equal to 5 times *CRDL?		[✓]	
	Is any **difference between sample and duplicate greater than *CRDL where sample and/or duplicate is less than 5 times *CRDL?		[✓]	
	ACTION: If yes, flag the associated data as estimated.			

* Substitute IDL for CRDL when IDL > CRDL.

** Use absolute values of sample and duplicate to calculate the difference.

	YES	NO	N/A

A.1.9.9.4 Soil/Sediment

Circle all values on Form VI for field duplicates that are:
RPD >100%, or

Difference > 2 x CRDL*

Is any RPD (where sample and duplicate are both greater than 5 times *CRDL) :

>100%? ___ [_ _] ___

Is any **difference between sample and duplicate (where sample and/or duplicate is less than 5x *CRDL):

>2x *CRDL? ___ [_ _] ___

ACTION: If yes, flag the associated data as estimated.

A.1.9.10 Form VII (Laboratory Control Sample) (Note: LCS - not required for aqueous Hg and cyanide analyses.)

A.1.9.10.1 Was one LCS prepared and analyzed for:

every 20 water samples? [___] _ _ ___

every 20 solid samples? [___] _ _ ___

both AA and ICP when both are used for same analyte? [___] _ _ ___

ACTION: If no for any of the above, prepare Telephone Record Log and contact laboratory for submittal of results of LCS. Flag as estimated (J) all data for which LCS was not analyzed.

NOTE: If only one LCS was analyzed for more than 20 samples, then first 20 samples close to LCS do not have to be flagged as estimated.

* Substitute IDL for CRDL when IDL > CRDL.

**Use absolute values of sample and duplicate to calculate the difference.

	YES	NO	N/A
A.1.9.10.2 Aqueous LCS			
Circle all LCS values outside control limits (80 - 120%- except aqueous Ag and Sb).			
Is any LCS recovery: less than 50%?	___	[✓]	___
between 50% and 79%?	___	[✓]	___
between 121% and 150%?	___	[✓]	___
greater than 150%?	___	[✓]	___

ACTION: Less than 50%, reject (red-line) all data; between 50% and 79%, flag all associated data as estimated (J); between 121% and 150%, flag all positive (not flagged with a "U") results as estimated; greater than 150%, reject all positive results.

A.1.9.10.3 Solid LCS

NOTE: 1. If "Found" value of LCS is rejectable due to duplicate injections or analytical spike recovery criteria, regardless of LCS recovery, flag the associated data as estimated (J).
2. If IDL of an analyte is equal to or greater than true value of LCS, disregard the "Action" below even though LCS is out of control limits.

Is LCS "Found" value higher than the control limits on Form VII?	___	[ ]	✓

ACTION: If yes, qualify all associated positive data as estimated.

Is LCS "Found" value lower than the Control limits on Form VII?	___	[ ]	✓

ACTION: If yes, qualify all associated data as estimated.

		YES	NO	N/A
A.1.9.11	Form IX (ICP Serial Dilution) -			
	NOTE: Serial dilution analysis is required only for initial concentrations equal to or greater than 10 x IDL.			
A.1.9.11.1	Was Serial Dilution analysis performed for: each 20 samples?	[✓]	--	--
	each matrix type?	[__]	--	✓
	each concentration range (i.e. low, med.)?	[__]	--	✓
	ACTION: If no for any of the above, flag all positive data greater than or equal to 10xIDLs as estimated (J) for which Serial Dilution Analysis was not performed, and summarize the deficiency on the DPO report.			
A.1.9.11.2	Was field blank(s) used for Serial Dilution Analysis?	__	[✓]	__
	ACTION: If yes, flag all associated data ≥ 10 x IDL as estimated (J).			
	NOTE: Serial dilution analysis should be performed on a field blank when it is the only aqueous sample in SDG.			
A.1.9.11.3	Are results outside control limit flagged with an "E" on Form I's and Form IX when initial concentration on Form IX is equal to 50 times IDL or greater.	[__]	__	✓
	ACTION: If no, write in the contract-problem/non-compliance section of the "Data Assessment Narrative".			
A.1.9.11.4	Circle all values on Data Summary Sheet that are outside control limit for initial concentrations equal to or greater than 10 x IDLs only. Are any % difference values: > 10%?	✓	[__]	__
	≥ 100%?	__	[✓]	__

		YES	NO	N/A
	ACTION: Flag as estimated (J) all associated equal to or greater than 10xIDLs for which percent difference is greater than 10% but less than 100%. Reject (red-line) all associated sample results equal to or greater than 10xIDLs for which PD is greater than or equal to 100%.			
A.1.9.12	Furnace Atomic Absorption (AA) QC Analysis			
A.1.9.12.1	Are duplicate injections present in furnace raw data (except during full Method of Standard Addition) for each sample analyzed by GFAA?	[✓]		
	ACTION: If no, reject the data on Form I's for which duplicate injections were not performed.			
A.1.9.12.2	Do the duplicate injection readings agree within 20% Relative Standard Deviation (RSD) or Coefficient of Variation (CV) for concentration greater than CRDL?	[✓]		
	Was a dilution analyzed for sample with post digestion spike recovery less than 40%?	[ ]		✓
	ACTION: If no for any of the above, flag all the associated data as estimated (J).			
A.1.9.12.3	Is *post digestion spike recovery less than 10% or greater than 150% for any result?		[✓]	
	ACTION: If yes, reject (red-line) the affected data if recovery is <10%; reject data not flagged with "U" if spike recovery is >150%.			
	NOTE: Reject the data only if the affected sample was not subsequently analyzed by Method of Standard Addition.			

* Post digestion spike is not required on the pre-digestion spiked sample when predigest spike recovery is within control limits of 75-125% or when SR>4xSA.

		YES	NO	N/A
A.1.9.13	Form VIII (Method of Standard Addition Results)			
A.1.9.13.1	Present?	[✓]	--	--
	If no, is any Form I result coded with "S" or a "+"?	—	[ ]	✓
	ACTION: If yes, write request on Telephone Record Log and contact laboratory for submittal of Form VIII.			
A.1.9.13.2	Is coefficient of correlation for MSA less than 0.990 for any sample?	✓	[ ]	—
	ACTION: If yes, reject (red-line) affected data.			
A.1.9.13.3	Was *MSA required for any sample but not performed?	—	[✓]	—
	Is coefficient of correlation for MSA less than 0.995?	—	[ ]	✓
	Are MSA calculations outside the linear range of the calibration curve generated at the beginning of the analytical run?	—	[ ]	✓
	ACTION: If yes for any of the above, flag all the associated data as estimated (J).			
A.1.9.13.4	Was proper quantitation procedure followed correctly as outlined in the SOW on page E-16 through E-17?	[✓]	--	—
	ACTION: If no, note exception under contract problem/ non-compliance of data assessment narrative, or prepare a separate list.			
A.1.9.14	Dissolved/Total or Inorganic/Total Analytes -			
A.1.9.14.1	Were any analyses performed for dissolved as well as total analytes on the same sample(s).	—	[✓]	—
	Were any analyses performed for inorganic as well as total (organic + inorganic) analytes on the same sample(s)?	—	[✓]	—

* MSA is not required on LCS and prep. blank.

	YES	NO	N/A
NOTE: 1. If yes, prepare a list comparing differences between all dissolved (or inorganic) and total analytes. Compute the differences as a percent of the total analyte only when dissolved concentration is greater than CRDL as well as total concentration. 2. Apply the following questions only if inorganic (or dissolved) results are (i) above CRDL, and (ii) greater than total constituents. 3. At least one preparation blank, ICS, and LCS should be analyzed in each analytical run.			
A.1.9.14.2 Is the concentration of any dissolved (or inorganic) analyte greater than its total concentration by more than 10%?	___	[_]	✓
A.1.9.14.3 Is the concentration of any dissolved (or inorganic) analyte greater than its total concentration by more than 50%?	___	[_]	✓
ACTION: If more than 10%, flag both dissolved (or inorganic) and total values as estimated (J); if more than 50%, reject (red-line) the data for both values.			

A.1.9.15 Form I to IX

A.1.9.15.1 Are all the Form I through Form IX labeled with:			
Laboratory name?	[✓]	_ _	___
Case/SAS number?	[✓]	_ _	___
EPA sample No.?	[✓]	_ _	___
SDG No.?	[✓]	_ _ _	___
Contract No.?	[✓]	___	___
Correct units?	[✓]	_ _	___
Matrix?	[✓]	_ _	___

ACTION: If no for any of the above, note under contract problem/non-compliance section of the "Data Assessment Narrative".

	YES	NO	N/A
A.1.9.15.2 Do any computation/transcription errors exceed 10% of reported values on Forms I-IX for:			
(NOTE: Check all forms against raw data.)			
(a) all analytes analyzed by ICP?	___	[✓]	___
(b) all analytes analyzed by GFAA?	___	[✓]	___
(c) all analytes analyzed by AA Flame?	___	[ ]	✓
(d) Mercury?	___	[✓]	___
(e) Cyanide?	___	[✓]	___

ACTION: If yes, prepare Telephone Log, contact laboratory for corrected data and correct errors with red pencil and initial.

A.1.9.16 Form I (Field Blank) -

Circle all field blank values on Data Summary Sheet that are greater than CRDL, 2 x IDL when IDL > CRDL.

Do concentrations of field blank(s) fall below CRDL (or 2 x IDL when IDL > CRDL) for all parameters of associated aqueous and soil samples?	[ ]	--	✓
If no, was field blank value already rejected due to other QC criteria?	[ ]	--	✓

ACTION: If no, reject (except field blank results) all associated positive sample data less than or equal to five times the field blank value.

	YES	NO	N/A
A.1.9.17 Form X, XI, XII (Verification of Instrumental Parameters).			
A.1.9.17.1 Is verification report present for:			
Instrument Detection Limits (quarterly)?	[✓]	__	__
ICP Interelement Correction Factors (annually)?	[✓]	__	__
ICP Linear Ranges (quarterly)?	[✓]	__	__
ACTION: If no, contact DPO of the lab.			
A.1.9.17.2 Form X (Instrument Detection Limits) - (Note: IDL is not required for Cyanide.)			
Are IDLs present for: all the analytes?	[✓]	__	__
all the instruments used?	[✓]	__	__
For both AA and ICP when both are used for same analyte?	[__]	__	✓
ACTION: If no for any of the above, prepare Telephone Record Log and contact laboratory.			
Is IDL greater than CRDL for any analyte?	__	[✓]	__
If yes, is the concentration on Form I of the sample analyzed on the instrument whose IDL exceeds CRDL, greater than 5 x IDL?	[__]	__	✓
ACTION: If no, flag as estimated all values less than five times IDL of the instrument whose IDL exceeds CRDL.			

	YES	NO	N/A
A.1.9.17.3 Form XC (Linear Ranges)			
Was any sample result higher than high linear range of ICP.	___	[✓]	. .
Was any sample result higher than the highest calibration standard for non-ICP parameters?	___	[✓]	___
If yes for any of the above, was the sample diluted to obtain the result on Form I?	[___]	_ .	✓
ACTION: If no, flag the result reported on Form I as estimated(J).			
A.1.9.18 Percent Solids of Sediments			
Is soil content in sediment(s) less than 50%?	___	[___]	✓
ACTION: If yes, qualify as estimated all data not previously rejected or flagged due to other QC criteria.			

U.S. EPA - CLP

6
DUPLICATES

EPA SAMPLE NO.
Rodriguez (PD)

Lab Name: CEIMIC Contract: 9000731

Lab Code: CEIMIC Case No.: 9007 SAS No.: _____ SDG No.: Dede

Matrix (soil/water): WATER Level (low/med): Low

% Solids for Sample: 0.0 % Solids for Duplicate: 0.0

Concentration Units (ug/L or mg/kg dry weight): ug/L

Analyte	Control Limit	Sample (S)	C	Duplicate (D)	C	RPD	Q	M
Aluminum		58.00	B	431.00		152.6		
Antimony		52.00	U	59.00	B			
Arsenic		3.00	U	3.00	U			
Barium		8.00	B	3.00	U			
Beryllium		3.00	B	3.00	B			
Cadmium		3.00	U	3.00	U			
Calcium		40000.00		47400.00		16.9		
Chromium		14.00		40.00		96.3		
Cobalt		34.00	B	29.00	B			
Copper		22.00	B	29.00		27.5		
Iron		50.00	B	45.00	B			
Lead		2.00	B	12.10		143.3		
Magnesium		38700.00		41400.00		6.7		
Manganese		122.00		129.00		5.6		
Mercury		0.20	U	0.20	U			
Nickel		22.00	B	39.00	B			
Potassium		1610.00	B	1730.00	B			
Selenium		1.00	U	1.00	U			
Silver		7.00	U	7.00	U			
Sodium		281000.00		298000.00		5.9		
Thallium		15.00	U	15.00	U			
Vanadium		19.00	B	8.00	B			
Zinc		17.00	B	16.00	B			
Cyanide		21.00		5.00	U			

STANDARD OPERATING PROCEDURE Page 1 of 3

Title:	Evaluation of Metals Data for the Contract Laboratory Program Appendix A.1: Data Assessment - Contract Compliance (Total Review - Inorganics)	Date:	Feb. 1990
		Number:	HW-2
		Revision:	10

Case #	900731	Site	Tutu Well Site	Matrix:	Soil	
SDG#	Dede	Lab	Ceimic		Water	X
Contractor	Geraghty & Miller	Reviewer	Donna Lesch		Other	

A.2.1 The case description and exceptions, if any, are noted below with reason(s) for rejection or qualification as estimated values(s) J.

This data package includes the analysis of the samples for SDG Dede. These samples originated from St. Thomas on the 24, 25, 26 and 27 of September, 1990. There are seventeen low level water samples for metals analysis including one duplicate and one matrix spike QC sample.

Cyanide concentration values for samples Devcon I, Devcon III, Rodriguez (P), Rodriguez (PD), and VIHA III are flagged "J" because the pH of the samples was less than 12.

Thallium concentration values for all samples are flagged "R" because the matrix spike recovery is less than 30% (10.5%). Aluminum, Lead and Selenium concentration values are flagged as estimated ("J") because the spike recoveries are between 30-74% (Al 70.6%, Pb 72.0%, Se 54.0%).

The post digestion spike recoveries are low for Selenium and Thallium in all samples. These concentration values are already qualified due to poor recovery in the matrix spike.

TUT 001 1456

STANDARD OPERATING PROCEDURE Page 2 of 3

Title: Evaluation of Metals Data for the Contract Laboratory Program Appendix A.1: Data Assessment - Contract Compliance (Total Review - Inorganics)

Date: Feb. 1990
Number: HW-2
Revision: 10

A.2.1 (continuation)

For sample Smith, the Selenium concentration value is qualified with "R" because the coefficient of correlation for the Method of Standard Additions is less than 0.990. This qualifier supercedes all others.

The sample Steele was used for the sample duplicate analysis. The % Difference is out for QC limits for Aluminum, Chromium, and Lead, therefore all sample data are qualified with "J" for all positive values and "UJ" for all non-detects. The % Difference for Aluminum, Chromium, and Lead are also out of QC limits in the field duplicate; the sample concentration values are already qualified for these analytes.

One CRDL standard has several metals with recoveries out of control limits (80-120 % recovery). The CRI run on 10/11 has the following deficiencies:

Metal	%Recovery
Antimony	49.2
Beryllium	130.0
Cobalt	121.0
Silver	60.0
Zinc	135.0

TUT 001 1457

All samples are associated with the above deficiences. All Antimony concentration values are rejected because the recovery is less than 50%.

STANDARD OPERATING PROCEDURE Page 3 of 3

Title: Evaluation of Metals Data for the Contract Laboratory Program
Appendix A.1: Data Assessment - Contract Compliance (Total Review - Inorganics)

Date: Feb. 1990
Number: HW-2
Revision: 10

Positive hits for Cobalt, Beryllium and Zinc are qualified with a "J". Silver concentration values are qualified "J" for positive hits and "UJ" for non-detects. In the ICP serial dilution analysis, the initial concentration of Aluminum is greater than 10 times the IDL and the % Difference is out of QC limits. As a result, all Aluminum concentration values are qualified with "J".

A.2.2 Contract Problems/Non Compliance:

There were 2-hours and six minutes between independent check samples for the ICAP run on October 11, 1990. This is six minutes greater than the two hour required maximum.

Devcon I, Devcon III, Rodriguez (P), Rodriguez (PD), and VIHA III were not correctly preserved for Cyanide.

MMB Reviewer: _____ Date: _____
Signature

Contractor Reviewer: Donna M. Lesch Date: 01/07/91
Signature

Verified by: (see next page for verification signature) Date: _____

TUT 001 1458

A.2.2 Contract-Problems/Non-Compliance

TUT 001 1459

MB Reviewer: _____ Date: _____
Signature

Contractor Reviewer: Donna M. Lesch Date: 01/07/91
Signature

Verified by: [signature] Date: 1/14/91

Table 2. Tutu Residential Wells Sampling Results, September 1990, Sample Delivery Group 900731

Sample Identification:	731-01	731-02	731-03	731-04	731-05	731-06
					9/24	
Volatile Organic Compounds (VOCs)	Devcon I	Devcon III	Rodriguez (P)	Rodriguez (PD)	Trip Blank	Dede
Chloromethane	2 UJ	2 U	2 UJ	2 UJ	2 U	2 U
Bromomethane	2 U	2 U	2 U	2 UJ	2 U	2 U
Vinyl Chloride	2 U	2 U	2 U	2 UJ	2 U	2 U
Chloroethane	2 UJ	2 U	2 UJ	2 UJ	2 U	2 U
Methylene Chloride	1 UJ	8 UJ	1 UJ	2 UJ	25 J	2 UJ
Acetone	R	R	R	R	12 J	R
Carbon Disulfide	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ
1,1-Dichloroethene	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ
1,1-Dichloroethane	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ
1,2-Dichloroethene (total)	1 U	1 UJ	1 U	1 UJ	1 UJ	1 UJ
Chloroform	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ
1,2-Dichloroethane	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ
2-Butanone	R	R	R	R	R	R
1,1,1-Trichloroethane	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ
Carbon Tetrachloride	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ
Vinyl Acetate	2 UJ	R	2 UJ	2 UJ	R	R
Bromodichloromethane	1 U	1 U	1 U	1 UJ	1 U	1 U
1,2-Dichloropropane	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ
cis-1,3-Dichloropropene	1 UJ	1 U	1 UJ	1 UJ	1 U	1 U
Trichloroethene	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ
Dibromochloromethane	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ
1,1,2-Trichloroethane	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ
Benzene	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ
trans-1,3-Dichloropropene	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ
Bromoform	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ
4-Methyl-2-Pentanone	2 UJ	2 UJ	2 UJ	2 UJ	2 UJ	2 UJ
2-Hexanone	R	R	R	R	R	R
Tetrachloroethene	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ
1,1,2,2-Tetrachloroethane	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ
Toluene	1 UJ	1 U	1 UJ	1 UJ	1 U	1 U
Chlorobenzene	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ
Ethylbenzene	1 U	1 U	1 U	1 UJ	1 U	1 U
Styrene	1 U	1 UJ	1 U	1 UJ	1 UJ	1 UJ
Total Xylenes	1 U	1 U	1 U	1 UJ	8	1 U
Tentatively Identified VOCs						
Ethane,1,1,2-Trichloro-1,2, 2-trifluoro					5 JN	
Unknown		2 JN	1 JN			
Propane-2-Methoxy-2-Methyl						
Dichlorobenzene isomer						

All concentrations are reported in micrograms per liter (ug/L).

J - Value is estimated.

U - Compound is not detected.

R - Value is rejected.

N - Compound is a tentatively identified compound.

Table 2. Tutu Residential Wells Sampling Results, September 1990, Sample Delivery Group 900731

Sample Identification:	731-07	731-08	731-09	731-10	731-11	731-12
				9/25		
Volatile Organic Compounds (VOCs)	Dench	Smith	Steele	Trip Blank	Hartman II	Hartman III
Chloromethane	1 J	25 U	17 UJ	2 U	2 UJ	2 UJ
Bromomethane	2 UJ	25 U	17 UJ	2 U	2 U	2 UJ
Vinyl Chloride	2 UJ	25 U	17 UJ	2 U	2 U	2 UJ
Chloroethane	2 UJ	25 U	17 UJ	2 U	2 UJ	2 UJ
Methylene Chloride	1 UJ	12 UJ	140 UJ	34 J	1 UJ	3 UJ
Acetone	R	25 UJ	R	42 J	R	R
Carbon Disulfide	1 UJ	12 UJ	8 UJ	1 UJ	1 UJ	1 UJ
1,1-Dichloroethene	1 UJ	12 UJ	8 UJ	1 UJ	1 UJ	1 UJ
1,1-Dichloroethane	1 UJ	12 U	8 U	1 UJ	1 UJ	1 U
1,2-Dichloroethene (total)	1 UJ	58	120	1 UJ	5 J	2
Chloroform	1 UJ	12 U	8 UJ	1 UJ	1 UJ	1 UJ
1,2-Dichloroethane	1 UJ	12 UJ	8 UJ	1 UJ	1 UJ	1 UJ
2-Butanone	R	25 UJ	R	R	R	R
1,1,1-Trichloroethane	1 UJ	12 U	8 UJ	1 UJ	1 UJ	1 UJ
Carbon Tetrachloride	1 UJ	12 U	8 U	1 UJ	1 UJ	1 U
Vinyl Acetate	R	25 UJ	17 UJ	R	2 UJ	2 UJ
Bromodichloromethane	1 UJ	12 U	8 U	1 U	1 U	1 U
1,2-Dichloropropane	1 UJ	12 U	8 U	1 UJ	1 UJ	1 U
cis-1,3-Dichloropropene	1 UJ	12 U	8 UJ	1 U	1 UJ	1 UJ
Trichloroethene	1 UJ	20	48	1 UJ	1 J	1 U
Dibromochloromethane	1 UJ	12 U	8 U	1 UJ	1 UJ	1 U
,1,2-Trichloroethane	1 UJ	12 U	8 U	1 UJ	1 UJ	1 U
Benzene	1 UJ	12 U	8 U	1 UJ	1 UJ	1 U
trans-1,3-Dichloropropene	1 UJ	R	8 UJ	1 UJ	1 UJ	1 UJ
Bromoform	1 UJ	12 UJ	8 UJ	1 UJ	1 UJ	1 UJ
4-Methyl-2-Pentanone	2 UJ	25 UJ	17 UJ	2 UJ	2 UJ	2 UJ
2-Hexanone	R	25 UJ	R	R	R	R
Tetrachloroethene	1 UJ	330 J	130 J	1 UJ	7 J	1 J
1,1,2,2-Tetrachloroethane	1 UJ	12 UJ	8 UJ	1 UJ	1 UJ	1 UJ
Toluene	1 UJ	12 U	8 U	1 J	1 UJ	1 U
Chlorobenzene	1 UJ	12 U	8 U	1 UJ	1 UJ	1 U
Ethylbenzene	1 UJ	12 U	8 U	1 U	1 U	1 U
Styrene	1 UJ	12 U	8 UJ	1 UJ	1 U	1 UJ
Total Xylenes	1 UJ	12 U	8 UJ	7	1 U	1 UJ
Tentatively Identified VOCs						
Ethane,1,1,2-Trichloro-1,2, 2-trifluoro				3 JN		
Unknown	6 JN			7 JN	3 JN	4 JN
Propane,2-Methoxy-2-methyl		88 JN	42 JN			
Dichlorobenzene isomer				1 JN		

All concentrations are reported in micrograms per liter (ug/L).

J - Value is estimated.

U - Compound is not detected.

R - Value is rejected.

- Compound is a tentatively identified compound.

TUT 001 1461

Table 2. Tutu Residential Wells Sampling Results, September 1990, Sample Delivery Group 900731

Sample Identification:	731-13	731-14	731-15	731-16	731-17	731-18
						9/26
Volatile Organic Compounds (VOCs)	Four Winds II	Tutu (Four Winds II Replicate)	Harvey	Leonard	VIHA III	Trip Blank
Chloromethane	5 UJ	5 UJ	100 U	2 UJ	2 UJ	2 UJ
Bromomethane	5 UJ	5 UJ	100 U	2 UJ	2 UJ	2 UJ
Vinyl Chloride	5 UJ	5 UJ	100 UJ	2 UJ	2 UJ	2 UJ
Chloroethane	5 UJ	5 UJ	100 U	2 UJ	2 UJ	2 UJ
Methylene Chloride	14 UJ	10 UJ	150 UJ	2 UJ	2 UJ	24J
Acetone	R	R	R	R	R	4 J
Carbon Disulfide	2 UJ	2 UJ	50 UJ	1 UJ	1 UJ	1 UJ
1,1-Dichloroethene	2 UJ	2 UJ	50 UJ	1 UJ	1 UJ	1 UJ
1,1-Dichloroethane	2 UJ	2 UJ	50 U	1 UJ	1 U	1 U
1,2-Dichloroethene (total)	75 J	61 J	50 UJ	1 UJ	1 U	1 U
Chloroform	2 UJ	2 UJ	50 U	1 UJ	3 J	1 UJ
1,2-Dichloroethane	2 UJ	2 UJ	50 UJ	1 UJ	1 UJ	1 UJ
2-Butanone	R	R	R	R	R	R
1,1,1-Trichloroethane	2 UJ	2 UJ	50 U	1 UJ	1 UJ	1 UJ
Carbon Tetrachloride	2 UJ	2 UJ	50 U	1 UJ	1 U	1 U
Vinyl Acetate	5 UJ	5 UJ	100 UJ	2 UJ	2 UJ	2 UJ
Bromodichloromethane	2 UJ	2 UJ	50 UJ	1 UJ	1 U	1 U
1,2-Dichloropropane	2 UJ	2 UJ	50 U	1 UJ	1 U	1 U
cis-1,3-Dichloropropene	2 UJ	2 UJ	50 UJ	1 UJ	1 UJ	1 UJ
Trichloroethene	6 J	4 J	50 U	1 UJ	1 U	1 U
Dibromochloromethane	2 UJ	2 UJ	50 U	1 UJ	1 U	1 U
1,1,2-Trichloroethane	2 UJ	2 UJ	50 U	1 UJ	1 U	1 U
Benzene	2 UJ	2 UJ	50 U	1 UJ	1 U	1 U
trans-1,3-Dichloropropene	2 UJ	2 UJ	50 U	1 UJ	1 UJ	1 UJ
Bromoform	2 UJ	2 UJ	50 UJ	1 UJ	1 UJ	1 UJ
4-Methyl-2-Pentanone	5 UJ	5 UJ	100 UJ	2 UJ	2 UJ	1 UJ
2-Hexanone	R	R	R	R	R	R
Tetrachloroethene	25 J	18 J	890 J	1 UJ	1 UJ	1 UJ
1,1,2,2-Tetrachloroethane	2 UJ	2 UJ	50 UJ	1 UJ	1 UJ	1 UJ
Toluene	2 UJ	2 UJ	50 U	1 UJ	1 U	1 U
Chlorobenzene	2 UJ	2 UJ	50 U	1 UJ	1 U	1 U
Ethylbenzene	2 UJ	2 UJ	50 U	1 UJ	1 U	1 U
Styrene	2 UJ	2 UJ	50 U	1 UJ	1 UJ	1 UJ
Total Xylenes	2 UJ	2 UJ	50 UJ	1 UJ	1 UJ	1 UJ
<u>Tentatively Identified VOCs</u>						
Ethane,1,1,2-Trichloro-1,2,2-trifluoro						7 JN
Unknown	15 JN				1 JN	
Propane, 2-Methoxy-2-methyl		7.5JN				

All concentrations are reported in micrograms per liter (ug/L).

J - Value is estimated.

U - Compound is not detected.

R - Value is rejected.

N - Compound is a tentatively identified compound.

TUT 001 1462

.ble 2. Tutu Residential Wells Sampling Results, September 1990, Sample Delivery Group 900731

Sample Identification:	731-19	731-20
olatile Organic Compounds (VOCs)	Eglin II	Eglin III
Chloromethane	10 UJ	10 UJ
omomethane	10 UJ	10 UJ
nyl Chloride	10 UJ	10 UJ
Chloroethane	10 UJ	10 UJ
ethylene Chloride	5 UJ	10 UJ
etone	R	22 J
Carbon Disulfide	5 UJ	5 UJ
1-Dichloroethene	5 UJ	5 UJ
1-Dichloroethane	5 UJ	5 U
1,2-Dichloroethene (total)	120 J	52 J
loroform	5 UJ	5 U
2-Dichloroethane	5 UJ	5 UJ
2-Butanone	R	R
1,1-Trichloroethane	5 UJ	5 U
rbon Tetrachloride	5 UJ	5 U
Vinyl Acetate	10 UJ	10 UJ
omodichloromethane	5 UJ	5 UJ
2-Dichloropropane	5 UJ	5 UJ
cis-1,3-Dichloropropene	5 UJ	5 UJ
ichloroethene	22 J	14
bromochloromethane	5 UJ	5 UJ
1,1,2-Trichloroethane	5 UJ	5 UJ
ne	5 UJ	5 UJ
ns-1,3-Dichloropropene	5 UJ	5 UJ
Bromoform	5 UJ	5 UJ
Methyl-2-Pentanone	10 UJ	10 UJ
Hexanone	R	R
Tetrachloroethene	71 J	44 J
1,2,2-Tetrachloroethane	5 UJ	5 UJ
luene	5 UJ	5 UJ
Chlorobenzene	5 UJ	5 UJ
hylbenzene	5 UJ	5 UJ
rene	5 UJ	5 UJ
Total Xylenes	5 UJ	5 UJ
ntatively Identified VOCs		
ethane, 1,1,2-Trichloro-1,2,2-trifluoro		
Unknown	220 JN	5 JN
opane, 2-Methoxy-2-methyl		

All concentrations are reported in micrograms per liter (ug/L).

J - Value is estimated.

U - Compound is not detected.

R - Value is rejected.

N - Compound is a tentatively identified compound.

TUT 001 1463

Table 2. Tutu Residential Wells Sampling Results, September 1990, Sample Delivery Group 900731

Sample Identification: Semivolatile Organic Compounds (SVOCs)	731-01 Devcon I	731-02 Devcon III	731-03 Rodriguez (P)	731-04 Rodriguez (PD)	731-06 Dede	731-07 Dench
Phenol	10 U	10 U	10 U	10 U	10 U	10 U
›is(2-Chloroethyl)Ether	10 U	10 U	10 U	10 U	10 U	10 U
2-Chlorophenol	10 U	10 U	10 U	10 U	10 U	10 U
1,3-Dichlorobenzene	10 U	10 U	10 U	10 U	10 U	10 U
1,4-Dichlorobenzene	10 U	10 U	10 U	10 U	10 U	10 U
Benzyl Alcohol	10 U	10 U	10 U	10 U	10 U	10 U
1,2-Dichlorobenzene	10 U	10 U	10 U	10 U	10 U	10 U
2-Methylphenol	10 U	10 U	10 U	10 U	10 U	10 U
N-Nitroso-Di-n-Propylamine	10 U	10 U	10 U	10 U	10 U	10 U
Hexachloroethane	10 U	10 U	10 U	10 U	10 U	10 U
Nitrobenzene	10 U	10 U	10 U	10 U	10 U	10 U
Isophorone	10 U	10 U	10 U	10 U	10 U	10 U
2-Nitrophenol	10 U	10 U	10 U	10 U	10 U	10 U
2,4-Dimethylphenol	10 U	10 U	10 U	10 U	10 U	10 U
Benzoic Acid	50 U	50 U	50 U	50 U	50 U	50 U
Bis(2-Chloroethoxy)Methane	10 U	10 U	10 U	10 U	10 U	10 U
2,4-Dichlorophenol	10 U	10 U	10 U	10 U	10 U	10 U
1,2,4-Trichlorobenzene	10 U	10 U	10 U	10 U	10 U	10 U
Naphthalene	10 U	10 U	10 U	10 U	10 U	10 U
4-Chloroaniline	10 U	10 U	10 U	10 U	10 U	10 U
Hexachlorobutadiene	10 U	10 U	10 U	10 U	10 U	10 U
4-Chloro-3-Methylphenol	10 U	10 U	10 U	10 U	10 U	10 U
2-Methylnaphthalene	10 U	10 U	10 U	10 U	10 U	10 U
Hexachlorocyclopentadiene	10 U	10 U	10 U	10 U	10 U	10 U
2,4,6-Trichlorophenol	10 U	10 U	10 U	10 U	10 U	10 U
2,4,5-Trichlorophenol	50 U	50 U	50 U	50 U	50 U	50 U
2-Chloronaphthalene	10 U	10 U	10 U	10 U	10 U	10 U
2-Nitroaniline	50 U	50 U	50 U	50 U	50 U	50 U
Dimethyl Phthalate	10 U	10 U	10 U	10 U	10 U	10 U
Acenaphthylene	10 U	10 U	10 U	10 U	10 U	10 U
2,6-Dinitrotoluene	10 U	10 U	10 U	10 U	10 U	10 U
3-Nitroaniline	50 U	50 U	50 U	50 U	50 U	50 U
Acenaphthene	10 U	10 U	10 U	10 U	10 U	10 U
2,4-Dinitrophenol	50 U	50 U	50 U	50 U	50 U	50 U
4-Nitrophenol	50 U	50 U	50 U	50 U	50 U	50 U
Dibenzofuran	10 U	10 U	10 U	10 U	10 U	10 U
2,4-Dinitrotoluene	10 U	10 U	10 U	10 U	10 U	10 U
Diethylphthalate	10 U	10 U	10 U	10 U	10 U	10 U
4-Chlorophenyl-phenylether	10 U	10 U	10 U	10 U	10 U	10 U
Fluorene	10 U	10 U	10 U	10 U	10 U	10 U
4-Nitroaniline	50 U	50 U	50 U	50 U	50 U	50 U
4,6-Dinitro-2-Methylphenol	50 U	50 U	50 U	50 U	50 U	50 U
N-Nitrosodiphenylamine	10 U	10 U	10 U	10 U	10 U	10 U
4-Bromophenyl-phenylether	10 U	10 U	10 U	10 U	10 U	10 U
Hexachlorobenzene	10 U	10 U	10 U	10 U	10 U	10 U

All concentrations are reported in micrograms per liter (ug/L).

- Compound is not detected.

ble 2. Tutu Residential Wells Sampling Results, September 1990. Sample Delivery Group 900731

mple Identification: nivolatile Organic ompo (SVOCs)	731-01 Devcon I	731-02 Devcon III	731-03 Rodriguez (P)	731-04 Rodriguez (PD)	731-06 Dede	731-07 Dench
ntachlorophenol	50 U	50 U	50 U	50 U	50 U	50 U
henanthrene	10 U	10 U	10 U	10 U	10 U	10 U
thracene	10 U	10 U	10 U	10 U	10 U	10 U
n-Butylphthalate	10 U	10 U	10 U	10 U	10 U	10 U
luoranthene	10 U	10 U	10 U	10 U	10 U	10 U
rene	10 U	10 U	10 U	10 U	10 U	10 U
ylbenzylphthalate	10 U	10 U	10 U	10 U	10 U	10 U
.3-Dichlorobenzidine	20 U	20 U	20 U	20 U	20 U	20 U
nzo(a)Anthracene	10 U	10 U	10 U	10 U	10 U	10 U
rysene	10 U	10 U	10 U	10 U	10 U	10 U
is(2-Ethylhexyl)Phthalate	10 U	10 U	10 U	10 U	10 U	10 U
-n-Octyl Phthalate	10 U	10 U	10 U	10 U	10 U	10 U
nzo(b)Fluoranthene	10 U	10 U	10 U	10 U	10 U	10 U
enzo(k)Fluoranthene	10 U	10 U	10 U	10 U	10 U	10 U
nzo(a)Pyrene	10 U	10 U	10 U	10 U	10 U	10 U
eno(1,2,3-cd)Pyrene	10 U	10 U	10 U	10 U	10 U	10 U
)ibenz(a,h)Anthracene	10 U	10 U	10 U	10 U	10 U	10 U
nzo(g,h,i)Perylene	10 U	10 U	10 U	10 U	10 U	10 U
ntatively Identified SVOCs						
lo tentatively identified compounds found.						

co rations are reported in micrograms per liter (ug/L).

J - Compound is not detected.

Table 2. Tutu Residential Wells Sampling Results, September 1990, Sample Delivery Group 900731

Sample Identification: Semivolatile Organic Compounds (SVOCs)	731-08 Smith	731-09 Steele	731-11 Hartman II	731-12 Hartman III	731-13 Four Winds II
Phenol	10 U	10 U	10 U	10 U	10 U
Bis(2-Chloroethyl)Ether	10 U	10 U	10 U	10 U	10 U
2-Chlorophenol	10 U	10 U	10 U	10 U	10 U
1,3-Dichlorobenzene	10 U	10 U	10 U	10 U	10 U
1,4-Dichlorobenzene	10 U	10 U	10 U	10 U	10 U
Benzyl Alcohol	10 U	10 U	10 U	10 U	10 U
1,2-Dichlorobenzene	10 U	10 U	10 U	10 U	10 U
2-Methylphenol	10 U	10 U	10 U	10 U	10 U
N-Nitroso-Di-n-Propylamine	10 U	10 U	10 U	10 U	10 U
Hexachloroethane	10 U	10 U	10 U	10 U	10 U
Nitrobenzene	10 U	10 U	10 U	10 U	10 U
Isophorone	10 U	10 U	10 U	10 U	10 U
Nitrophenol	10 U	10 U	10 U	10 U	10 U
2,4-Dimethylphenol	10 U	10 U	10 U	10 U	10 U
Benzoic Acid	50 U	50 U	50 U	50 U	50 U
Bis(2-Chloroethoxy)Methane	10 U	10 U	10 U	10 U	10 U
2,4-Dichlorophenol	10 U	10 U	10 U	10 U	10 U
1,2,4-Trichlorobenzene	10 U	10 U	10 U	10 U	10 U
Naphthalene	10 U	10 U	10 U	10 U	10 U
4-Chloroaniline	10 U	10 U	10 U	10 U	10 U
Hexachlorobutadiene	10 U	10 U	10 U	10 U	10 U
4-Chloro-3-Methylphenol	10 U	10 U	10 U	10 U	10 U
2-Methylnaphthalene	10 U	10 U	10 U	10 U	10 U
Hexachlorocyclopentadiene	10 U	10 UJ	10 U	10 U	10 U
2,4,6-Trichlorophenol	10 U	10 U	10 U	10 U	10 U
2,4,5-Trichlorophenol	50 U	50 U	50 U	50 U	50 U
2-Chloronaphthalene	10 U	10 U	10 U	10 U	10 U
2-Nitroaniline	50 U	50 U	50 U	50 U	50 U
Dimethyl Phthalate	10 U	10 U	10 U	10 U	10 U
Acenaphthylene	10 U	10 U	10 U	10 U	10 U
2,6-Dinitrotoluene	10 U	10 U	10 U	10 U	10 U
3-Nitroaniline	50 U	50 U	50 U	50 U	50 U
Acenaphthene	10 U	10 U	10 U	10 U	10 U
2,4-Dinitrophenol	50 U	50 UJ	50 U	50 U	50 U
4-Nitrophenol	50 U	50 U	50 U	50 U	50 U
Dibenzofuran	10 U	10 U	10 U	10 U	10 U
2,4-Dinitrotoluene	10 U	10 U	10 U	10 U	10 U
Diethylphthalate	10 U	10 U	10 U	10 U	10 U
4-Chlorophenyl-phenylether	10 U	10 U	10 U	10 U	10 U
Fluorene	10 U	10 U	10 U	10 U	10 U
4-Nitroaniline	50 U	50 U	50 U	50 U	50 U
4,6-Dinitro-2-Methylphenol	50 U	50 U	50 U	50 U	50 U
N-Nitrosodiphenylamine	10 U	10 U	10 U	10 U	10 U
4-Bromophenyl-phenylether	10 U	10 U	10 U	10 U	10 U
Hexachlorobenzene	10 U	10 U	10 U	10 U	10 U

All concentrations are reported in micrograms per liter (ug/L).

J - Value is estimated.

U - Compound is not detected.

TUT 001 1466

able 2. Tutu Residential Wells Sampling Results, September 1990, Sample Delivery Group 900731

Sample Identification: Semivolatile Organic Compounds (SVOCs)	731-08 Smith	731-09 Steele	731-11 Hartman II	731-12 Hartman III	731-13 Four Winds II
entachlorophenol	50 U	50 U	50 U	50 U	50 U
henanthrene	10 U	10 U	10 U	10 U	10 U
Anthracene	10 U	10 U	10 U	10 U	10 U
i-n-Butylphthalate	10 U	10 U	10 U	10 U	10 U
luoranthene	10 U	10 U	10 U	10 U	10 U
Pyrene	10 U	10 U	10 U	10 U	10 U
utylbenzylphthalate	10 U	10 U	10 U	10 U	10 U
,3-Dichlorobenzidine	20 U	20 U	20 U	20 U	20 U
Benzo(a)Anthracene	10 U	10 U	10 U	10 U	10 U
hrysene	10 U	10 U	10 U	10 U	10 U
s(2-Ethylhexyl)Phthalate	10 U	10 U	10 U	10 U	10 U
Di-n-Octyl Phthalate	10 U	10 U	10 U	10 U	10 U
enzo(b)Fluoranthene	10 U	10 U	10 U	10 U	10 U
enzo(k)Fluoranthene	10 U	10 U	10 U	10 U	10 U
Benzo(a)Pyrene	10 U	10 U	10 U	10 U	10 U
deno(1,2,3-cd)Pyrene	10 U	10 U	10 U	10 U	10 U
ibenz(a,h)Anthracene	10 U	10 U	10 U	10 U	10 U
Benzo(g,h,i)Perylene	10 U	10 U	10 U	10 U	10 U
entatively Identified SVOCs					
no tentatively identified compounds found.					

ll entrations are reported in micrograms per liter (ug/L).

- Value is estimated.

U - Compound is not detected.

TUT 001 1467

able 2. Tutu Residential Wells Sampling Results, September 1990, Sample Delivery Group 900731

ample Identification: emivolatile Organic Compounds (SVOCs)	731-14 Tutu (Four Winds II Replicate)	731-15 Harvey	731-16 Leonard	731-17 VIHA III	731-19 Eglin II	731-20 Eglin III
henol	10 U	10 U	10 U	10 U	10 U	10 U
bis(2-Chloroethyl)Ether	10 U	10 U	10 U	10 U	10 U	10 U
-Chlorophenol	10 U	10 U	10 U	10 U	10 U	10 U
,3-Dichlorobenzene	10 U	10 U	10 U	10 U	10 U	10 U
1,4-Dichlorobenzene	10 U	10 U	10 U	10 U	10 U	10 U
enzyl Alcohol	10 U	10 U	10 U	10 U	10 U	10 U
,2-Dichlorobenzene	10 U	10 U	10 U	10 U	10 U	10 U
2-Methylphenol	10 U	10 U	10 U	10 U	10 U	10 U
-Nitroso-Di-n-Propylamine	10 U	10 U	10 U	10 U	10 U	10 U
exachloroethane	10 U	10 U	10 U	10 U	10 U	10 U
Nitrobenzene	10 U	10 U	10 U	10 U	10 U	10 U
ophorone	10 U	10 U	10 U	10 U	10 U	10 U
-Nitrophenol	10 U	10 U	10 U	10 U	10 U	10 U
2,4-Dimethylphenol	10 U	10 U	10 U	10 U	10 U	10 U
enzoic Acid	50 U	50 U	50 U	50 U	50 U	50 U
s(2-Chloroethoxy)Methane	10 U	10 U	10 U	10 U	10 U	10 U
2,4-Dichlorophenol	10 U	10 U	10 U	10 U	10 U	10 U
,2,4-Trichlorobenzene	10 U	10 U	10 U	10 U	10 U	10 U
aphthalene	10 U	10 U	10 U	10 U	10 U	10 U
4-Chloroaniline	10 U	10 U	10 U	10 U	10 U	10 U
exachlorobutadiene	10 U	10 U	10 U	10 U	10 U	10 U
-Chloro-3-Methylphenol	10 U	10 U	10 U	10 U	10 U	10 U
2-Methylnaphthalene	10 U	10 U	10 U	10 U	10 U	10 U
exachlorocyclopentadiene	10 U	10 U	10 U	10 U	10 U	10 U
,4,6-Trichlorophenol	10 U	10 U	10 U	10 U	10 U	10 U
2,4,5-Trichlorophenol	50 U	50 U	50 U	50 U	50 U	50 U
-Chloronaphthalene	10 U	10 U	10 U	10 U	10 U	10 U
-Nitroaniline	50 U	50 U	50 U	50 U	50 U	50 U
Dimethyl Phthalate	10 U	10 U	10 U	10 U	10 U	10 U
cenaphthylene	10 U	10 U	10 U	10 U	10 U	10 U
,6-Dinitrotoluene	10 U	10 U	10 U	10 U	10 U	10 U
3-Nitroaniline	50 U	50 U	50 U	50 U	50 U	50 U
cenaphthene	10 U	10 U	10 U	10 U	10 U	10 U
,4-Dinitrophenol	50 U	50 U	50 U	50 U	50 U	50 U
4-Nitrophenol	50 U	50 U	50 U	50 U	50 U	50 U
ibenzofuran	10 U	10 U	10 U	10 U	10 U	10 U
,4-Dinitrotoluene	10 U	10 U	10 U	10 U	10 U	10 U
Diethylphthalate	10 U	10 U	10 U	10 U	10 U	10 U
-Chlorophenyl-phenylether	10 U	10 U	10 U	10 U	10 U	10 U
luorene	10 U	10 U	10 U	10 U	10 U	10 U
4-Nitroaniline	50 U	50 U	50 U	50 U	50 U	50 U
6-Dinitro-2-Methylphenol	50 U	50 U	50 U	50 U	50 U	50 U
-Nitrosodiphenylamine	10 U	10 U	10 U	10 U	10 U	10 U
4-Bromophenyl-phenylether	10 U	10 U	10 U	10 U	10 U	10 U

ll concentrations are reported in micrograms per liter (ug/L).

U - Compound is not detected.

TUT 001 1468

Table 2. Tutu Residential Wells Sampling Results, September 1990, Sample Delivery Group 900731

Sample Identification: Semivolatile Organic Compounds (SVOCs)	731-14 Tutu (Four Winds II Replicate)	731-15 Harvey	731-16 Leonard	731-17 VIHA III	731-19 Eglin II	731-20 Eglin III
Hexachlorobenzene	10 U	10 U	10 U	10 U	10 U	10 U
Pentachlorophenol	50 U	50 U	50 U	50 U	50 U	50 U
Phenanthrene	10 U	10 U	10 U	10 U	10 U	10 U
Anthracene	10 U	10 U	10 U	10 U	10 U	10 U
Di-n-Butylphthalate	10 U	10 U	10 U	10 U	10 U	10 U
Fluoranthene	10 U	10 U	10 U	10 U	10 U	10 U
Pyrene	10 U	10 U	10 U	10 U	10 U	10 U
Butylbenzylphthalate	10 U	10 U	10 U	10 U	10 U	10 U
3,3-Dichlorobenzidine	20 U	20 U	20 U	20 U	20 U	20 U
Benzo(a)Anthracene	10 U	10 U	10 U	10 U	10 U	10 U
Chrysene	10 U	10 U	10 U	10 U	10 U	10 U
Bis(2-Ethylhexyl)Phthalate	10 U	10 U	10 U	10 U	10 U	10 U
Di-n-Octyl Phthalate	10 U	10 U	10 U	10 U	10 U	10 U
Benzo(b)Fluoranthene	10 U	10 U	10 U	10 U	10 U	10 U
Benzo(k)Fluoranthene	10 U	10 U	10 U	10 U	10 U	10 U
Benzo(a)Pyrene	10 U	10 U	10 U	10 U	10 U	10 U
Indeno(1,2,3-cd)Pyrene	10 U	10 U	10 U	10 U	10 U	10 U
Dibenz(a,h)Anthracene	10 U	10 U	10 U	10 U	10 U	10 U
Benzo(g,h,i)Perylene	10 U	10 U	10 U	10 U	10 U	10 U

Tentatively Identified SVOCs

No tentatively identified compounds found.

All concentrations are reported in micrograms per liter (ug/L).

- Compound is not detected.

TUT 001 1469

Table 2. Tutu Residential Wells Sampling Results, September 1990, Sample Delivery Group 900731

Sample Identification:	731-01	731-02	731-03	731-04	731-06	731-07
Pesticide/PCBs	Devcon I	Devcon III	Rodriguez (P)	Rodriguez (PD)	Dede	Dench
alpha-BHC	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
beta-BHC	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
delta-BHC	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
gamma-BHC	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Heptachlor	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Aldrin	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Heptachlor epoxide	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Endosulfan I	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Dieldrin	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U
4,4-DDE	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U
Endrin	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U
Endosulfan II	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U
4,4-DDD	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U
Endosulfan sulfate	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U
4,4-DDT	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U
Methoxychlor	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Endrin ketone	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U
alpha-Chlordane	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
gamma-Chlordane	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Toxaphene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Aroclor-1016	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Aroclor-1221	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Aroclor-1232	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Aroclor-1242	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Aroclor-1248	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Aroclor-1254	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Aroclor-1260	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U

All concentrations are reported in micrograms per liter (ug/L).

J - Compound is not detected.

Table 2. Tutu Residential Wells Sampling Results, September 1990, Sample Delivery Group 900731

Sample Identification:	731-08	731-09	731-11	731-12	731-13
Pesticide/PCBs	Smith	Steele	Hartman II	Hartman III	Four Winds II
alpha-BHC	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
eta-BHC	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
elta-BHC	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
gamma-BHC	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Heptachlor	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
ldrin	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Heptachlor epoxide	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
ndosulfan I	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
ieldrin	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U
4,4-DDE	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U
ndrin	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U
ndosulfan II	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U
4,4-DDD	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U
ndosulfan sulfate	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U
,4-DDT	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U
Methoxychlor	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
ndrin ketone	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U
pha-Chlordane	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
gamma-Chlordane	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
oxaphene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
roclor-1016	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Aroclor-1221	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
r -1232	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
roclor-1242	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Aroclor-1248	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
roclor-1254	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
roclor-1260	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U

All concentrations are reported in micrograms per liter (ug/L).

- Compound is not detected.

Table 2. Tutu Residential Wells Sampling Results, September 1990. Sample Delivery Group 900731

Sample Identification: Pesticide/PCBs	731-14 Tutu (Four Winds II Replicate)	731-15 Harvey	731-16 Leonard	731-17 VIHA III	731-19 Eglin II	731-20 Eglin III
alpha-BHC	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
beta-BHC	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
delta-BHC	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
gamma-BHC	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Heptachlor	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Aldrin	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Heptachlor epoxide	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Endosulfan I	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Dieldrin	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U
4,4-DDE	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U
Endrin	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U
Endosulfan II	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U
4,4-DDD	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U
Endosulfan sulfate	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U
4,4-DDT	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U
Methoxychlor	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Endrin ketone	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U
alpha-Chlordane	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
gamma-Chlordane	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Toxaphene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Aroclor-1016	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Aroclor-1221	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Aroclor-1232	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Aroclor-1242	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Aroclor-1248	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Aroclor-1254	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Aroclor-1260	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U

All concentrations are reported in micrograms per liter (ug/L).

'J - Compound is not detected.

TUT 001 1472

Table 2. Tutu Residential Wells Sampling Results, September 1990, Sample Delivery Group 900731

Sample Identification:	731-01	731-02	731-03	731-04	731-06	731-07	731-08	731-09
Inorganic Analyses	Devcon I	Devcon III	Rodriguez (P)	Rodriguez (PD)	Dede	Dench	Smith	Steele
Aluminum	139 BJ	411 J	58 BJ	431 J	136 BJ	278 J	234 J	492 J
Antimony	R	R	R	R	R	R	R	R
Arsenic	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U
Barium	21 B	15 B	8 B	3 U	8 B	19 B	15 B	27 B
Beryllium	5 BJ	4 BJ	3 BJ	3 BJ	3 BJ	4 BJ	3 BJ	3 BJ
Cadmium	3 U	3 U	3 U	3 U	5	3 B	3 U	4 B
Calcium	41600	43800	40000	47400	23500	24200	50200	44000
Chromium	4 UJ	4 UJ	14 J	40 J	16 J	22 J	14 J	9 BJ
Cobalt	18 U	59 J	34 BJ	39 BJ	60 J	44 BJ	18 U	55 J
Copper	4 U	53	22 B	29	32	52	13 B	21 B
Iron	34 B	40 B	50 B	45 B	43 B	163	158	26 B
Lead	8.2 J	11.8 J	2 BJ	12.1 J	3.7 J	7.8 J	10.9 J	13.2 J
Magnesium	39500	41000	38700	41400	25600	25000	45500	40500
Manganese	241	91	122	129	201	545	41	23
Mercury	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Nickel	13 B	41	22 B	39 B	11 U	73	57	45
Potassium	2970 B	2050 B	1610 B	1730 B	2000 B	1690 B	1540 B	1180 B
Selenium	1.6 BJ	1.4 BJ	1 UJ	1 UJ	1 UJ	1 UJ	R	1.4 BJ
Silver	7 UJ	7 UJ	7 UJ	7 UJ	7 UJ	7 UJ	7 UJ	7 UJ
Sodium	330000	384000	281000	298000	324000	328000	410000	313000
Thallium	R	R	R	R	R	R	R	R
Vanadium	32 B	20 B	19 B	8 B	21 B	28 B	5 U	27 B
Zinc	6 BJ	6 BJ	17 BJ	16 BJ	12 BJ	41 J	179 J	12 BJ
Cyanide	5 UJ	5 UJ	21 J	5 UJ	5 U	6.8 B	5 U	6.3 B

All concentrations are reported in micrograms per liter (ug/L).

J - Value is estimated.

U - Analyte is not detected.

R - Value is rejected.

B - Value is between instrument detection limit and contract required detection limit.

TUT 001 1473

Table 2. Tutu Residential Wells Sampling Results, September 1990, Sample Delivery Group 900731

Sample Identification:	731-11	731-12	731-13	731-14	731-15	731-16	731-17
Inorganic Analyses	Hartman 2	Hartman 3	Four Winds II	Tutu (Four Winds II Replicate)	Harvey	Leonard	VIHA III
Aluminum	269 J	278 J	162 BJ	304 J	1280 J	93 BJ	182 BJ
Antimony	R	R	R	R	R	R	R
Arsenic	3 U	3 U	3 U	3 U	3 U	3 U	3 U
Barium	12 B	15 B	15 B	11 B	35 B	11 B	14 B
Beryllium	3 BJ	4 BJ	3 BJ	4 BJ	3 BJ	3 BJ	3 BJ
Cadmium	8	3 U	5	6	3 U	3 U	3 U
Calcium	38100	41100	46100	54300	53700	38300	43300
Chromium	11 J	11 J	32 J	14 J	18 J	15 J	5 BJ
Cobalt	30 BJ	25 BJ	29 BJ	43 BJ	38 BJ	37 BJ	18 U
Copper	34	30	37	5 B	59	31	29
Iron	23 B	31 B	55 B	57 B	3360	37 BJ	149
Lead	10.4 J	1.8 BJ	8 J	8.7 J	32.6 J	1.8 BJ	3.7 J
Magnesium	33400	28300	34000	38800	46200	24400	28000
Manganese	2 U	3 B	28	31	191	2 U	11 B
Mercury	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Nickel	95	52	36 B	44	58	11 U	43
Potassium	1040 B	1690 B	2190 B	2060 B	2000 B	1210 B	1030 B
Selenium	1.6 BJ	1 UJ	1.2 BJ	1 UJ	1.2 BJ	1.4 BJ	1.5 BJ
Silver	7 UJ	7 UJ	7 UJ	7 UJ	11 J	17 J	7 UJ
Sodium	285000	217000	215000	249000	233000	318000	162000
Thallium	R	R	R	R	R	R	R
Vanadium	52	124	75	83	59	135	33 B
Zinc	9 BJ	13 BJ	85 J	88 J	248 J	7 BJ	17 BJ
Cyanide	5 U	5 U	8.5 B	5 U	7.4 B	6.3 B	8 BJ

All concentrations are reported in micrograms per liter (ug/L).

J - Value is estimated.

U - Analyte is not detected.

R - Value is rejected.

B - Value is between instrument detection limit and contract required detection limit.

Table 2. Tutu Residential Wells Sampling Results, September 1990, Sample Delivery Group 900731

Sample Identification:	731-19	731-20
Inorganic Analyses	Eglin II	Eglin III
Aluminum	69 BJ	156 BJ
Antimony	R	R
Arsenic	3 U	3 U
Barium	23 B	57 B
Beryllium	3 BJ	4 BJ
Cadmium	11	3 U
Calcium	47900	81400
Chromium	17 J	10 J
Cobalt	32 BJ	30 BJ
Copper	36	9 B
Iron	86 B	56 B
Lead	2.1 BJ	1 UJ
Magnesium	35400	54600
Manganese	8 B	53
Mercury	0.2 U	0.2 U
Nickel	67	24 B
Potassium	1620 B	2250 B
Selenium	1.2 BJ	1.2 BJ
Silver	7 UJ	18 J
Sodium	247000	398000
Thallium	R	R
Vanadium	47 B	9 B
Zinc	75 J	49 J
Cyanide	6.8 B	7.4 B

All concentrations are reported in micrograms per liter (ug/L).

J - Value is estimated.

U - Analyte is not detected.

R - Value is rejected.

B - Value is between instrument detection limit and contract required detection limit.

TUT 001 1475

DATA VALIDATION SUMMARY REPORT

for the

TUTU WELLS SITE

September 1990 Quarterly Sampling

USEPA REGION II
Standard Operating Procedures HW-2 and HW-6
for the
Contract Laboratory Program
Organic and Inorganic
Data Review

Sample Delivery Group 900770 (VIHA I)

January 1991

Prepared for

Tutu Environmental Investigation Committee

Geraghty & Miller, Inc.
International Group
290 Vincent Avenue
Hackensack, New Jersey 07601

TUT 001 1476

A.2.2 Contract-Problems/Non-Compliance

MMB Reviewer: _____ Date: _____
Signature

Contractor Reviewer: Donna M. Lesch Date: 01/07/91
Signature

Verified by: James P. Joyce Date: 1/14/91

TUF 001 1477

Table 1. Tutu Residential Wells Sampling Results, September 1990, Sample Delivery Group 900770

Sample Identification:	770-01	770-02	770-03	770-04	770-05	770-06
					10/01	
Volatile Organic Compounds (VOCs)	Bryan	Dimitri	Matthias	Ramsey	Trip Blank	Eglin I
Chloromethane	2 U	2 UJ	2 UJ	4 UJ	2 UJ	R
Bromomethane	2 U	2 UJ	2 UJ	4 UJ	2 UJ	R
Vinyl Chloride	2 U	2 UJ	2 UJ	4 UJ	2 UJ	R
Chloroethane	2 U	2 UJ	2 UJ	4 UJ	2 UJ	R
Methylene Chloride	2 UJ	2 UJ	9 UJ	17 UJ	13 J	R
Acetone	R	R	R	R	6 J	R
Carbon Disulfide	1 UJ	1 UJ	1 UJ	2 UJ	1 UJ	R
1,1-Dichloroethene	1 UJ	1 UJ	1 UJ	2 UJ	1 UJ	R
1,1-Dichloroethane	1 U	1 UJ	1 U	2 UJ	1 UJ	R
1,2-Dichloroethene (total)	1 U	1 UJ	22	2 UJ	1 UJ	68 J
Chloroform	1 U	1 UJ	1 UJ	2 UJ	1 UJ	R
1,2-Dichloroethane	1 UJ	1 UJ	1 UJ	2 UJ	1 UJ	R
2-Butanone	R	R	R	R	R	R
1,1,1-Trichloroethane	1 U	1 UJ	1 UJ	2 UJ	1 UJ	R
Carbon Tetrachloride	1 U	1 UJ	1 U	2 UJ	1 UJ	R
Vinyl Acetate	2 UJ	2 UJ	2 UJ	2 UJ	2 UJ	R
Bromodichloromethane	1 U	1 UJ	1 U	2 UJ	1 UJ	R
1,2-Dichloropropane	1 U	1 UJ	1 U	2 UJ	1 UJ	R
cis-1,3-Dichloropropene	1 U	1 UJ	1 UJ	2 UJ	1 UJ	R
Trichloroethene	1 U	1 UJ	11	2 UJ	1 UJ	10 J
Dibromochloromethane	1 U	1 UJ	1 U	2 UJ	1 UJ	R
1,1,2-Trichloroethane	1 U	1 UJ	1 U	2 UJ	1 UJ	R
Benzene	1 U	1 UJ	1 U	2 UJ	1 UJ	R
trans-1,3-Dichloropropene	1 U	R	1 UJ	2 UJ	R	R
Bromoform	1 U	1 UJ	1 U	2 UJ	1 UJ	R
4-Methyl-2-Pentanone	2 UJ	2 UJ	2 UJ	4 UJ	2 UJ	R
2-Hexanone	R	R	R	R	R	R
Tetrachloroethene	1 UJ	1 UJ	120 J	3 J	1 UJ	32 J
1,1,2,2-Tetrachloroethane	1 UJ	1 UJ	1 UJ	2 UJ	1 UJ	R
Toluene	1 U	1 UJ	1 U	2 UJ	1 UJ	R
Chlorobenzene	1 U	1 UJ	1 U	2 UJ	1 UJ	R
Ethylbenzene	1 U	1 UJ	1 U	2 UJ	1 UJ	R
Styrene	1 U	1 UJ	1 UJ	2 UJ	1 UJ	R
Total Xylenes	1 U	1 UJ	1 UJ	2 UJ	1 UJ	R
Tentatively Identified VOCs						
Ethane,1,1,2-Trichloro-1,2,2 trifluoro						
Unknown			16 JN	2 JN	1 JN	3 JN
Propane,2-Methoxy-2-methyl						6 JN
C5H12 isomer						
Aliphatic hydrocarbon						
C3-Benzene isomer						
C6H12 isomer						
C9H12 isomer						

All concentrations are reported in micrograms per liter (ug/L).

J - Value is estimated.

U - Compound is not detected.

R - Value is rejected.

N - Compound is a tentatively identified compound.

Table 1. Tutu Residential Wells Sampling Results, September 1990, Sample Delivery Group 900770

Sample Identification:	770-07	770-08	770-09	770-10	770-11	770-12
				H2O	10/02	Gassett
Volatile Organic Compounds (VOCs)	LaPlace	Tillet	Tillet-D (Replicate)	Blank Tutu	Trip Blank	(Hartman I)
Chloromethane	R	R	R	2 UJ	2 UJ	2 UJ
Bromomethane	R	R	R	2 UJ	2 UJ	2 UJ
Vinyl Chloride	R	17 J	12 J	2 UJ	2 UJ	2 UJ
Chloroethane	R	R	R	2 UJ	2 UJ	2 UJ
Methylene Chloride	R	R	R	2 UJ	14 J	1 UJ
Acetone	R	R	R	R	7 J	R
Carbon Disulfide	R	R	R	1 UJ	1 UJ	1 UJ
1,1-Dichloroethene	R	R	R	1 UJ	1 UJ	1 UJ
1,1-Dichloroethane	R	R	R	1 UJ	1 UJ	1 U
1,2-Dichloroethene (total)	140 J	280 J	270 J	1 UJ	1 UJ	1 U
Chloroform	R	R	R	1 UJ	1 UJ	1 U
1,2-Dichloroethane	R	R	R	1 UJ	1 UJ	1 UJ
2-Butanone	R	R	R	R	R	R
1,1,1-Trichloroethane	R	R	R	1 UJ	1 UJ	1 UJ
Carbon Tetrachloride	R	R	R	1 UJ	1 UJ	1 U
Vinyl Acetate	R	R	R	2 UJ	2 UJ	2 UJ
Bromodichloromethane	R	R	R	1 UJ	1 UJ	1 U
1,2-Dichloropropane	R	R	R	1 UJ	1 UJ	1 U
cis-1,3-Dichloropropene	R	R	R	1 UJ	1 UJ	1 U
Trichloroethene	24 J	56 J	47 J	1 UJ	1 UJ	1 U
Dibromochloromethane	R	R	R	1 UJ	1 UJ	1 U
1,1,2-Trichloroethane	R	R	R	1 UJ	1 UJ	1 UJ
Benzene	R	32 J	26 J	1 UJ	1 UJ	1 U
trans-1,3-Dichloropropene	R	R	R	R	R	1 UJ
Bromoform	R	R	R	1 UJ	1 UJ	1 UJ
4-Methyl-2-Pentanone	R	R	R	2 UJ	2 UJ	1 UJ
2-Hexanone	R	R	R	R	R	R
Tetrachloroethene	98 J	120 J	98 J	1 UJ	1 UJ	1 UJ
1,1,2,2-Tetrachloroethane	R	R	R	1 UJ	1 UJ	1 UJ
Toluene	R	R	R	1 UJ	1 UJ	1 U
Chlorobenzene	R	R	R	1 UJ	1 UJ	1 U
Ethylbenzene	R	R	R	1 UJ	1 UJ	1 U
Styrene	R	R	R	1 UJ	1 UJ	1 UJ
Total Xylenes	R	R	R	1 UJ	1 UJ	1 UJ
Tentatively Identified VOCs						
Ethane,1,1,2-Trichloro-1,2,2-trifluoro					3 JN	
Unknown		21 JN	39 JN			2 JN
Propane,2-Methoxy-2-methyl	130 JN	240 JN	270 JN			
C5H12 isomer		121 JN	230 JN			
Aliphatic hydrocarbon		6 JN				
C3-Benzene isomer		6 JN				
C6H12 isomer		35 JN				
C9H12 isomer		6 JN				

All concentrations are reported in micrograms per liter (ug/L).

J - Value is estimated.

U - Compound is not detected.

R - Value is rejected.

N - Compound is a tentatively identified compound.

TUT 001 1479

Table 1. Tutu Residential Wells Sampling Results, September 1990, Sample Delivery Group 900770

Sample Identification:	770-13	770-14	770-15
	10/03		9/27
Volatile Organic Compounds (VOCs)	Trip Blank	VIHA I	Trip Blank
Chloromethane	2 UJ	2 UJ	2 UJ
Bromomethane	2 UJ	2 UJ	2 UJ
Vinyl Chloride	2 UJ	2 UJ	2 UJ
Chloroethane	2 UJ	2 UJ	2 UJ
Methylene Chloride	1 UJ	2 UJ	16 J
Acetone	R	R	R
Carbon Disulfide	1 UJ	1 UJ	1 UJ
1,1-Dichloroethene	1 UJ	1 UJ	1 UJ
1,1-Dichloroethane	1 UJ	1 UJ	1 U
1,2-Dichloroethene (total)	1 UJ	6 J	1 U
Chloroform	1 UJ	1 UJ	1 U
1,2-Dichloroethane	1 UJ	1 UJ	1 UJ
2-Butanone	R	R	R
1,1,1-Trichloroethane	1 UJ	1 UJ	1 UJ
Carbon Tetrachloride	1 UJ	1 UJ	1 U
Vinyl Acetate	2 UJ	2 UJ	2 UJ
Bromodichloromethane	1 UJ	1 UJ	1 U
1,2-Dichloropropane	1 UJ	1 UJ	1 U
cis-1,3-Dichloropropene	1 UJ	1 UJ	1 U
Trichloroethene	1 UJ	1 UJ	1 U
Dibromochloromethane	1 UJ	1 UJ	1 U
1,1,2-Trichloroethane	1 UJ	1 UJ	1 UJ
Benzene	1 UJ	1 UJ	1 U
trans-1,3-Dichloropropene	1 UJ	1 UJ	1 UJ
Bromoform	1 UJ	1 UJ	1 UJ
4-Methyl-2-Pentanone	2 UJ	2 UJ	2 UJ
2-Hexanone	R	R	R
Tetrachloroethene	1 UJ	5 J	1 UJ
1,1,2,2-Tetrachloroethane	1 UJ	1 UJ	1 UJ
Toluene	1 UJ	1 UJ	1 U
Chlorobenzene	1 UJ	1 UJ	1 U
Ethylbenzene	1 UJ	1 UJ	1 U
Styrene	1 UJ	1 UJ	1 UJ
Total Xylenes	1 UJ	1 UJ	1 UJ
Tentatively Identified VOCs			
Ethane,1,1,2-Trichloro-1,2,2-trifluoro			
Unknown			
Propane,2-Methoxy-2-methyl	1.5 JN		
C5H12 isomer			
Aliphatic hydrocarbon			
C3-Benzene isomer			
C6H12 isomer			
C9H12 isomer			

All concentrations are reported in micrograms per liter (ug/L).

J - Value is estimated.

U - Compound is not detected.

R - Value is rejected.

N - Compound is a tentatively identified compound.

Table 1. Tutu Residential Wells Sampling Results. September 1990. Sample Delivery Group 900770

Sample Identification: Semivolatile Organic Compounds (SVOCs)	770-01 Bryan	770-02 Dimitri	770-03 Matthias	770-04 Ramsey	770-06 Eglin I	770-07 LaPlace
Phenol	10 U	10 U	10 U	10 U	10 U	10 U
bis(2-Chloroethyl)Ether	10 U	10 U	10 U	10 U	10 U	10 U
2-Chlorophenol	10 U	10 U	10 U	10 U	10 U	10 U
1,3-Dichlorobenzene	10 U	10 U	10 U	10 U	10 U	10 U
1,4-Dichlorobenzene	10 U	10 U	10 U	10 U	10 U	10 U
Benzyl Alcohol	10 U	10 U	10 U	10 U	10 U	10 U
1,2-Dichlorobenzene	10 U	10 U	10 U	10 U	10 U	10 U
2-Methylphenol	10 U	10 U	10 U	10 U	10 U	10 U
N-Nitroso-Di-n-Propylamine	10 U	10 U	10 U	10 U	10 U	10 U
Hexachloroethane	10 U	10 U	10 U	10 U	10 U	10 U
Nitrobenzene	10 U	10 U	10 U	10 U	10 U	10 U
Isophorone	10 U	10 U	10 U	10 U	10 U	10 U
2-Nitrophenol	10 U	10 U	10 U	10 U	10 U	10 U
2,4-Dimethylphenol	10 U	10 U	10 U	10 U	10 U	10 U
Benzoic Acid	50 U	50 U	50 U	50 U	50 U	50 U
bis(2-Chloroethoxy)Methane	10 U	10 U	10 U	10 U	10 U	10 U
2,4-Dichlorophenol	10 U	10 U	10 U	10 U	10 U	10 U
1,2,4-Trichlorobenzene	10 U	10 U	10 U	10 U	10 U	10 U
Naphthalene	10 U	10 U	10 U	10 U	10 U	10 U
4-Chloroaniline	10 U	10 U	10 U	10 U	10 U	10 U
Hexachlorobutadiene	10 U	10 U	10 U	10 U	10 U	10 U
4-Chloro-3-Methylphenol	10 U	10 U	10 U	10 U	10 U	10 U
Methylnaphthalene	10 U	10 U	10 U	10 U	10 U	10 U
Hexachlorocyclopentadiene	10 U	10 U	10 U	10 U	10 U	10 UJ
2,4,6-Trichlorophenol	10 U	10 U	10 U	10 U	10 U	10 U
2,4,5-Trichlorophenol	50 U	50 U	50 U	50 U	50 U	50 U
2-Chloronaphthalene	10 U	10 U	10 U	10 U	10 U	10 U
2-Nitroaniline	50 U	50 U	50 U	50 U	50 U	50 U
Dimethyl Phthalate	10 U	10 U	10 U	10 U	10 U	10 U
Acenaphthylene	10 U	10 U	10 U	10 U	10 U	10 U
2,6-Dinitrotoluene	10 U	10 U	10 U	10 U	10 U	10 U
3-Nitroaniline	50 U	50 U	50 U	50 U	50 U	50 U
Acenaphthene	10 U	10 U	10 U	10 U	10 U	10 U
2,4-Dinitrophenol	50 U	50 U	50 U	50 U	50 U	50 U
4-Nitrophenol	50 U	50 U	50 U	50 U	50 U	50 U
Dibenzofuran	10 U	10 U	10 U	10 U	10 U	10 U
2,4-Dinitrotoluene	10 U	10 U	10 U	10 U	10 U	10 U
Diethylphthalate	10 U	10 U	10 U	10 U	10 U	10 U
4-Chlorophenyl-phenylether	10 U	10 U	10 U	10 U	10 U	10 U
Fluorene	10 U	10 U	10 U	10 U	10 U	10 U
4-Nitroaniline	50 U	50 U	50 U	50 U	50 U	50 U
4,6-Dinitro-2-Methylphenol	50 U	50 U	50 U	50 U	50 U	50 U
N-Nitrosodiphenylamine	10 U	10 U	10 U	10 U	10 U	10 U
4-Bromophenyl-phenylether	10 U	10 U	10 U	10 U	10 U	10 U
Hexachlorobenzene	10 U	10 U	10 U	10 U	10 U	10 U

All concentrations are reported in micrograms per liter (ug/L).

J - Value is estimated.

U - Compound is not detected.

N - Compound is a tentatively identified compound.

TUT 001 1481

Table 1. Tutu Residential Wells Sampling Results, September 1990. Sample Delivery Group 900770

Sample Identification: Semivolatile Organic Compounds (SVOCs)	770-01 Bryan	770-02 Dimitri	770-03 Matthias	770-04 Ramsey	770-06 Eglin I	770-07 LaPlace
Pentachlorophenol	50 U	50 U	50 U	50 U	50 U	50 U
Phenanthrene	10 U	10 U	10 U	10 U	10 U	10 U
Anthracene	10 U	10 U	10 U	10 U	10 U	10 U
Di-n-Butylphthalate	10 U	10 U	10 U	10 U	10 U	10 U
Fluoranthene	10 U	10 U	10 U	10 U	10 U	10 U
Pyrene	10 U	10 U	10 U	10 U	10 U	10 U
Butylbenzylphthalate	10 U	10 U	10 U	10 U	10 U	10 U
3,3-Dichlorobenzidine	20 U	20 U	20 U	20 U	20 U	20 U
Benzo(a)Anthracene	10 U	10 U	10 U	10 U	10 U	10 U
Chrysene	10 U	10 U	10 U	10 U	10 U	10 U
bis(2-Ethylhexyl)Phthalate	10 U	10 U	10 U	10 U	10 U	10 U
Di-n-Octyl Phthalate	10 U	10 U	10 U	10 U	10 U	10 U
Benzo(b)Fluoranthene	10 U	10 U	10 U	10 U	10 U	10 U
Benzo(k)Fluoranthene	10 U	10 U	10 U	10 U	10 U	10 U
Benzo(a)Pyrene	10 U	10 U	10 U	10 U	10 U	10 U
Indeno(1,2,3-cd)Pyrene	10 U	10 U	10 U	10 U	10 U	10 U
Dibenz(a,h)Anthracene	10 U	10 U	10 U	10 U	10 U	10 U
Benzo(g,h,i)Perylene	10 U	10 U	10 U	10 U	10 U	10 U
Tentatively Identified SVOCs						
Unknown			4 JN		12 JN	42 JN
Benzene, pentachlorofluoro-						

All concentrations are reported in micrograms per liter (ug/L).

J - Value is estimated.

U - Compound is not detected.

N - Compound is a tentatively identified compound.

Table 1. Tutu Residential Wells Sampling Results, September 1990, Sample Delivery Group 900770

Sample Identification: Semivolatile Organic Compounds (SVOCs)	770-08 Tillet *	770-09 Tillet-D (Replicate)	770-10 H2O Blank	770-12 Gassett (Hartman I)	770-14 VIHA I
Phenol	R	10 U	10 U	10 U	10 U
bis(2-Chloroethyl)Ether	10 U	10 U	10 U	10 U	10 U
2-Chlorophenol	R	R	10 U	10 U	10 U
1,3-Dichlorobenzene	10 U	10 U	10 U	10 U	10 U
1,4-Dichlorobenzene	10 U	10 U	10 U	10 U	10 U
Benzyl Alcohol	R	R	10 U	10 U	10 U
1,2-Dichlorobenzene	10 U	10 U	10 U	10 U	10 U
2-Methylphenol	R	R	10 U	10 U	10 U
N-Nitroso-Di-n-Propylamine	10 U	10 U	10 U	10 U	10 U
Hexachloroethane	10 U	10 U	10 U	10 U	10 U
Nitrobenzene	10 U	10 U	10 U	10 U	10 U
Isophorone	10 U	10 U	10 U	10 U	10 U
2-Nitrophenol	R	R	10 U	10 U	10 U
2,4-Dimethylphenol	R	R	10 U	10 U	10 U
Benzoic Acid	R	R	50 U	50 U	50 U
bis(2-Chloroethoxy)Methane	10 U	10 U	10 U	10 U	10 U
2,4-Dichlorophenol	R	R	10 U	10 U	10 U
1,2,4-Trichlorobenzene	10 U	10 U	10 U	10 U	10 U
Naphthalene	10 U	10 U	10 U	10 U	10 U
4-Chloroaniline	10 U	10 U	10 U	10 U	10 U
Hexachlorobutadiene	10 U	10 U	10 U	10 U	10 U
4-Chloro-3-Methylphenol	R	R	10 U	10 U	10 U
2-Methylnaphthalene	10 U	10 U	10 U	10 U	10 U
Hexachlorocyclopentadiene	10 UJ	10 UJ	10 U	10 U	10 U
2,4,6-Trichlorophenol	R	R	10 U	10 U	10 U
2,4,5-Trichlorophenol	R	R	50 U	50 U	50 U
2-Chloronaphthalene	10 U	10 U	10 U	10 U	10 U
2-Nitroaniline	50 U	50 U	50 U	50 U	50 U
Dimethyl Phthalate	10 U	10 U	10 U	10 U	10 U
Acenaphthylene	10 U	10 U	10 U	10 U	10 U
2,6-Dinitrotoluene	10 U	10 U	10 U	10 U	10 U
3-Nitroaniline	50 U	50 U	50 U	50 U	50 U
Acenaphthene	10 U	10 U	10 U	10 U	10 U
2,4-Dinitrophenol	R	R	50 U	50 U	50 U
4-Nitrophenol	R	R	50 U	50 U	50 U
Dibenzofuran	10 U	10 U	10 U	10 U	10 U
2,4-Dinitrotoluene	10 U	10 U	10 U	10 U	10 U
Diethylphthalate	10 U	10 U	10 U	10 U	10 U
4-Chlorophenyl-phenylether	10 U	10 U	10 U	10 U	10 U
Fluorene	10 U	10 U	10 U	10 U	10 U
4-Nitroaniline	50 U	50 U	50 U	50 U	50 U
4,6-Dinitro-2-Methylphenol	R	R	50 U	50 U	50 U
N-Nitrosodiphenylamine	R	10 U	10 U	10 U	10 U
Bromophenyl-phenylether	R	10 U	10 U	10 U	10 U

* The first extraction results.

All concentrations are reported in micrograms per liter (ug/L).

J - Value is estimated.

U - Compound is not detected.

R - Value is rejected.

N - Compound is a tentatively identified compound.

Table 1. Tutu Residential Wells Sampling Results, September 1990, Sample Delivery Group 900770

Sample Identification: Semivolatile Organic Compounds (SVOCs)	770-08 Tillet	770-09 Tillet-D (Replicate)	770-10 H2O Blank	770-12 Gassett (Hartman I)	770-14 VIHA I
Hexachlorobenzene	R	10 U	10 U	10 U	10 U
Pentachlorophenol	R	R	50 U	50 U	50 U
Phenanthrene	R	10 U	10 U	10 U	10 U
Anthracene	R	10 U	10 U	10 U	10 U
Di-n-Butylphthalate	R	10 U	10 U	10 U	10 U
Fluoranthene	R	10 U	10 U	10 U	10 U
Pyrene	10 U	10 U	10 U	10 U	10 U
Butylbenzylphthalate	10 U	10 U	10 U	10 U	10 U
3,3-Dichlorobenzidine	20 U	20 U	20 U	20 U	20 U
Benzo(a)Anthracene	10 U	10 U	10 U	10 U	10 U
Chrysene	10 U	10 U	10 U	10 U	10 U
bis(2-Ethylhexyl)Phthalate	10 U	10 U	10 U	10 U	10 U
Di-n-Octyl Phthalate	10 U	10 U	10 U	10 U	10 U
Benzo(b)Fluoranthene	10 U	10 U	10 U	10 U	10 U
Benzo(k)Fluoranthene	10 U	10 U	10 U	10 U	10 U
Benzo(a)Pyrene	10 U	10 U	10 U	10 U	10 U
Indeno(1,2,3-cd)Pyrene	10 U	10 U	10 U	10 U	10 U
Dibenz(a,h)Anthracene	10 U	10 U	10 U	10 U	10 U
Benzo(g,h,i)Perylene	10 U	10 U	10 U	10 U	10 U
Tentatively Identified SVOCs					
Unknown		82 JN			
Benzene, pentachlorofluoro-		4 JN			

All concentrations are reported in micrograms per liter (ug/L).

J - Value is estimated.

U - Compound is not detected.

R - Value is rejected.

N - Compound is a tentatively identified compound.

TUT 001 1484

Table 1. Tutu Residential Wells Sampling Results, September 1990, Sample Delivery Group 900770

Sample Identification:	770-01	770-02	770-03	770-04	770-06	70-07
esticide/PCBs	Bryan	Dimitri	Matthias	Ramsey	Eglin I	LaPlace
alpha-BHC	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
beta-BHC	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
delta-BHC	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
gamma-BHC	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Heptachlor	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Aldrin	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Heptachlor epoxide	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Endosulfan I	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Dieldrin	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U
4,4-DDE	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U
Endrin	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U
Endosulfan II	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U
4,4-DDD	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U
Endosulfan sulfate	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U
4,4-DDT	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U
Methoxychlor	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Endrin ketone	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U
alpha-Chlordane	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
gamma-Chlordane	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Toxaphene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Aroclor-1016	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Aroclor-1221	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Aroclor-1232	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Aroclor-1242	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Aroclor-1248	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Aroclor-1254	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Aroclor-1260	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U

All concentrations are reported in micrograms per liter (ug/L).

U - Compound is not detected.

Table 1. Tutu Residential Wells Sampling Results, September 1990, Sample Delivery Group 900770

Sample Identification:	770-08	770-09	770-10	770-12	770-14
Pesticides/PCBs	Tillet	TilletD	H2O Blk	Hartmanl	VIHA I
alpha-BHC	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
beta-BHC	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
delta-BHC	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
gamma-BHC	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Heptachlor	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Aldrin	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Heptachlor epoxide	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Endosulfan I	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Dieldrin	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U
4,4-DDE	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U
Endrin	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U
Endosulfan II	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U
4,4-DDD	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U
Endosulfan sulfate	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U
4,4-DDT	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U
Methoxychlor	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Endrin ketone	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U
alpha-Chlordane	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
gamma-Chlordane	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Toxaphene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Aroclor-1016	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Aroclor-1221	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Aroclor-1232	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Aroclor-1242	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Aroclor-1248	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Aroclor-1254	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Aroclor-1260	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U

All concentrations are reported in micrograms per liter (ug/L).

U - Compound is not detected.

TUT 001 1486

SOP NO. HW-6
Revision #7

CLP ORGANICS DATA REVIEW AND PRELIMINARY REVIEW

BY: _____ Date: 3-22-90
Leon Lazarus, Environmental Scientist
Toxic and Hazardous Waste Section

CONCURRED BY: _____ Date: 3/27/90
Louis Bevilacqua, Chief
Toxic and Hazardous Waste Section

APPROVED BY: _____ Date: 3/26/90
Gerard F. McKenna, Chief
Monitoring Management Branch

INTRODUCTION TO DATA VALIDATION

.0 Scope

1.1 This procedure is applicable to organic data obtained from contractor laboratories working for the Contract Laboratory Program (CLP).

1.2 The data validation is based upon analytical and quality assurance requirements specified in the Statement of Work (SOW).

.0 Responsibilities

Data reviewers will complete the following tasks as assigned by the Data Review Coordinator:

2.1 Data Assessment - The reviewer must answer every question on the checklist. All response shall be in ink.

2.2 Data Assessment Narrative (Attachment 1) - Data reviewer is required to use these forms and must match the action in the narrative with the action taken on the Form I(s).

2.3 Rejection Summary Form (Attachment 2) - Fill in the total number of analytes measured by different analyses and the number of analytes rejected or flagged as estimated due to corresponding quality control criteria. Place an "X" in the boxes where analyses were not performed or criteria do not apply.

2.4 Organic Regional Data Assessment - Data reviewer is also required to fill out Organic Regional Data Assessment Form (Attachment 3).

2.5 Telephone Record Log - The data reviewer should enter the bare facts of inquiry before initiating any authorized telephone conversation with a CLP laboratory. After the case review has been completed, mail the white copy of the Telephone Record Log to the laboratory and the pink copy to SMO. File the yellow copy in the Telephone Record Log folder and attach a photocopy of the Telephone Record Log to the completed Data Assessment Narrative.

2.6 Forwarded Paperwork - Upon completion of the review, the following are to be forwarded to the Regional Sample Control Center (RSCC) located in the Surveillance and Monitoring Branch:

a. data package
b. completed assessment checklist
c. SMO Contract Compliance Screening (CCS)

Forward four (4) copies of the completed Data Assessment Narrative along with four (4) copies of the Organic Data Assessment Form: one each for the appropriate Regional DPO, the Sample Management Office (SMO), and to the last two addressees of the Data Reviewer Mailing List.

2.7 Filed Paperwork - Upon completion of the review, the following are to be filed within the Monitoring and Management Branch (MMB) files:

a. Telephone record Log (copy)
b. Record of Communication (original)
c. Rejection Summary Form

1.0 Rejection of Data - All values determined to be unacceptable on the Organic Analysis Dat Sheet (Form I) must be flagged with an "R". As soon as review criteria causes data to b rejected, that data can be eliminated from any further review or consideration.

2.0 Acceptance Criteria - In order that the reviews be consistent among reviewers, this Standard Operating Procedure (SOP) should be used. Additional guidance can be found in the Functional Guidelines.

3.0 SMO Contract Compliance Screening (CCS) - This is intended to aid the reviewer in locating any problems, both corrected and uncorrected. However, the validation should be carried out even if CCS is not present. Resubmittals received from the laboratory in response to CCS must be used by the reviewer.

'ACKAGE COMPLETENESS AND DELIVERABLES

CASE NUMBER: # 900 770

LAB: CEIMIC CORP

SITE: TUTU WELLS, ST. THOMAS

.0 Data Completeness and Deliverables	YES	NO	N/A
1.1 Have any missing deliverables been received and added to the data package.	[✓]	—	—
ACTION: Call lab for explanation / resubmittal of any missing deliverables. If lab cannot provide them, note the effect on review of the package under the "Contract Problems/Non-compliance" section of reviewer narrative.			
1.2 Was SMO CCS checklist included with package?	[ ]	—	✓
.0 Cover Letter/Case Narrative			
2.1 Is the Narrative or Cover Letter present?	[✓]	—	—
2.2 Are Case Number and/or SAS number contained in the Narrative or Cover Letter?	[✓]	—	—
.0 Data Validation Checklist			
The following checklist is divided into three parts. Part A is filled out if the data package contains any VOA analyses, Part B for any BNA analyses and Part C for Pesticide/PCBs.			
Does this package contain:			
VOA data?	✓	—	
BNA data?	✓	—	
Pesticide/PCB data?	✓	—	
ACTION: Complete corresponding parts of checklist.			

	YES	NO	N/A

PART A: VOA ANALYSES

.0 Traffic Reports and Laboratory Narrative

1.1 Are the Traffic Report Forms present for all samples? [✓] ___ ___

ACTION: If no, contact lab for replacement of missing or illegible copies.

1.2 Do the Traffic Reports or Lab Narrative indicate any problems with sample receipt, condition of samples, analytical problems or special notations affecting the quality of the data? ✓ [ ] ___

ACTION: Use professional judgement to evaluate the effect on the quality of the data.

ACTION: If any sample analyzed as a soil contains more than 50% water, all data should be flagged as estimated (J).

ACTION: If both VOA vials for a sample have air bubbles, flag all positive results "J" and all non-detects "R".

Holding Times

2.1 Have any VOA holding times, determined from date of collection to date of analysis, been exceeded? ✓ [ ] ___

If unpreserved, aqueous aromatic volatiles must be analyzed within 7 days of collection and non-aromatic volatiles must be analyzed within 14 days. If preserved with hydrochloric acid and stored at 4°C, then both aromatic and non-aromatic volatiles must be analyzed within 14 days. If uncertain about preservation, contact the sampler to determine whether the samples were preserved.

A ten-day holding time for soil samples is recommended. -

Table of Holding Time Violations

Sample	Sample Matrix	Preserved ?	(See Traffic Report) Date Sampled	Date Lab Received	Date Analyzed
Trip Blank 900770-05	Aqueous	Not indicated	10/01/90	10/02/90	10/13/90

ACTION: If holding times are exceeded, flag all positive results as estimated ("J") and sample quantitation limits as estimated ("UJ"), and document in the narrative that holding times were exceeded.

	YES	NO	N/A

If analyses were done more than 14 days beyond holding time, either on the first analysis or upon reanalysis, the reviewer must use professional judgement to determine the reliability of the data and the effects of additional storage on the sample results. The reviewer may determine that non-detect data are unusable ("R").

3.0 Surrogate Recovery (Form II)

3.1 Are the VOA Surrogate Recovery Summaries (Form II) present for each of the following matrices:

a. Low Water	[✓]	—	—
b. Med Water	[ ]	—	✓
c. Low Soil	[ ]	—	✓
d. Med Soil	[ ]	—	✓

3.2 Are all the VOA samples listed on the appropriate Surrogate Recovery Summaries for each of the following matrices:

a. Low Water	[✓]	—	—
b. Med Water	[ ]	—	✓
c. Low Soil	[ ]	—	✓
d. Med Soil	[ ]	—	✓

ACTION: Call lab for explanation / resubmittals. If missing deliverables are unavailable, document effect on data under "Conclusions" section of reviewer narrative.

3.3 Were outliers marked correctly with an asterisk?	[✓]	—	—

ACTION: Circle all outliers in red.

3.4 Was one or more VOA surrogate recovery outside of contract specifications for any sample or method blank?	✓	[ ]	—
If yes, were samples reanalyzed?	[ ]	✓	—
Were method blanks reanalyzed?	[ ]	✓	—

ACTION: If surrogate recoveries are > 10% but all do not meet SOW specifications:

1. Flag all positive results as estimated ("J").
2. Flag all non-detects as estimated detection limits ("UJ").

	YES	NO	N/A
If any surrogate has a recovery of <10% :			
1. Flag all positive results as estimated ("J").			
2. Flag all non-detects as unusable ("R").			
Professional judgement should be used to qualify data that have method blank surrogate recoveries out of specification in both original and re-analyses. Check the internal standard areas.			
3.5 Are there any transcription/calculation errors between raw data and Form I?	___	☑	___
ACTION: If large errors exist, call lab for explanation / resubmittal, make any necessary corrections and note errors under "Conclusions".			
.0 Matrix Spikes (Form III)			
4.1 Is the Matrix Spike Duplicate/Recovery Form (Form III) present?	☑	___	___
4.2 Were matrix spikes analyzed at the required frequency for each of the following matrices:			
a. Low Water	☑	___	___
b. Med Water	☐	___	☑
c. Low Soil	☐	___	☑
d. Med Soil	☐	___	☑
ACTION: If any matrix spike data are missing, take the action specified in 3.2 above.			

4.3 How many VOA spike recoveries are outside QC limits?

Water	Soils
0 out of 10	N/A out of 10

4.4 How many RPD's for matrix spike and matrix spike duplicate recoveries are outside QC limits?

Water	Soils
2 out of 5	N/A out of 5

ACTION: If MS and MSD both have less than 10% recovery for an analyte, negative results for that analyte should be rejected, and positive results should be flagged "J". The above applies only to the sample used for the MS/MSD analysis. Use professional judgement in applying this criterion to other samples in the package.

	YES	NO	N/A
5.0 Blanks (Form IV)			
5.1 Is the Method Blank Summary (Form IV) present?	☑	___	___
5.2 Frequency of Analysis: for the analysis of VOA TCL compounds, has a reagent/method blank been analyzed for each set of samples or every 20 samples of similar matrix (low water, med water, low soil, medium soil), whichever is more frequent?	☑	___	___
5.3 Has a VOA instrument blank been analyzed at least once every twelve hours for each GC/MS system used?	☑	___	___
ACTION: If any method blank data are missing, call lab for explanation / resubmittal. If not available, reject all associated positive data ("R").			
5.4 Chromatography: review the blank raw data - chromatograms (RICs), quant reports or data system printouts and spectra.			
Is the chromatographic performance (baseline stability) for each instrument acceptable for VOAs?	☑	___	___
ACTION: Use professional judgement to determine the effect on the data.			
6.0 Contamination			
NOTE: "Water blanks" and "distilled water blanks" are validated like any other sample and are not used to qualify data. Do not confuse them with the other QC blanks discussed below.			
6.1 Do any method/instrument/reagent blanks have positive results (TCL and/or TIC) for VOAs? When applied as described below, the contaminant concentration in these blanks are multiplied by the sample Dilution Factor.	✓	☐	___
6.2 Do any field/trip/rinse blanks have positive VOA results (TCL and/or TIC)?	✓	☐	___
ACTION: Prepare a list of the samples associated with each of the contaminated blanks. (Attach a separate sheet.)			
NOTE: Only field/rinse blanks taken the same day as the samples are used to qualify data. Trip blanks are used to qualify only those samples with which they were shipped. Blanks may not be qualified because of contamination in another blank. Blanks may be qualified for surrogate, spectral, tuning or calibration QC problems.			

YES NO N/A

ACTION: Follow the directions in the table below to qualify TCL results due to contamination. Use the largest value from all the associated blanks.

	Sample conc > CRQL but < 10x blank	Sample conc < CRQL & is < 10x blank value	Sample conc > CRQL value & >10x blank value
Methylene chloride Acetone Toluene 2-butanone	Flag sample result with a 'U'; cross out 'B' flag	Reject sample result and report CRQL; cross out 'B' flag	No qualification is needed

	Sample conc > CRQL but < 5x blank	Sample conc < CRQL & is < 5x blank value	Sample conc > CRQL value & > 5 blank value
Other Contaminants	Flag sample result with a 'U'; cross out 'B' flag	Reject sample result and report CRQL; cross out 'B' flag	No qualification is needed

ACTION: For TIC compounds, if the concentration in the sample is less than five times the concentration in the most contaminated associated blank, flag the sample data "R" (unusable).

6.3 Are there field/rinse/equipment blanks associated with every sample? [ ] ___ [✓]

ACTION: For low level samples, note in data assessment that there is no associated field/rinse/equipment blank. Exception: samples taken from a drinking water tap do not have associated field blanks.

.0 GC/MS Tuning and Mass Calibration (Form V)

7.1 Are the GC/MS Tuning and Mass Calibration Forms (Form V) present for Bromofluorobenzene (BFB)? [✓] ___ ___

7.2 Are the enhanced bar graph spectrum and mass/charge (m/z) listing for the BFB provided for each twelve hour shift? [✓] ___ ___

7.3 Has a tuning performance compound been analyzed for every twelve hours of sample analysis per instrument? [✓] ___ ___

ACTION: If any tuning data are missing, take action specified in 3.2 above.

ACTION: List date, time, instrument ID, and sample analyses for which no associated GC/MS tuning data are available.

	YES	NO	N/A

DATE	TIME	INSTRUMENT	SAMPLE NUMBERS

ACTION: If lab cannot provide missing data, reject ("R") all data generated outside an acceptable twelve hour calibration interval.

7.4 Have the ion abundance criteria been met for each instrument used? [✓] ___ ___

ACTION: List all data which do not meet ion abundance criteria (attach a separate sheet).

ACTION: If tuning calibration is in error, flag all associated sample data as unusable ("R"). However, if expanded ion criteria are met (See 1988 Functional Guidelines), the data reviewer may accept data with appropriate qualifiers.

7.5 Are there any transcription / calculation errors between mass lists and Form Vs? (Check at least two values but if errors are found, check more.) ___ [✓] ___

7.6 Have the appropriate number of significant figures (two) been reported? (Check at least two values, but if errors are found check more values.) [✓] ___ ___

ACTION: If large errors exist, call lab for explanation / resubmittal, make necessary corrections and note errors under "Conclusions".

7.7 Are the spectra of the mass calibration compound acceptable? [✓] ___ ___

ACTION: Use professional judgement to determine whether associated data should be accepted, qualified, or rejected.

8.0 Target Compound List (TCL) Analytes

8.1 Are the Organic Analysis Data Sheets (Form I VOA) present with required header information on each page, for each of the following:

a. Samples and/or fractions as appropriate [✓] ___ ___

b. Matrix spikes and matrix spike duplicates [✓] ___ ___

c. Blanks [✓] ___ ___

	YES	NO	N/A
8.2 Are the VOA Reconstructed Ion Chromatograms, the mass spectra for the identified compounds, and the data system printouts (Quant Reports) included in the sample package for each of the following?			
a. Samples and/or fractions as appropriate	☑		
b. Matrix spikes and matrix spike duplicates (Mass spectra not required)	☑		
c. Blanks	☑		
ACTION: If any data are missing, take action specified in 3.2 above.			
8.3 Are the response factors shown in the Quant Report?	☐	☑	
8.4 Is chromatographic performance acceptable with respect to:			
Baseline stability	☑		
Resolution	☑		
Peak shape	☑		
Full-scale graph (attenuation)	☑		
Other:_____	☐		☑
ACTION: Use professional judgement to determine the acceptability of the data.			
8.5 Are the lab-generated standard mass spectra of the identified VOA compounds present for each sample?	☑		
ACTION: If any mass spectra are missing, take action specified in 3.2 above. If Lab does not generate their own standard spectra, make note in "Contract Problems/Non-compliance".			
8.6 Is the RRT of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?	☑		
8.7 Are all ions present in the standard mass spectrum at a relative intensity greater than 10% also present in the sample mass spectrum?	☑		
8.8 Do sample and standard relative ion intensities agree within 20%?	☑		
ACTION: Use professional judgement to determine acceptability of data. If it is determined that incorrect identifications were made, all such data should be rejected, flagged "N" (presumptive evidence of the presence of the compound) or changed to not detected (at the calculated detection limit).			

	YES	NO	N/A
9.0 Tentatively Identified Compounds (TIC)			
9.1 Are all Tentatively Identified Compound Forms (Form I, Part B) present; and do listed TICs include scan number or retention time, estimated concentration and "J" qualifier?	☑	—	—
9.2 Are the mass spectra for the tentatively identified compounds and associated "best match" spectra included in the sample package for each of the following:			
a. Samples and/or fractions as appropriate	☑	—	—
b. Blanks	☑	—	—
ACTION: If any TIC data are missing, take action specified in 3.2 above.			
ACTION: Add "J" qualifier if missing and "N" qualifier to all identified TIC compounds on Form I, Part B.			
9.3 Are any TCL compounds (from any fraction) listed as TIC compounds (example: 1,2-dimethylbenzene is xylene—a VOA TCL—and should not be reported as a TIC)?	—	☑	—
ACTION: Flag with "R" any TCL compound listed as a TIC.			
9.4 Are all ions present in the reference mass spectrum with a relative intensity greater than 10% also present in the sample mass spectrum?	☑	—	—
9.5 Do TIC and "best match" standard relative ion intensities agree within 20%?	☑	—	—
ACTION: Use professional judgement to determine acceptability of TIC identifications. If it is determined that an incorrect identification was made, change identification to "unknown" or to some less specific identification (example: "C3 substituted benzene") as appropriate.			
10.0 Compound Quantitation and Reported Detection Limits			
10.1 Are there any transcription / calculation errors in Form I results? Check at least two positive values. Verify that the correct internal standard, quantitation ion, and RRF were used to calculate Form I result. Were any errors found?	—	☑	—
10.2 Are the CRQLs adjusted to reflect sample dilutions and, for soils, sample moisture?	☑	—	—

	YES	NO	N/A

ACTION: If errors are large, call lab for explanation / resubmittal, make any necessary corrections and note errors under "Conclusions".

ACTION: When a sample is analyzed at more than one dilution, the lowest CRQLs are used (unless a QC exceedance dictates the use of the higher CRQL data from the diluted sample analysis). Replace concentrations that exceed the calibration range in the original analysis by crossing out the "E" value on the original Form I and substituting it with data from the analysis of diluted sample. Specify which Form I is to be used, then draw a red "X" across the entire page of all Form I's that should not be used, including any in the summary package.

11.0 Standards Data (GC/MS)

11.1 Are the Reconstructed Ion Chromatograms, and data system printouts (Quant. Reports) present for initial and continuing calibration? [✓] — —

ACTION: If any calibration standard data are missing, take action specified in 3.2 above.

12.0 GC/MS Initial Calibration (Form VI)

12.1 Are the Initial Calibration Forms (Form VI) present and complete for the volatile fraction? [✓] — —

ACTION: If any calibration standard forms are missing, take action specified in 3.2 above.

12.2 Are response factors stable for volatiles over the concentration range of the calibration (RSD <30%)? [ ] ✓ —

ACTION: Circle all outliers in red.

ACTION: When RSD >30%, non-detects may be qualified using professional judgement. Flag all positive results "J". When RSD >90%, flag all non-detects as unusable ("R"). (Region II policy.)

12.3 Do any compounds have an average RRF < 0.05? ✓ [ ] —

ACTION: Circle all outliers in red.

ACTION: If any volatile compound has an average RRF < 0.05, flag positive results for that compound as estimated ("J"), and flag non-detects for that compound as unusable ("R").

	YES	NO	N/A
12.4 Are there any transcription / calculation errors in the reporting of average response factors (RRF) or %RSD? (Check at least two values but if errors are found, check more.)	___	[✓]	___

ACTION: Circle errors in red.

ACTION: If errors are large, call lab for explanation / resubmittal, make any necessary corrections and note errors under "Conclusions".

13.0 GC/MS Continuing Calibration (Form VII)

13.1 Are the Continuing Calibration Forms (Form VII) present and complete for the volatile fraction?	[✓]	___	___
13.2 Has a continuing calibration standard been analyzed for every twelve hours of sample analysis per instrument?	[✓]	___	___

ACTION: List below all sample analyses that were not within twelve hours of the previous continuing calibration analysis.

_____

_____

_____

ACTION: If any forms are missing or no continuing calibration standard has been analyzed within twelve hours of every sample analysis, call lab for explanation / resubmittal. If continuing calibration data are not available, flag all associated sample data as unusable ("R").

13.3 Do any continuing calibration standard compounds have a RRF < 0.05?	✓	[ ]	___

ACTION: Circle all outliers in red.

ACTION: If any volatile compound has a RRF < 0.05, flag positive results for that compound as estimated ("J"), and flag non-detects for that compound as unusable ("R").

13.4 Do any compounds have a % difference between initial and continuing calibration RRF > 25%?	✓	[ ]	___

ACTION: Circle all outliers in red and qualify associated sample data as outlined in the table below:

YES NO N/A

% DIFFERENCE

25-50	50-90	>90
'J' positive results, no action for non detects	'J' positive results, 'UJ' non detects	'J' positive results, "R" non detects

13.5 Are there any transcription / calculation errors in the reporting of average response factors (RRF) or difference (%D) between initial and continuing RRFs? (Check at least two values but if errors are found, check more.) ___ [✓] ___

ACTION: Circle errors in red.

ACTION: If errors are large, call lab for explanation / resubmittal, make any necessary corrections and note errors under "Conclusions".

14.0 Internal Standards (Form VIII)

14.1 Are the internal standard areas (Form VIII) of every sample and blank within the upper and lower limits for each continuing calibration? [✓] ___ ___

ACTION: List all the outliers below.

Sample #	Internal Std	Area	Lower Limit	Upper Limit
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____

(Attach additional sheets if necessary.)

ACTION: If the internal standard area count is outside the upper or lower limit, flag with "J" all positive results and non-detects (U values) quantitated with this internal standard. If extremely low area counts are reported, or if performance exhibits a major abrupt drop off, flag all associated non-detects as unusable ("R").

14.2 Are the retention times of the internal standards within 30 seconds of the associated calibration standard? [✓] ___ ___

ACTION: Professional judgement should be used to qualify data if the retention times differ by more than 30 seconds.

	YES	NO	N/A
15.0 Field Duplicates			
15.1 Were any field duplicates submitted for VOA analysis?	[✓]	___	___

ACTION: Compare the reported results for field duplicates and calculate the relative percent difference.

ACTION: Any gross variation between field duplicate results must be addressed in the reviewer narrative. However, if large differences exist, identification of field duplicates should be confirmed by contacting the sampler.

	YES	NO	N/A

PART B: BNA ANALYSES

..0 Traffic Reports and Laboratory Narrative

1.1 Are the Traffic Report Forms present for all samples? [✓] ___ ___

ACTION: If no, contact lab for replacement of missing or illegible copies.

1.2 Do the Traffic Reports or Lab Narrative indicate any problems with sample receipt, condition of samples, analytical problems or special notations affecting the quality of the data? ___ [✓] ___

ACTION: Use professional judgement to evaluate the effect on the quality of the data.

ACTION: If any sample analyzed as a soil contains more than 50% water, all data should be flagged as estimated (J).

:.0 Holding Times

2.1 Have any BNA holding times, determined from date of collection to date of extraction, been exceeded? ✓ [ ] ___

Samples for BNA analysis, both soils and waters, must be extracted within seven days of the date of collection. Extracts must be analyzed within 40 days of the date of extraction.

Table of Holding Time Violations

Sample	Sample Matrix	Date Sampled	(See Traffic Report) Date Lab Received	Date Extracted	Date Analyzed
Tillet(RE)	Aqueous	10/02/90	10/03/90	11/07/90	11/08/90*
Tillet(D)RE	Aqueous	10/02/90	10/03/90	11/09/90	11/09/90

ACTION: If holding times are exceeded, flag all positive results as estimated ("J") and sample quantitation limits as estimated ("UJ"), and document in the narrative that holding times were exceeded.

TOT 1503

	YES	NO	N/A

If analyses were done more than 14 days beyond holding time, either on the first analysis or upon reanalysis, the reviewer must use professional judgement to determine the reliability of the data and the effects of additional storage on the sample results. The reviewer may determine that non-detect data are unusable ("R").

3.0 Surrogate Recovery (Form II)

3.1 Are the BNA Surrogate Recovery Summaries (Form II) present for each of the following matrices:

a. Low Water	[✓]	—	—
b. Med Water	[ ]	—	✓
c. Low Soil	[ ]	—	✓
d. Med Soil	[ ]	—	✓

3.2 Are all the BNA samples listed on the appropriate Surrogate Recovery Summaries for each of the following matrices:

a. Low Water	[✓]	—	—
b. Med Water	[ ]	—	✓
c. Low Soil	[ ]	—	✓
d. Med Soil	[ ]	—	✓

ACTION: Call lab for explanation / resubmittals. If missing deliverables are unavailable, document effect on data under "Conclusions" section of reviewer narrative.

3.3 Were outliers marked correctly with an asterisk?	[✓]	—	—

ACTION: Circle all outliers in red.

3.4 Were two or more base-neutral OR acid surrogate recoveries out of specification for any sample or method blank?	✓	[ ]	—
If yes, were samples reanalyzed?	[✓]	—	—
Were method blanks reanalyzed?	[ ]	—	✓

ACTION: If all BNA surrogate recoveries are > 10% but two within the base-neutral or acid fraction do not meet SOW specifications, <u>for the affected fraction only (i.e. base-neutral OR acid compounds)</u>:

1. Flag all positive results as estimated ("J").
2. Flag all non-detects as estimated detection limits ("UJ").

	YES	NO	N/A

If any base-neutral or acid surrogate has a recovery of <10% :
1. Flag all positive results for that fraction (i.e. all acid or base-neutral compounds) "J".
2. Flag all non-detects for that fraction "R".

Professional judgement should be used to qualify data that have method blank surrogate recoveries out of specification in both original and re-analyses. Check the internal standard areas.

3.5 Are there any transcription/calculation errors between raw data and Form II? — [✓] —

ACTION: If large errors exist, call lab for explanation / resubmittal, make any necessary corrections and note errors under "Conclusions".

4.0 Matrix Spikes (Form III)

4.1 Is the Matrix Spike Duplicate/Recovery Form (Form III) present? [✓] — —

4.2 Were matrix spikes analyzed at the required frequency for each of the following matrices:

a. Low Water [✓] — —

b. Med Water [ ] — ✓

c. Low Soil [ ] — ✓

d. Med Soil [ ] — ✓

ACTION: If any matrix spike data are missing, take the action specified in 3.2 above.

4.3 How many BNA spike recoveries are outside QC limits?

Water	Soils
0 out of 22	N/A out of 22

4.4 How many RPD's for matrix spike and matrix spike duplicate recoveries are outside QC limits?

Water	Soils
0 out of 11	N/A out of 11

ACTION: If MS and MSD both have less than 10% recovery for an analyte, negative results for that analyte should be rejected, and positive results should be flagged "J". The above applies only to the sample used for MS/MSD analysis. Use professional judgement in applying this criterion to other samples

TUT 001 1505

	YES	NO	N/A
5.0 Blanks (Form IV)			
5.1 Is the Method Blank Summary (Form IV) present?	☑		
5.2 Frequency of Analysis: for the analysis of BNA TCL compounds, has a reagent/method blank been analyzed for each set of samples or every 20 samples of similar matrix (low water, med water, low soil, medium soil), whichever is more frequent?	☑		
5.3 Has a BNA instrument blank been analyzed for each GS/MS system used.	☑		
ACTION: If any method blank data are missing, call lab for explanation/resubmittal. If not available, reject all associated positive data ("R").			
5.4 Chromatography: review the blank raw data - chromatograms (RICs), quant reports or data system printouts and spectra.			
Is the chromatographic performance (baseline stability) for each instrument acceptable for VOAs?	☑		
ACTION: Use professional judgement to determine the effect on the data.			
6.0 Contamination			
NOTE: "Water blanks" and "distilled water blanks" are validated like any other sample and are not used to qualify data. Do not confuse them with the other QC blanks discussed below.			
6.1 Do any method/instrument/reagent blanks have positive results (TCL and/or TIC) for BNAs? When applied as described below, the contaminant concentration in these blanks are multiplied by the sample Dilution Factor.		☑	
6.2 Do any field/rinse blanks have positive BNA results (TCL and/or TIC)?		☐	☑
ACTION: Prepare a list of the samples associated with each of the contaminated blanks. (Attach a separate sheet.)			
NOTE: Only field/rinse blanks taken the same day as the samples are used to qualify data. Blanks may not be qualified because of contamination in another blank. Blanks may be qualified for surrogate, spectral, tuning or calibration QC problems.			

YES NO N/A

ACTION: Follow the directions in the table below to qualify TCL results due to contamination. Use the largest value from all the associated blanks.

	Sample conc > CRQL but < 10x blank	Sample conc < CRQL & is < 10x blank value	Sample conc > CRQL value & >10x blank value
Common Phthalate Esters	Flag sample result with a 'U'; cross out 'B' flag	Reject sample result and report CRQL; cross out 'B' flag	No qualification is needed

	Sample conc > CRQL but < 5x blank	Sample conc < CRQL & is < 5x blank value	Sample conc > CRQL value & > 5 blank value
Other Contaminants	Flag sample result with a 'U'; cross out 'B' flag	Reject sample result and report CRQL; cross out 'B' flag	No qualification is needed

ACTION: For TIC compounds, if the concentration in the sample is less than five times the concentration in the most contaminated associated blank, flag the sample data "R" (unusable).

6.3 Are there field/rinse/equipment blanks associated with every sample? [ ] ___ [✓]

ACTION: For low level samples, note in data assessment that there is no associated field/rinse/equipment blank. Exception: samples taken from a drinking water tap do not have associated field blanks.

'.0 GC/MS Tuning and Mass Calibration (Form V)

7.1 Are the GC/MS Tuning and Mass Calibration Forms (Form V) present for Decafluorotriphenylphosphine (DFTPP)? [✓] ___ ___

7.2 Are the enhanced bar graph spectrum and mass/charge (m/z) listing for the DFTPP provided for each twelve hour shift? [✓] ___ ___

7.3 Has a tuning performance compound been analyzed for every twelve hours of sample analysis per instrument? [✓] ___ ___

ACTION: If any tuning data are missing, take action specified in 3.2 above.

ACTION: List date, time, instrument ID, and sample analyses for which no associated GC/MS tuning data are available.

			YES	NO	N/A
DATE	TIME	INSTRUMENT	SAMPLE NUMBERS		

ACTION: If lab cannot provide missing data, reject ("R") all data generated outside an acceptable twelve hour calibration interval.

7.4 Have the ion abundance criteria been met for each instrument used? ☑ ___ ___

ACTION: List all data which do not meet ion abundance criteria (attach a separate sheet).

ACTION: If tuning calibration is in error, flag all associated sample data as unusable ("R"). However, if expanded ion criteria are met (See 1988 Functional Guidelines), the data reviewer may accept data with appropriate qualifiers.

7.5 Are there any transcription / calculation errors between mass lists and Form Vs? (Check at least two values but if errors are found, check more.) ___ ☑ ___

7.6 Have the appropriate number of significant figures (two) been reported? (Check at least two values, but if errors are found check more values.) ☑ ___ ___

ACTION: If large errors exist, call lab for explanation / resubmittal, make necessary corrections and note errors under "Conclusions".

7.7 Are the spectra of the mass calibration compound acceptable? ☑ ___ ___

ACTION: Use professional judgement to determine whether associated data should be accepted, qualified, or rejected.

8.0 Target Compound List (TCL) Analytes

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8.1 Are the Organic Analysis Data Sheets (Form I BNA) present with required header information on each page, for each of the following:

a. Samples and/or fractions as appropriate ☑ ___ ___

b. Matrix spikes and matrix spike duplicates ☑ ___ ___

c. Blanks ☑ ___ ___

	YES	NO	N/A
8.2 Are the BNA Reconstructed Ion Chromatograms, the mass spectra for the identified compounds, and the data system printouts (Quant Reports) included in the sample package for each of the following?			
a. Samples and/or fractions as appropriate	[✓]	—	—
b. Matrix spikes and matrix spike duplicates (Mass spectra not required)	[✓]	—	—
c. Blanks	[✓]	—	—
ACTION: If any data are missing, take action specified in 3.2 above.			
8.3 Are the response factors shown in the Quant Report?	[ ]	✓	—
8.4 Is chromatographic performance acceptable with respect to:			
Baseline stability	[✓]	—	—
Resolution	[✓]	—	—
Peak shape	[✓]	—	—
Full-scale graph (attenuation)	[✓]	—	—
Other:_____	[ ]	—	✓
ACTION: Use professional judgement to determine the acceptability of the data.			
8.5 Are the lab-generated standard mass spectra of the identified BNA compounds present for each sample?	[ ]	—	✓
ACTION: If any mass spectra are missing, take action specified in 3.2 above. If Lab does not generate their own standard spectra, make note in "Contract Problems/Non-compliance".			
8.6 Is the RRT of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?	[ ]	—	✓
8.7 Are all ions present in the standard mass spectrum at a relative intensity greater than 10% also present in the sample mass spectrum?	[ ]	—	✓
8.8 Do sample and standard relative ion intensities agree within 20%?	[ ]	—	✓
ACTION: Use professional judgement to determine acceptability of data. If it is determined that incorrect identifications were made, all such data should be rejected, flagged "N" (presumptive evidence of the presence of the compound) or changed to not detected (at			

	YES	NO	N/A
9.0 Tentatively Identified Compounds (TIC)			
9.1 Are all Tentatively Identified Compound Forms (Form I, Part B) present; and do listed TICs include scan number or retention time, estimated concentration and "J" qualifier?	☑	—	—
9.2 Are the mass spectra for the tentatively identified compounds and associated "best match" spectra included in the sample package for each of the following:			
a. Samples and/or fractions as appropriate	☑	—	—
b. Blanks	☐	—	☑
ACTION: If any TIC data are missing, take action specified in 3.2 above.			
ACTION: Add "J" qualifier if missing and "N" qualifier to all identified TIC compounds on Form I, Part B.			
9.3 Are any TCL compounds (from any fraction) listed as TIC compounds (example: 1,2-dimethylbenzene is xylene—a VOA TCL—and should not be reported as a TIC)?	—	☑	—
ACTION: Flag with "R" any TCL compound listed as a TIC.			
9.4 Are all ions present in the reference mass spectrum with a relative intensity greater than 10% also present in the sample mass spectrum?	☑	—	—
9.5 Do TIC and "best match" standard relative ion intensities agree within 20%?	☑	—	—
ACTION: Use professional judgement to determine acceptability of TIC identifications. If it is determined that an incorrect identification was made, change identification to "unknown" or to some less specific identification (example: "Cl substituted benzene") as appropriate.			
10.0 Compound Quantitation and Reported Detection Limits			
10.1 Are there any transcription / calculation errors in Form I results? Check at least two positive values. Verify that the correct internal standard, quantitation ion, and RRF were used to calculate Form I result. Were any errors found?	—	☑	—
10.2 Are the CRQLs adjusted to reflect sample dilutions and, for soils, sample moisture?	☐	—	☑

TUT 001 1510

	YES	NO	N/A

ACTION: If errors are large, call lab for explanation / resubmittal, make any necessary corrections and note errors under "Conclusions".

ACTION: When a sample is analyzed at more than one dilution, the lowest CRQLs are used (unless a QC exceedance dictates the use of the higher CRQL data from the diluted sample analysis). Replace concentrations that exceed the calibration range in the original analysis by crossing out the "E" value on the original Form I and substituting it with data from the analysis of diluted sample. Specify which Form I is to be used, then draw a red "X" across the entire page of all Form I's that should not be used, including any in the summary package.

11.0 Standards Data (GC/MS)

11.1 Are the Reconstructed Ion Chromatograms, and data system printouts (Quant. Reports) present for initial and continuing calibration? [✓] — —

ACTION: If any calibration standard data are missing, take action specified in 3.2 above.

12.0 GC/MS Initial Calibration (Form VI)

12.1 Are the Initial Calibration Forms (Form VI) present and complete for the BNA fraction? [✓] — —

ACTION: If any calibration standard forms are missing, take action specified in 3.2 above.

12.2 Are response factors stable for BNAs over the concentration range of the calibration (RSD <30%)? [ ] ✓ —

ACTION: Circle all outliers in red.

ACTION: When RSD >30%, non-detects may be qualified using professional judgement. Flag all positive results "J". When RSD >90%, flag all non-detects as unusable ("R"). (Region II policy.)

12.3 Do any compounds have a RRF < 0.05? — [✓] —

ACTION: Circle all outliers in red.

ACTION: If any BNA compound has an average RRF < 0.05, flag positive results for that compound as estimated ("J"), and flag non-detects for that compound as unusable ("R").

TUT 001 1511

	YES	NO	N/A
12.4 Are there any transcription / calculation errors in the reporting of average response factors (RRF) or %RSD? (Check at least two values but if errors are found, check more.)	___	[✓]	___

ACTION: Circle errors in red.

ACTION: If errors are large, call lab for explanation / resubmittal, make any necessary corrections and note errors under "Conclusions".

13.0 GC/MS Continuing Calibration (Form VII)

13.1 Are the Continuing Calibration Forms (Form VII) present and complete for the BNA fraction?	[✓]	___	___
13.2 Has a continuing calibration standard been analyzed for every twelve hours of sample analysis per instrument?	[✓]	___	___

ACTION: List below all sample analyses that were not within twelve hours of the previous continuing calibration analysis.

_____

_____

_____

ACTION: If any forms are missing or no continuing calibration standard has been analyzed within twelve hours of every sample analysis, call lab for explanation / resubmittal. If continuing calibration data are not available, flag all associated sample data as unusable ("R").

13.3 Do any continuing calibration standard compounds have a RRF < 0.05?	___	[✓]	___

ACTION: Circle all outliers in red.

ACTION: If any BNA compound has a RRF < 0.05, flag positive results for that compound as estimated ("J"), and flag non-detects for that compound as unusable ("R").

TUT 001 1512

13.4 Do any compounds have a % difference between initial and continuing calibration RRF > 25%?	✓	[ ]	___

ACTION: Circle all outliers in red and qualify associated sample data as outlined in the table below:

YES NO N/A

% DIFFERENCE

25-50	50-90	>90
'J' positive results, no action for non detects	'J' positive results, 'UJ' non detects	'J' positive results, "R" non detects

13.5 Are there any transcription / calculation errors in the reporting of average response factors (RRF) or difference (%D) between initial and continuing RRFs? (Check at least two values but if errors are found, check more.) ___ [✓] ___

ACTION: Circle errors in red.

ACTION: If errors are large, call lab for explanation / resubmittal, make any necessary corrections and note errors under "Conclusions".

14.0 Internal Standards (Form VIII)

14.1 Are the internal standard areas (Form VIII) of every sample and blank within the upper and lower limits for each continuing calibration? [✓] ___ ___

ACTION: List all the outliers below.

Sample #	Internal Std	Area	Lower Limit	Upper Limit
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____

(Attach additional sheets if necessary.)

ACTION: If the internal standard area count is outside the upper or lower limit, flag with "J" all positive results and non-detects (U values) quantitated with this internal standard. If extremely low area counts are reported, or if performance exhibits a major abrupt drop off, flag all associated non-detects as unusable ("R").

14.2 Are the retention times of the internal standards within 30 seconds of the associated calibration standard? [✓] ___ ___

ACTION: Professional judgement should be used to qualify data if the retention times differ by more than 30 seconds.

TDT 001 1513

	YES	NO	N/A
15.0 Field Duplicates			
15.1 Were any field duplicates submitted for BNA analysis?	[✓]	___	___

ACTION: Compare the reported results for field duplicates and calculate the relative percent difference.

ACTION: Any gross variation between field duplicate results must be addressed in the reviewer narrative. However, if large differences exist, identification of field duplicates should be confirmed by contacting the sampler.

	YES	NO	N/A
PART C: PESTICIDE/PCB ANALYSES			
1.0 Traffic Reports and Laboratory Narrative			
1.1 Are the Traffic Report Forms present for all samples?	[✓]	—	—
ACTION: If no, contact lab for replacement of missing or illegible copies.			
1.2 Do the Traffic Reports or Lab Narrative indicate any problems with sample receipt, condition of samples, analytical problems or special notations affecting the quality of the data?	—	[✓]	—
ACTION: Use professional judgement to evaluate the effect on the quality of the data.			
ACTION: If any sample analyzed as a soil contains more than 50% water, all data should be flagged as estimated (J).			
2.0 Holding Times			
2.1 Have any PEST/PCB holding times, determined from date of collection to date of extraction, been exceeded?	—	[✓]	—
Samples for PEST/PCB analysis, both soils and waters, must be extracted within seven days of the date of collection. Extracts must be analyzed within 40 days of the date of extraction.			
3.0 Surrogate Recovery (Form II)			
3.1 Are the PEST/PCB Surrogate Recovery Summaries (Form II) present for each of the following matrices:			
a. Low Water	[✓]	—	—
b. Med Water	[ ]	—	✓
c. Low Soil	[ ]	—	✓
d. Med Soil	[ ]	—	✓
3.2 Are all the PEST/PCB samples listed on the appropriate Surrogate Recovery Summaries for each of the following matrices:			
a. Low Water	[✓]	—	—
b. Med Water	[ ]	—	✓
c. Low Soil	[ ]	—	✓
d. Med Soil	[ ]	—	✓

	YES	NO	N/A

ACTION: Call lab for explanation / resubmittals. If missing deliverables are unavailable, document effect on data under "Conclusions" section of reviewer narrative.

3.3 Were outliers marked correctly with an asterisk? ☑ ___ ___

ACTION: Circle all outliers in red.

3.4 Was surrogate (DBC) recovery outside of the contract specification for any sample or blank? ✓ ☐ ___

ACTION: No qualification is done if surrogates are diluted beyond detection. If recovery is below contract limit (but above zero), flag all results for that sample "J". If recovery is zero, flag positive results "J" and non-detects "R". If recovery for the blank is zero, flag non-detects for all associated samples "R". If recovery is above contract limit, flag all positive results for that sample "J", unless in the reviewers professional judgement the high recovery is due to co-eluting interference (check the associated blank - if recovery is high there also, flag the sample data).

3.5 Are there any transcription/calculation errors between raw data and Form II? ___ ☑ ___

ACTION: If large errors exist, call lab for explanation / resubmittal, make any necessary corrections and note errors under "Conclusions".

4.0 Matrix Spikes (Form III)

4.1 Is the Matrix Spike Duplicate/Recovery Form (Form III) present? ☑ ___ ___

4.2 Were matrix spikes analyzed at the required frequency for each of the following matrices:

a. Low Water ☑ ___ ___

b. Med Water ☐ ___ ✓

c. Low Soil ☐ ___ ✓

d. Med Soil ☐ ___ ✓

ACTION: If any matrix spike data are missing, take the action specified in 3.2 above.

4.3 How many PEST/PCB spike recoveries are outside QC limits?

Water	Soils
0 out of 12	N/A out of 12

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	YES	NO	N/A

4.4 How many RPD's for matrix spike and matrix spike duplicate recoveries are outside QC limits?

Water	Soils
1 out of 6	N/A out of 6

ACTION: If MS and MSD both have less than zero recovery for an analyte, negative results for that analyte should be rejected, and positive results should be flagged "J". The above applies only to the sample used for MS/MSD analysis. Use professional judgement in applying this criterion to other samples.

Blanks (Form IV)

5.1 Is the Method Blank Summary (Form IV) present? [✓] ___ ___

5.2 Frequency of Analysis: for the analysis of Pesticide TCL compounds, has a reagent/method blank been analyzed for each set of samples or every 20 samples of similar matrix (low water, med water, low soil, medium soil), whichever is more frequent? [✓] ___ ___

5.3 Chromatography: review the blank raw data - chromatograms, quant reports or data system printouts.

Is the chromatographic performance (baseline stability) for each instrument acceptable for PEST/PCBs? [✓] ___ ___

ACTION: Use professional judgement to determine the effect on the data.

5.0 Contamination

NOTE: "Water blanks" and "distilled water blanks" are validated like any other sample and are not used to qualify data. Do not confuse them with the other QC blanks discussed below.

6.1 Do any method/instrument/reagent blanks have positive results for PEST/PCBs? When applied as described below, the contaminant concentration in these blanks are multiplied by the sample Dilution Factor. ___ [✓] ___

6.2 Do any field/rinse blanks have positive PEST/PCB results? ___ [ ] ✓

ACTION: Prepare a list of the samples associated with each of the contaminated blanks. (Attach a separate sheet.)

YES NO N/A

NOTE: Only field/rinse blanks taken the same day as the samples are used to qualify data. Blanks may not be qualified because of contamination in another blank. Blanks may be qualified for surrogate, spectral, tuning or calibration QC problems.

ACTION: Follow the directions in the table below to qualify TCL results due to contamination. Use the largest value from all the associated blanks.

Sample conc > CRQL but < 5x blank	Sample conc < CRQL & is < 5x blank value	Sample conc > CRQL & > 5x blank value
Flag sample result with a "U"; cross out "B" flag	Reject sample result and report CRQL; cross out "B" flag	No qualification is needed

6.3 Are there field/rinse/equipment blanks associated with every sample? [ ] — [✓]

ACTION: For low level samples, note in data assessment that there is no associated field/rinse/equipment blank. Exception: samples taken from a drinking water tap do not have associated field blanks.

7.0 Calibration and QC Performance

7.1 Are the following Gas Chromatograms and Data System Printouts for both Primary and Confirmation (confirmation standards not required if there are no positive results above CRQL) column present:

a. Evaluation Standard Mix A [✓] — —

b. Evaluation Standard Mix B [✓] — —

c. Evaluation Standard Mix C [✓] — —

d. Individual Standard Mix A [✓] — —

e. Individual Standard Mix B [✓] — —

f. Multi-component Pesticides Toxaphene & Chlordane [✓] — —

g. Aroclors 1016/1260 [✓] — —

h. Aroclors 1221, 1232, 1242, 1248, and 1254 [✓] — —

ACTION: If no, take action specified in 3.2 above

	YES	NO	N/A
7.2 Is Form VIII Pest-1 present and complete for each GC column (primary and confirmation) and each 72 hour sequence of analyses?	☑		
ACTION: If no, take action specified in 3.2 above.			
7.3 Are there any transcription/calculation errors between raw data and Form VIII?		☑	
ACTION: If large errors exist, call lab for explanation / resubmittal, make any necessary corrections and note errors under "Conclusions".			
7.4 Has the total breakdown on quantitation or confirmation column exceeded 20% for DDT?		☑	
- for Endrin?		☑	
or if Endrin aldehyde and 4,4'-DDD co-elute and there is a peak at their retention time, has the combined DDT and Endrin breakdown exceeded 20%?		☐	☑

ACTION:

a. If DDT breakdown is greater than 20% on quantitation column beginning with the samples following the last in control standard:

1. Flag all positive DDT results "J".
2. If DDT was not detected but DDD and/or DDE are positive, flag the DDT non-detect "R".
3. Flag positive DDD and DDE results "JN".
4. If DDT breakdown is > 20% on confirmation column and DDT is identified on quantitation column but not on confirmation column, use professional judgement to determine whether DDT should be reported on Form I (if reported, flag result "N").

b. If Endrin breakdown is > 20% on quantitation column, beginning with the samples following the last in control standard:

1. Flag all positive Endrin results "J".
2. If Endrin was not detected, but Endrin Aldehyde and/or Endrin Ketone are positive, flag the Endrin non-detect "R".
3. Flag Endrin Ketone positive results "JN".
4. If Endrin breakdown is > 20% on confirmation column and Endrin is identified on quantitation column but not on confirmation column, use professional judgement to determine whether Endrin should be reported on Form I (if reported, flag result "N").

c. If the combined breakdown is used (it can only be used if the conditions in 7.4 above are met) and is > 20% on quantitation column beginning with the last in control standard, take the actions specified in 7.4 a and b above. If the combined breakdown is >20% on confirmation column and Endrin or DDT is identified on quantitation column but not on confirmation column, use professional judgement to determine whether Endrin or DDT should be reported on Form I (if reported, flag result "N").

	YES	NO	N/A
7.5 Is the linearity check RSD of all four calibration factors <10% for the quantitation column?	☑		
ACTION: If no, flag positive hits for all pesticide and PCB analytes "J" for all associated samples. Do not flag toxaphene or DDT if they are quantified from a 3-point calibration curve.			
7.6 Is the % difference between the EVAL A and each analysis (quantitation and confirmation) DBC retention time within QC limits (2% for packed column, 0.3% for capillary [I.D. < 0.32 mm], 1% for megabore [0.32 < I.D. < 2 mm]) ?	☑		
ACTION: DBC retention time cannot be evaluated if DBC is not detected. If it is present and has a retention time out of QC limits, then use professional judgement to determine the reliability of the analysis and flag results "R", if appropriate.			
7.7 Was the proper analytical sequence followed for each 72 hour period of analyses (page PEST D-36 in 8/87 SOW).	☑		
ACTION: If no, use professional judgement to determine the severity of the effect on the data and accept or reject it accordingly. Generally, the effect is negligible unless the sequence was grossly altered or the calibration was also out of limits.			

3.0 Pesticide/PCB Standards Summary

8.1 Is Form IX present and complete for each GC column and 72 hr sequence of analyses?	☑		
ACTION: If no, take action specified in 3.2 above.			
8.2 Are there any transcription/calculation errors between raw data and Form IX?		☑	
ACTION: If large errors exist, call lab for explanation / resubmittal, make any necessary corrections and note errors under "Conclusions".			
8.3 Is DDT retention time for packed columns > 12 min (except OV-1 and OV-101 columns)?	☑		
ACTION: If no, check that there is adequate resolution between individual components. If not, flag results for compounds that interfere with each other (co-elute) "R".			
8.4 Do all standard retention times fall within the windows established for the first IND A and IND B analyses?	☑		

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	YES	NO	N/A
ACTION: Beginning with the samples following the last in control standard, check to see if the chromatograms contain peaks within an expanded window surrounding the expected retention times. If no peaks are found and, DBC is visible non-detects are valid. If peaks are present and cannot be identified through "pattern recognition" or a consistant shift in standard retention times, flag all affected compound results "R".			
8.5 Are the continuing calibration standard calibration factors within 15% (for quantitation column) or 20% (for confirmation column) of the initial (at beginning of 72 hr sequence) calibration factors?	☑	—	—
ACTION: If no, flag all associated positive results "J". Use professional judgement to determine whether or not to flag non-detects.			
9.0 Pesticide/PCB Identification			
9.1 Is Form X complete for every sample in which a pesticide or PCB was detected?	☐	—	☑
ACTION: If no, take action specified in 3.2 above.			
9.2 Are there any transcription errors between raw data and Form X?	—	☐	☑
ACTION: If large errors exist, call lab for explanation / resubmittal, make any necessary corrections and note errors under "Conclusions".			
9.3 Are retention times of sample compounds within the calculated retention time windows for both quantitation and confirmation analyses?	☐	—	☑
Was GC/MS confirmation provided when required (when compound concentration is > 10 ug/ml in final extract)?	☐	—	☑
ACTION: Reject ("R") all positive results (meeting quantitation column criteria, but missing confirmation by a second column or GC/MS (if appropriate). Also, reject ("R") all positive results not meeting retention time window criteria unless associated standard compounds are similarly biased (i.e. base on RRT to DBC).			
9.4 Check chromatograms for false negatives, especially for the multiple peak components toxaphene and PCB's. Were there any false negatives?	—	☑	—
ACTION: If appropriate PCB standards were not analyzed, or if the lab performed no confirmation analysis, flag the appropriate data with an "R".			

	YES	NO	N/A
10.0 Compound Quantitation and Reported Detection Limits			
10.1 Are there any transcription / calculation errors in Form I results? Check at least two positive values. Were any errors found?	—	[ ]	✓
NOTE: Simple peak pesticide results can be checked for rough agreement between quantitative results obtained on the two GC columns. The reviewer should use professional judgement to decide whether a much larger concentration obtained on one column versus the other indicates the presence of an interfering compound. If an interfering compound is indicated, the lower of the two values should be reported and qualified as presumptively present at an estimated quantity ("JN"). This necessitates a determination of an estimated concentration on the confirmation column. The narrative should indicate that the presence of interferences has obscured the attempt at a second column confirmation.			
10.2 Are the CRQLs adjusted to reflect sample dilutions and, for soils, sample moisture?	—	[ ]	✓
ACTION: If errors are large, call lab for explanation / resubmittal, make any necessary corrections and note errors under "Conclusions".			
ACTION: When a sample is analyzed at more than one dilution, the lowest CRQLs are used (unless a QC exceedance dictates the use of the higher CRQL data from the diluted sample analysis). Replace concentrations that exceed the calibration range in the original analysis by crossing out the "E" value on the original Form I and substituting it with data from the analysis of diluted sample. Specify which Form I is to be used, then draw a red "X" across the entire page of all Form I's that should not be used, including any in the summary package.			
1.0 Chromatogram Quality			
11.1 Were baselines stable?	[✓]	—	—
11.2 Were any electropositive displacement (negative peaks) or unusual peaks seen?	—	[✓]	—
11.3 Were early eluting peaks (for early eluting analytes) resolved to baseline?	[✓]	—	—
ACTION: For 11.1 and 11.2, comment only. For 11.3, reject ("R") those analytes that are not sufficiently resolved.			

	YES	NO	N/A
12.0 Field Duplicates			
12.1 Were any field duplicates submitted for PEST/PCB analysis?	☑		

ACTION: Compare the reported results for field duplicates and calculate the relative percent difference.

ACTION: Any gross variation between field duplicate results must be addressed in the reviewer narrative. However, if large differences exist, identification of field duplicates should be confirmed by contacting the sampler.

SDG # 900770 VIHA I
Tutu Wells Site

Contaminated Volatile Method Blanks and Their Associated Samples

Method Blank	Associated Samples
VBLK01	Matthias
VBLK02	Tillet, Hartman I (Gassett), Tillet(D), Trip Blank 10/03, Trip Blank 9/27, VIHA I
VBLK03	Trip Blank 10/01, H_2O Blk Tutu, Trip Blank 10/02, Dimitri, Dimitri MS
VBLK04	Ramsey, Dimitri MSD, LaPlace, Bryan, Eglin I

SDG # 900770 VIHA I
Tutu Wells Site

Contaminated Trip Blanks and Their Associated Samples

Trip Blank	Associated Samples
Trip Blank 10/01 (770-05)	Bryan, Dimitri, Dimitri MS, Dimitri MSD, Matthias, Ramsey
Trip Blank 10/02 (770-11)	Eglin I, LaPlace, Tillet, Tillet(D)
Trip Blank 10/03 (770-13)	Hartman I (Gassett)
Trip Blank 9/27 (770-15)	VIHA I

ATTACHMENT 1
SOP NO. HW-6

TOTAL REVIEW

CLP DATA ASSESSMENT

Functional Guidelines for Evaluating Organics Analysis

Case No. 900770 SDG No. VIHAI LABORATORY Ceimic SITE Tutu Well Site

DATA ASSESSMENT:

The current functional guidelines (1988) for evaluating organic data have been applied.

All data are valid and acceptable except those analytes which have been qualified with a "J" (estimated), "U" (non-detects), "R" (unusable),or "JN" (presumptive evidence for the presence of the material at an estimated value). All action is detailed on the attached sheets.

Two facts should be noted by all data users. First, the "R" flag means that the associated value is unusable. In other words, due to significant QC problems the analysis is invalid and provides no information as to whether the compound is present or not. "R" values should not appear on data tables because they cannot be relied upon, even as a last resort. The second fact to keep in mind is that no compound concentration, even if it has passed all QC tests, is guaranteed to be accurate. Strict QC serves to increase confidence in data but any value potentially contains error.

Reviewer's Signature: Donna M. Leach Date: 01/07/1991

Verified By: Tom E. Spyer Date: 1/14/1991

ATTACHMENT 1
SOP NO. HW-6

DATA ASSESSMENT:

1. HOLDING TIME:

The amount of an analyte in a sample can change with time due to chemical instability, degradation, volatilization, etc. If the specified holding time is exceeded, the data may not be valid. Those analytes detected in the samples whose holding time has been exceeded with be qualified as estimated, "J". The non-detects (sample quantitation limits) will be flagged as estimated, "J", or unusable, "R", if the holding times are grossly exceeded.

The following action was taken in the samples and analytes shown due to excessive holding time.

All samples were analyzed within the holding time for volatile organic compounds except the trip blank dated 10/01/90. The chain of custody does not indicate whether or not this sample was preserved, therefore it is assumed that it wasn't. The trip blank 10/01 was analyzed 5 days over the 7 day aromatic volatile holding time; all aromatic volatile compound concentration values (hits and non-detects) are qualified with "J".

All samples were analyzed within the holding time for semivolatile organic compounds except Tillet (RE) and Tillet(D)-RE (RE - re-extracted and reanalyzed). These samples are re-extractions which exceeded the 7 day holding time by 29 days and 31 days, respectively. All compound concentration values (hits and non-detects) are rejected for Tillet (RE) and Tillet(D)-RE. Note: The -RE suffix is used in this report to make a distinction between the first (original) extraction and second (re-extraction) extraction. All first extraction data are labelled "original" and the re-extraction data have the suffix -RE.

The pesticides and PCBs were analyzed within holding times for all samples.

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ATTACHMENT 1
SOP NO. HW-6

DATA ASSESSMENT:

2. BLANK CONTAMINATION

Quality assurance (QA) blanks, i.e., method, trip, field, rinse, and water blanks are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Trip blanks measure cross-contamination of samples during shipment. Field blanks measure cross-contamination of samples during field operations. If the concentration of the analyte is less than 5 times the blank contaminant level (10 times for the common laboratory contaminants), the analytes are qualified as non-detects, "U". The following analytes in the samples shown were qualified with "U" for these reasons:

A) Method blank contamination

Volatile Organic Compounds

Method blank VBLK01 is reported to contain methylene chloride at a concentration of 5 micrograms per liter (ug/L) and a tentatively identified compound (TIC) with a retention time (RT) of 3.83 minutes at a concentration of 7 ug/L. The sample Matthias is associated with this method blank and contains 9 ug/L of methylene chloride and 5 ug/L of the same TIC. The methylene chloride concentration value is qualified with "U" because it is less than 10 times the common contaminant concentration in the method blank. The TIC concentration value is qualified as a non-detect because it is less than 5 times the contamination in the method blank and therefore it is not reported.

Method blank VBLK02 is reported to contain methylene chloride at a concentration of 5 ug/L, acetone at a concentration of 2 ug/L, and a TIC with a RT of 3.78 at a concentration of 5 ug/L. The sample Tillet, which had a dilution factor of 5, is associated with this method blank and has a methylene chloride concentration of 40 ug/L and the same TIC at a concentration of 42 ug/L. The methylene chloride concentration value is qualified with "U" and the TIC concentration value is is not reported for the same reasons stated above. The samples Tillet(D) and VIHA I are also associated with this method blank and have methylene chloride and acetone concentrations at or above the contract required quantitation limits (CRQLs) as well as the same TIC contamination. The methylene chloride and acetone concentration values

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DATA ASSESSMENT:

are qualified with "U" and the TIC concentration values are not reported for reasons stated above.

Method blank VBLK03 is reported to contain methylene chloride at a concentration of 2 ug/L and a TIC with a RT of 3.93 at a concentration of 6 ug/L. The sample Dimitri and the H_2O Blk Tutu are associated with this method blank and have methylene chloride concentrations above the CRQL and the same TIC contamination. The methylene chloride concentration values are qualified with "U" and the TIC values are not reported for reasons stated above.

Method blank VBLK04 is reported to contain methylene chloride at a concentration of 2 ug/L and a TIC with a RT of 3.97 at a concentration of 5 ug/L. The samples Bryan, Eglin I, Ramsey, and LaPlace are associated with this method blank and have methylene chloride concentrations at or above the CRQL and the same TIC contamination. The methylene chloride concentration values are qualified with "U" and the TIC concentration values are not reported for reasons stated above.

Semivolatile Organic Compounds

No contaminants are detected in the method blank.

Pesticides/PCBs

No contaminants are detected in the method blank.

B) Field or rinse blank contamination ("water blanks" or "distilled water blanks" are validated like any other sample).

All samples were taken directly from a drinking water tap into a collection bottle, therefore no field blanks were necessary.

C) Trip blank contamination

Only volatile organic compounds were analyzed for in trip blanks.

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DATA ASSESSMENT:

Trip blank 9/27 is reported to contain methylene chloride at a concentration of 16 ug/L. Sample VIHA I is associated with this trip blank and contains 3 ug/L of methylene chloride. This value is already qualified due to method blank contamination.

Trip blank 10/01 is reported to contain methylene chloride at a concentration of 13 ug/L, acetone at a concentration of 6 ug/L, and a TIC with a RT of 3.95 at a concentration of 4 ug/L. The samples Bryan, Dimitri, Matthias, and Ramsey are associated with this trip blank. The methylene chloride and same TIC concentration values for these samples have already been qualified due to method blank contamination. Acetone is not detected in any of the associated samples.

Trip blank 10/02 is reported to contain methylene chloride at a concentration of 14 ug/L, acetone at a concentration 7 ug/L, and a TIC with a RT of 3.95 at a concentration of 3 ug/L. The samples Eglin I and LaPlace are associated with this trip blank. The methylene chloride and same TIC concentration values for these samples have already been qualified due to method blank contamination. These samples also have acetone concentrations above the CRQL. These values are qualified with "U" because they are less than 10 times the common contaminant concentration in the trip blank.

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DATA ASSESSMENT:

3. MASS SPECTROMETER TUNING:

Tuning and performance criteria are established to ensure adequate mass resolution, proper identification of compounds, and to some degree, sufficient instrument sensitivity. These criteria are not sample specific. Instrument performance is determined using standard materials. Therefore, these criteria should be met in all circumstances. The tuning standard for volatile organics is bromofluorobenzene (BFB) and for semi-volatiles is decafluorotriphenyl-phosphine (DFTPP).

If the mass calibration is in error, all associated data will be classified as unusable, "R".

All mass calibrations are acceptable for both the volatile and semivolatile analyses.

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DATA ASSESSMENT:

4. CALIBRATION

Satisfactory instrument calibration is established to ensure that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of giving acceptable performance at the beginning of an experimental sequence. The continuing calibration checks document that the instrument is giving satisfactory daily performance.

A) RESPONSE FACTOR:

The response factor measures the instrument's response to specific chemical compounds. The response factor for the Target Compound List (TCL) must be $\geq$ 0.05 (a ratio of areas) in both the initial and continuing calibrations. A value < 0.05 indicates a serious detection and quantitation problem (poor sensitivity). Analytes detected in the sample will be qualified as estimated, "J". All non-detects for that compound will be rejected ("R").

Volatile Organic Compounds

The initial calibration performed on 9/28/90 has response factors <0.05 for acetone, 2-butanone, and 2-hexanone. All samples are associated with this calibration and are qualified as stated above.

The continuing calibration performed on 10/08 has response factors <0.05 for 2-butanone and 2-hexanone. The continuing calibrations performed on 10/09, 10/13, and 10/14 have response factors <0.05 for acetone, 2-butanone,and 2-hexanone. These compounds are already qualified in the associated samples as a result of deficient initial calibration response factors.

Semivolatile Organic Compounds

All response factors are greater than or equal to 0.05 in both the initial and continuing calibrations.

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DATA ASSESSMENT:

5. CALIBRATION:

A) PERCENT RELATIVE STANDARD DEVIATION (%RSD) AND PERCENT DIFFERENCE (%D):

Percent RSD is calculated from the initial calibration and is used to indicate the stability of the specific compound response factor over increasing concentration. Percent D compares the response factor of the continuing calibration check to the mean response factor (RRF) from the initial calibration. Percent D is a measure of the instrument's daily performance. Percent RSD must be <30% and %D must be <25%. A value outside of these limits indicates potential detection and quantitation errors. For these reasons, all positive results are flagged as estimated, "J" and non-detects are flagged "UJ" (if %D or RSD > 50%). If there is a gross deviation of %RSD and %D, the non-detects may be rejected ("R").

For the PCB/PESTICIDE fraction, %RSD for aldrin, endrin, DDT, and dibutylchlorendate must not exceed 10%. Percent D must be within 15% on the quantitation column and 20% on the confirmation column.

Volatile Organic Compounds

The initial calibration performed on 9/28/90 has a %RSD greater than 30% for methylene chloride (66.948%) and acetone (71.280%). All samples are associated with this initial calibration. The methylene chloride concentration values will be qualified as stated above. The acetone concentration values are already qualified as a result of deficient response factors.

The continuing calibration performed on 10/08 has a %D greater than 25% for 2-butanone (82.37%) and acetone (93.97%). The sample Matthias is associated with this calibration. These compounds are already qualified as a result of deficient response factors.

The continuing calibration performed on 10/09 has a %D greater than 25% for the following compounds:

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DATA ASSESSMENT:

Compound	%D
Chloromethane	28.83
Bromomethane	27.18
Methylene Chloride	33.67
2-Butanone	75.79
Vinyl Acetate	46.25
4-Methyl-2-Pentanone	38.55

The samples Tillet, Tillet(D), Hartman I, Trip Blank 10/03, VIHA I, and Trip Blank 9/27 are associated with this calibration. The concentration values of the above compounds are qualified with "J" for positive hits. No action is taken for non-detects, except for 2-butanone, which are already qualified as a result of deficient response factors.

The continuing calibration performed on 10/13 has a %D greater than 25% for the following compounds:

Compound	%D
Bromomethane	39.46
1,1-Dichloroethane	28.41
trans-1,2,-Dichloroethene	30.42
Chloroform	40.08
1,2-Dichloroethane	48.71
1,1,1-Trichloroethane	37.61
Carbon Tetrachloride	34.44
Bromodichloromethane	40.12
1,2-Dichloropropane	31.95
trans-1,3-Dichloropropene	108.79
Trichloroethene	26.37
Dibromochloromethane	40.43
1,1,2-Trichloroethane	34.86
Benzene	33.19
Bromoform	27.06
4-Methyl-2-Pentanone	31.53
Chlorobenzene	27.12

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DATA ASSESSMENT:

The samples Dimitri, Trip Blank 10/01, H_2O Blk Tutu and Trip Blank 10/02 are associated with this calibration. The concentration values of the above compounds are qualified with "J" for positive hits in the affected samples. No action is taken for non-detects, except for trans-1,3-dichloropropene, which will be qualified with "R" because the %D is greater than 90%.

The continuing calibration performed on 10/14 has a %D greater than 25% for the following compounds:

Compound	%D
Acetone	36.79
1,1,1-Trichloroethane	29.70
Vinyl Acetate	26.53
trans-1,3-Dichloropropene	38.95
cis-1,3-Dichloropropene	29.80

The samples Bryan, Ramsey, Eglin I, and La Place are associated with this calibration. The concentration values of the above compounds are qualified with "J" for positive hits. No action is taken for non-detects, except for acetone, which is already qualified as a result of deficient response factors.

Semivolatile Organic Compounds

No semivolatile organic compounds were detected in any of the samples. Therefore, the CRQLs will be qualified with "UJ" only when calibrations have %RSDs or %Ds greater than 50%.

The continuing calibration performed on 10/27 has a %D greater than 50% for hexachlorocyclopentadiene (66.0%). Samples La Place, Tillet (original), and Tillet(D) (original) are associated with this calibration. The non-detect values will be qualified with "UJ".

The continuing calibration performed on 11/08 has a %D greater than 50% for benzoic acid (55.0%), 2,4-dinitrophenol (65.0%), and 2,4,6-tribromophenol (-55.0%). Sample Tillet(RE) is associated with this calibration. All semivolatile concentration values are already flagged with "R" due to holding time exceedence.

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SOP NO. HW-6

DATA ASSESSMENT:

Pesticides/PCBs

The %RSD for aldrin, endrin, DDT, and dibutylchlorendate did not exceed 10%. The %D was within 15% on the quantitation column and within 20% on the confirmation column.

Title: Evaluation of Metals Data for the Contract Laboratory Program
Appendix A.1: Data Assessment - Contract Compliance (Total Review - Inorganics)

Date: Feb. 1990
Number: HW-2
Revision: 10

A.2.1 (continuation)

The CRA run on 10/31/90 has a 45% recovery for Mercury. The samples Bryan, Dimitri, Matthias, Ramsey, Eglin I, LaPlace, Tillet, Tillet(D), H20 blk Tutu, and Hartman I are associated with the above deficiencies. Positive hits for the listed metals are qualified "J" in the affected samples. The mercury concentration values are qualified "R" for all affected samples because the recovery is below 50%.

The CRI run on 11/01 has the following deficiencies:

Metal	%R
Antimony	71.7
Cadmium	130.0
Silver	140.0

The CRA run on 11/05 has a 50% recovery for Mercury. VIHA I is the only sample associated with the above deficiencies. The positive hits for the listed metals are qualified "J". The Mercury value has previously been qualified "R".

The CRA run on 10/20 has a 133% recovery for Selenium. Samples Bryan, Dimitri, DimitriD, DimitriS, Matthias, and Ramsey are associated with this CRA analysis. The positive hits for Selenium are qualified with "J" for the samples.

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Title: Evaluation of Metals Data for the Contract Laboratory Program Appendix A.1: Data Assessment - Contract Compliance (Total Review - Inorganics)

Date: Feb. 1990
Number: HW-2
Revision: 10

A.2.1 (continuation)

The CRA run on 10/25 has a 125% recovery for Thallium. The samples Matthias, Ramsey, Eglin I, LaPlace, Tillet, Tillet(D), and the H2O blk Tutu are associated with this deficiency. There are no positive hits, therefore no qualifiers are necessary. However, Thallium has previously been qualified "UJ" for these samples.

The Iron concentration value in the field duplicate has a RPD that is greater than 50% where sample and duplicate are both greater than 5 times the CRDL. As a result, Iron values are qualified as estimated ("J") in all samples. The Lead concentration values are less than 5 times the CRDL in both the sample and duplicate and the difference is greater than the CRDL, therefore all Lead values are qualified as estimated ("J") in all samples.

Sample Dimitri was used for the matrix spike analysis. Selenium (36%) and Thallium (25%) have % recoveries out of QC limits (75-125%). All Selenium results are qualified "UJ" for non-detects and "J" for positive hits. All Thallium results are qualified "R", which supercedes previous qualifiers.

In the ICP Serial Dilution, the initial concentration of Vanadium is greater than 10 times the IDL and the % difference is out of QC units. As a result, all Vanadium concentration values are qaulified with "J".

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Title:	Evaluation of Metals Data for the Contract Laboratory Program Appendix A.1: Data Assessment - Contract Compliance (Total Review - Inorganics)	Date: Number: Revision:	Feb. 1990 HW-2 10

A.2.2 Contract Problems/Non Compliance

The holding time for Mercury analysis was exceeded for nine samples.

Samples Dimitri and Tillet were not correctly preserved.

The correlation coefficients were out of QC limits for Arsenic and Thallium analyses.

The Selenium analysis had eleven samples betwen the ICV and CCV, one sample over the QC limit.

MMB Reviewer: _____ Date: _____
Signature

Contractor Reviewer: Donna M. Lesch Date: 01/07/91
Signature

Verified by: (see next page for verification signature) Date: _____

Table 1. Tutu Residential Wells Sampling Results, September 1990. Sample Delivery Group 900770

Sample Identification:	770-01	770-02	770-03	770-04	770-06	770-07
Inorganics Analysis	Bryan	Dimitri	Matthias	Ramsey	Eglin I	LaPlace
Aluminum	149 B	163 BJ	227	187 B	149 B	146 B
Antimony	52 U	52 UJ	52 U	52 U	52 U	57 B
Arsenic	3 UJ	3 UJ	3 UJ	3 UJ	3 U	3 U
Barium	3 U	3 UJ	6 B	3 U	3 U	3 U
Beryllium	3 B	4 BJ	3 B	3 B	4 B	4 B
Cadmium	4 BJ	3 BJ	3 U	3 BJ	3 U	4 BJ
Calcium	54300	37500 J	36300	43100	35300	41000
Chromium	7 B	4 BJ	5 B	11	12	8 B
Cobalt	18 U	18 UJ	18 U	18 U	18 U	18 U
Copper	17 BJ	17 BJ	18 BJ	15 BJ	14 BJ	49 J
Iron	63 BJ	115 J	20 UJ	20 BJ	20 UJ	55 BJ
Lead	4.6J	2.6BJ	1.8BJ	2.6BJ	2 BJ	2.3BJ
Magnesium	49100	27800 J	34900	34400	28700	32600
Manganese	2 B	7 BJ	2 U	2 U	56	2 B
Mercury	R	R	R	R	R	R
Nickel	11 U	14 BJ	20 BJ	21 BJ	26 BJ	18 BJ
Potassium	1000 B	2000 BJ	1410 B	1140 B	920 B	1140 B
Selenium	2 UJ	10 UJ	2 UJ	10 UJ	10 UJ	10 UJ
Silver	7 U	7 UJ	7 U	7 U	7 U	7 U
Sodium	83000	328000 J	379000	209000	190000	250000
Thallium	R	R	R	R	R	R
Vanadium	37 B	92 J	21 B	43 B	34 B	39 B
Zinc	30	4 UJ	4 BJ	7 BJ	13 BJ	13 BJ
Cyanide	5 U	5 UJ	5 U	5 U	5 U	5 U

All concentrations are reported in micrograms per liter (ug/L).

J - Value is estimated.

U - Analyte is not detected.

R - Value is rejected.

B - Value is between instrument detection limit and contact required detection limit.

Table 1. Tutu Residential Wells Sampling Results, September 1990, Sample Delivery Group 900770

Sample Identification:	770-08	770-09	770-10	770-12	770-14
Inorganic Analysis	Tillet	Tillet-D (Replicate)	H2O Blank Tutu	Gassett (Hartman I)	VIHA I
Aluminum	153 BJ	159 B	85 B	526	154 B
Antimony	52 UJ	52 U	52 U	52 U	54 BJ
Arsenic	3 UJ	4.4B	3 U	3 U	3 U
Barium	43 BJ	40 B	3 U	7 B	5 B
Beryllium	4 BJ	4 B	4 B	4 B	3 B
Cadmium	4 BJ	3 BJ	3 U	3 U	4 BJ
Calcium	54800 J	48600	74 U	31200	49400
Chromium	8 BJ	7 B	5 B	4 B	10
Cobalt	18 UJ	18 U	18 U	18 U	18 U
Copper	48 J	32 J	12 BJ	10 BJ	10 B
Iron	953 J	2660 J	27 BJ	418 J	29 BJ
Lead	1.5BJ	8.5J	1 UJ	1.4BJ	9 J
Magnesium	38300 J	34500	95 U	26300	33900
Manganese	1260 J	1100	2 U	853	2 U
Mercury	R	R	R	R	R
Nickel	33 BJ	15 BJ	11 UJ	11 U	15 B
Potassium	760 BJ	1190 B	300 B	880 B	2000 B
Selenium	10 UJ	10 UJ	2 UJ	10 UJ	1.4BJ
Silver	7 UJ	7 U	7 U	7 B	16 J
Sodium	192000 J	169000	158 B	236000	252000
Thallium	R	R	R	R	R
Vanadium	25 BJ	50 J	10 BJ	26 BJ	67 J
Zinc	162 J	124 J	4 UJ	5 BJ	16 B
Cyanide	5 UJ	5 U	5 U	5 U	9.7B

All concentrations are reported in micrograms per liter (ug/L).

J - Value is estimated.

U - Analyte is not detected.

R - Value is rejected.

B - Value is between instrument detection limit and contract required detection limit.

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DATA ASSESSMENT:

6. SURROGATES:

All samples are spiked with surrogate compounds prior to sample preparation to evaluate overall laboratory performance and efficiency of the analytical technique. If the measured surrogate concentrations were outside contract specifications, qualifications were applied to the samples and analytes as shown below.

Volatile Organic Compounds

As specified in Method 524.2, only two surrogate compounds were used, bromofluorobenzene (BFB) and trans-1,2-dichlorobenzene-d4 (t-DCB). The recovery of BFB is outside the quality control (QC) limits (86-115%) in the following sample analyses:

Sample	%BFB Recovered
Dimitri	82
H20 BLK Tutu	76
Trip Blank 10/03	82
Trip Blank 10/01	70
Trip Blank 10/02	74
VIHA I	82
DimitriMS	80
VBLK01	118
VBLK03	78

These samples were not re-analyzed. For each affected sample, the concentration values for compounds are qualified "J" for positive hits, and "UJ" for all non-detects. No QC limits are established for the recovery of t-DCB; however, when the BFB recovery is within QC limits, the t-DCB recovery is in the range of 80% to 120%.

Semivolatile Organic Compounds

The laboratory narrative states that in the original analyses of sample Tillet and Tillet(D) the recovery of the surrogates phenol-d5 (PHL) and 2-fluorophenol (2FP) were low, which lead to a re-extraction and re-analysis of

ATTACHMENT 1
SOP NO. HW-6

DATA ASSESSMENT:

both samples. After the re-extraction, the Tillet (RE) surrogate recoveries were all within QC limits and the laboratory reported only this set of results. This re-extraction was performed out of holding time, therefore those results are qualified with "R" and are not reported. The original Tillet results were requested from the laboratory. The recoveries for PHL and 2FP were 8% and 11%, respectively, in the original Tillet analysis. Both PHL and 2FP are surrogates for the acid fraction, therefore only the acid fraction concentration values are qualified with "R" in the original Tillet sample as a result of one surrogate having less then a 10% recovery.

After re-extraction, the Tillet (D)RE recoveries of the surrogates PHL and 2FP remained out of QC limits. The lab reported both sets of Tillet(D) results. The following are the recoveries for both Tillet(D) (original) and Tillet(D) RE analyses:

Sample	%PHL	%2FP
Tillet(D) - original	7	9
Tillet(D)RE	9	15

Only the acid fraction will be qualified "R" in each sample as a result of at least one acid fraction surrogate having less than a 10% recovery.

Pesticides/PCBs

The Dibutylchlorandate (DBC) recovery was high for sample VIHA I (191%, QC limits 24-154%). No pesticides or PCBs were found in this sample, therefore no qualifiers are necessary.

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DATA ASSESSMENT:

7. INTERNAL STANDARDS PERFORMANCE:

Internal standard (IS) performance criteria ensure that the GC/MS sensitivity and response are stable during every experimental run. The internal standard area count must no vary by more than a factor of 2 (-50% to +100%) from the associated continuing calibration standard. the retention time of the internal standard must not vary more than ± 30 seconds from the associated continuing calibration standard. If the area count is outside the (-50% to +100%) range of the associated standard, all of the positive results for compounds quantitated using that IS are qualified as estimated, "J", and all non-detects as "UJ", or "R" if there is a severe loss of sensitivity.

If an internal standard retention time varies by more than 30 seconds, the reviewer will use professional judgement to determine either partial or total rejection of the data for that sample fraction.

All internal standard area counts and retention times are within QC limits for VOC analyses.

The internal standard area count for Phenanthrene-d10 is extremely low for sample Tillet (original). All associated sample data quantitated using this internal standard are rejected. Sample Tillet (original) is reported to contain 20 ug/L of Di-n-Butylphthalate. This concentration was quantitated using the Phenanthrene-d10 internal standard area count. In the reviewer's professional judgement, this value is rejected because the quantitation is greatly altered by the low internal standard area count. If the area count were within QC limits, the reported value would be dramatically lower and would most likely be a non-detect. The internal standard area counts are within QC limits for the remaining volatile compound analyses.

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DATA ASSESSMENT:

8. COMPOUND IDENTIFICATION:

A) VOLATILE AND SEMI-VOLATILE FRACTIONS:

TCL compounds are identified on the GC/MS by using the analyte's relative retention time (RRT) and by comparison to the ion spectra obtained from known standards. For the results to be a positive hit, the sample peak must be within $\pm$ 0.06 RRT units of the standard compound and have an ion spectra which has a ratio of the primary and secondary m/e intensities within 20% of that in the standard compound. For the tentatively identified compounds (TIC) the ion spectra must match accurately. In the cases where there is not an adequate ion spectrum match, the laboratory may have provided negative proofs.

Volatile organic compounds are properly identified on the GC/MS and all TICs accurately match their ion spectra.

No semivolatile target compounds were found in any sample. TICs accurately match their ion spectra.

B) PESTICIDE/PCB FRACTION:

The retention times of reported compounds must fall within the calculated retention time windows for the two chromatographic columns and a GC/MS confirmation is required if the concentration exceeds 10 nanograms per milliliter (ng/ml) in the final sample extract.

No pesticides or PCBs were found in any sample.

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DATA ASSESSMENT:

9. MATRIX SPIKE/SPIKE DUPLICATE, MS/MSD:

The MS/MSD data are generated to determine the long-term precision and accuracy of the analytical method in various matrices. The MS/MSD may be used in conjunction with other QC criteria for some additional qualification of the data.

All MS/MSD % recoveries are within QC limits for volatile, semivolatile organic compounds and pesticides/PCBs.

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DATA ASSESSMENT:

10. OTHER QC DATA OUT OF SPECIFICATION:

A) Sample Receipt

The chains of custody indicate that the lab received several vials which contained bubbles. As a result, all volatile organic data is assumed to be biased low and additional qualifiers are necessary. Bubbles were found in both vials for samples Tillet(D), LaPlace, and Eglin I. All positive hits for these samples are qualified with "J" and all non-detects are qualified with "R". These qualifiers supercede all others. Bubbles were found in only one vial for sample Tillet, but the lab was not able to distinguish which vial was used for the volatile organic analysis. Therefore, we must assume the vial with bubbles was used and additional qualifiers are necessary. All positive hits are qualified with "J" and all non detects are qualified with "R".

B) Method Detection Limit Study

Method 524.2 state that a method detection limit (MDL) study must be performed prior to sample analyses.

The MDL study consists of seven repeat analyses of target compounds at concentrations of 1 ppb. The QC limits for mean accuracy (% recovery) and %RSD are 80-120% and 20%, respectively. The MDL study must be repeated if these standards are not met. The MDL study associated with SDG VIHAI results were performed in April 1990 and has the following deficiencies (*):

Compound	Mean Accuracy,%	% RSD	
1,1-Dichloroethene	72*	7.2	
Methylene Chloride	148*	12.0	
1,2-Dichloroethane	121*	7.9	
Tetrachloroethene	76*	9.5	
Bromoform	88	28.0	*
1,1,2,2-Tetrachloroethane	122*	7.3	

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DATA ASSESSMENT:

In addition, the following compounds were not included in the MDL study: acetone, carbon disulfide, 2-butanone, vinyl acetate, 4-methyl-2-pentanone and 2-hexanone. The above compounds are flagged "J" for all samples, except where compounds are qualified "R" for other deficiencies.

C) Laboratory Fortified Blanks

QC requirements established in Method 524.2 and the Sampling, Analysis, and Monitoring Plan (Appendix A) state that laboratory fortified blanks (LFBs) must be analyzed immediately following each continuing calibration and the accuracy must be between 80% to 120% recovery. The provided data indicate that the recoveries were out of QC limits for volatile compounds in each LFB. The LFBs were not always analyzed immediately after the calibrations. The affected samples and compounds are qualified "J" to reflect these deficiencies.

FUT 001 1548

ATTACHMENT 1
SOP NO. HW-6

DATA ASSESSMENT:

11. SYSTEM PERFORMANCE AND OVERALL ASSESSMENT:

The compounds of primary importance in this project are the volatile organics. SDG VIHA I has several volatile QC criteria out of specification.

The MDL study had % recoveries out of QC limits as well as compounds which were not included in the study at all. The FLBs also had several compounds out of QC Limits and in two instances was not run immediately after the continuing calibrations. All target compounds were present in the FLBs. These MDL and FLB deficiencies indicate that the laboratory instrumentation has difficulties recovering certain compounds at low concentrations (1 ppb). As a result, the data is assumed to be biased low and the affected compounds are qualified with "J" in the associated samples.

The volatile surrogate recoveries are out of QC limits in several samples as well as two (out of four) method blanks. For the affected samples, the identification of the compounds is acceptable, but for positive hits and non-detects the quantitation must be considered as estimated only. The concentration values and quantitation limits for the six affected samples have been qualified as such.

The volatile calibrations are deficient for compounds which were either common lab contaminants or compounds not detected in any sample. The majority of the data is not seriously affected by these deficiencies.

During the process of validation, the compound quantitation performed by the reviewer did not agree with the quantitation performed by the lab. The lab was notified and the laboratory personnel determined that the incorrect response factors were used to quantitate the compound concentrations for sample Matthias. The lab corrected the problem and sent a revised Form I(s) and quantitation report. These revisions are included with the data package.

The bubbles in the vials have an impact on the quality of the volatile organic data for the affected samples. In samples Eglin I, LaPlace, Tillet, and Tillet(D), all non-detects in the affected samples are rejected "R" and all positive hits are qualified with "J".

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DATA ASSESSMENT:

Overall, the volatile organic data is consistent although QC problems exist as discussed above.

The semivolatile acid fraction surrogate recoveries for the samples Tillet and Tillet(D) were originally out of QC limits. Both samples were re-extracted and re-analyzed. Although the re-analysis presented some surrogate recoveries within QC limits, the re-extractions far exceeded the holding time, making the re-analysis data unusable (qualified "R"). The original Tillet sample results were received from the laboratory, and are reported in the table with the acid fraction concentration values rejected. In addition, several compounds are rejected because the associated internal standard area count was out of QC limits. The original Tillet(D) results are acceptable except for the acid fraction concentration values, which are rejected. All other semivolatile data is acceptable.

The pesticide/PCB data is acceptable. The surrogate recovery was high for one sample, but no pesticides or PCBs were found, therefore it has no effect on the data.

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SOP NO. HW-6

DATA ASSESSMENT:

12. CONTRACT PROBLEMS:

The MDL study failed to include six target compounds. Several results were out of QC limits established in Method 524.2 and the Sampling, Analysis, and Monitoring Plan.

The laboratory fortified blanks were not analyzed immediately after the calibrations and many % recoveries are not within QC limits.

The volatile organic analyses have several samples and two blanks with the surrogate BFB out of QC limits. The lab has failed to perform satisfactorily because there is no evidence of reanalysis for any sample or blank.

13. This package contains sample re-extraction, re-analysis or dilution. Upon reviewing the QA results, the following form I(s) are identified to be used.

The Form I(s) for the original analyses of samples Tillet and Tillet(D) are to be used because they were performed within the holding time.

SOP NO. HW-2

Evaluation of Metals Data for the Contract Laboratory Program (CLP)

based on

SOW. 7/88
REV. 2/89

(SOP Revision X)

PREPARED BY: Hanif Sheikh DATE: 2-16-90
Hanif Sheikh, Quality Assurance Chemist
Toxic and Hazardous Waste Section

CONCURRED BY: Louis Bevilacqua DATE: 2/16/90
Louis Bevilacqua, Section Chief
Toxic and Hazardous Waste Section

APPROVED BY: L Bevilacqua for GFM DATE: 2/16/90
Gerard F. McKenna, Chief
Monitoring Management Branch

TUT 001 1552

STANDARD OPERATING PROCEDURE

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Title: Evaluation of Inorganic Data for the Contract Laboratory Program

Date: Feb. 1991
Number: HW-2
Revision: 10

1.0 Scope

1.1 This procedure is applicable to inorganic data obtained from contractor laboratories working for Hazardous Waste Site Contract Laboratory Program (CLP).

1.2 The data validation is based upon analytical and quality assurance requirements specified in Statement of Work (SOW) 7/88.

2.0 Responsibilities - Data reviewers will complete the following tasks as assigned by the D. Review Coordinator:

2.1. For a total review:

2.1.1 Data Assessment - "Total Review-Inorganics" Checklist Appendix (A.1). The reviewer must answer every question on the checklist.

2.1.2 Data Assessment - Data Assessment Narrative (Appendix A.2) The answer on the checklist must match the action in the narrative (appendix A.2) and on Form I's. Do not use pencil to write the narrative.

2.1.3 Contract Non-Compliance - SMO Report (Appendix A.3) This report is to be completed only when a serious contract violation is encountered, or upon the request of the Data Review Manager or Deputy Project Officer (DPO). Forward 5 copies: one each for internal files, appropriate Regional DPO, Sample Management Office (SMO) and last two addresses of Mailing List for Data Reviewers (Appendix A.4). In other cases, all contract violations should be appended to end of Data Assessment Narrative (Sec. A.2.2).

2.1.4 Data Summary Sheet - Summary of Inorganic Quality Control Data (Appendix A.5). Enter in ink on Data Summary Sheet required QC values from Forms I through IX. Cir all values that require data qualification "Action".

2.1.5 CLP Data Assessment Summary Forms

2.1.5.1 Appendix A.6
Fill in the total number of analytes analyzed by different analyses and the number of analytes rejected or flagged as estimated due to corresponding quality control criteria. Place an "X" in boxes where analyses were not performed, or criteria do not apply.

2.1.5.2 Appendix A.7
Data reviewer is also required to fill out Inorganic Regional Data Assessment form (Appendix A.7) provided by EPA Headquarters. Codes listed on the form will be used to describe the Data Assessment Summary.

2.1.6 Data Review Log: It is recommended that each data reviewer should maintain a log reviews completed to include:
a. date of start of case review
b. date of completion of case review
c. site
d. case number
e. contract laboratory
f. number of samples
g. matrix
h. hours worked
i. reviewer's initials

2.1.7 Telephone Record Log - the data reviewer should enter the bare facts of inquiry, before initiating any phone conversation with CLP laboratory. After the case review has been completed, mail white copy of Telephone Record Log to the laboratory and pink copy to SMO. File yellow copy in the Telephone Record Log folder, and attach a xerox copy of the Telephone Record Log to the completed Data Assessment Narrative (Appendix A.2).

2.1.8 Forwarded Paperwork

2.1.8.1 Upon completion of review, the following are to be forwarded to the Regional Sample Control Center (RSCC) located in the Surveillance and Monitoring Branch:
a. data package
b. completed data assessment checklist (Appendix A.1,original)
c. SMO Contract Compliance Screening (CCS)
d. Data Summary Sheet (Appendix A.5) along with completed Data Assessment Narrative (Appendix A.2)
e. Record of Communication (copy)
f. CLP Reanalysis Request/Approval Record (original + 3 copies)
g. Appendix A.7 (original).

2.1.8.2 Forward 4 copies of completed Data Assessment Narrative (Appendix A.2) along with 2 copies of the Inorganic Data Assessment Form (Appendix A.7) and Telephone Record Log , if any,: one each for appropriate Regional DPO, Sample Management Office (SMO), and last two addressees of Mailing List for Data Reviewers (Appendix A.4) (the Inorganic Data Assessment form does not go to the last two addressees).

2.1.9 Filed Paperwork - Upon completion of review, the following are to be filed within M-E files:

a. Four copies of completed Data Assessment Narrative (Appendix A.2) each carrying Appendix A.7.
b. Telephone Record Log (copy)
c. S-D Report (copy Appendix A-3)
d. CLP Data Assessment Summary Form (Appendix A.6).
e. CLP Reanalysis Request/Approval Record (copy)

3.0 Data Completeness
Indicate incomplete data package on the computer tracking sheet located in M-E office. Authorized contractor personnel may contact the laboratory after discovery of an incomple data package. If a laboratory will not return phone calls or does not respond to reques notify M-E coordinator of Region II for resolution.

4.0 Rejection of Data - All values determined to be unacceptable on the Inorganic Analysis Da Sheet (Form I) must be lined over with a red pencil. As soon as any review criteria caus data to be rejected, that data can be eliminated from any further review or consideratic

5.0 Acceptance Criteria - In order that reviews be consistent among reviewers, acceptance criteria as stated in Appendix A.1 (pages 4-25) should be used. Additional guidance c be found in the National Inorganic Functional Guidelines of October 1, 1989.

6.0 SMO Contract Compliance Screening (CCS) - This is intended to aid reviewer in locating problems, both corrected and uncorrected. However, the validation should be carried even if CCS is not present. Resubmittals received from laboratory in response to CCS m be used by the reviewer.

7.0 Request for Reanalysis - Data reviewers must note all items of contract non-compliance within Data Assessment Narrative.If holding times and sample storage times have not b exceeded, DPO may request reanalysis if items of non-compliance are critical to data assessment. Requests are to be made on "CLP Re-Analysis Request/Approval Record".

8.0 Record of Communication - Provided by the Regional Sample Control Center (RSCC) to indicate which data packages have been received and are ready to be reviewed.

0 Rounding off numbers - The data reviewer will follow the standard practice.

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Title: Evaluation of Metals Data for the Contract Laboratory Program
Appendix A.1: Data Assessment - Contract Compliance (Total Review - Inorganics)

Date: Feb. 1992
Number: HW-2
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	YES	NO	N/A
A.1.1 Contract Compliance Screening Report (CCS) - Present?	[ ]	__	✓
ACTION: If no, contact RSCC.			
A.1.2 Record of Communication (from RSCC) - Present?	[ ]	__	✓
ACTION: If no, request from RSCC.			
A.1.3 Trip Report - Present and complete?	[ ]	__	✓
ACTION: If no, contact RSCC for trip report.			
A.1.4 Sample Traffic Report - Present or on file?	[✓]	_	__
Legible?	[✓]	__	—
ACTION: If no, request from Regional Sample Control Center (RSCC).			
A.1.5 Cover Page - Present?	[✓]	__	—
Is cover page properly filled in and signed by the lab manager or the manager's designee?	[✓]	__	—
ACTION: If no, prepare Telephone Record Log, and contact laboratory.			
Do numbers of samples correspond to numbers on Record of Communication?	[✓]	—	—
Do sample numbers on cover page agree with sample numbers on:			
(a) Traffic Report Sheet?	[✓]	__	—
(b) Form I's?	[✓]	__	—
ACTION: If no for any of the above, contact RSCC for clarification.			

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Title: Evaluation of Metals Data for the Contract Laboratory Program
Appendix A.1: Data Assessment - Contract Compliance (Total Review - Inorganics)

Date: Feb. 1991
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	YES	NO	N/A
A.1.6 Form I (Final Data) - Are all Form I's present and complete?	[✓]	—	—
ACTION: If no, prepare telephone record log and contact laboratory for submittal.			
Are correct units (ug/l for waters and mg/kg for soils) indicated on Form I's?	[✓]	—	—
Are soil sample results for each parameter corrected for percent solids?	[—]	—	✓
Are EPA sample # s and corresponding laboratory sample ID # s the same as on the Cover Page, Form I's and in the raw data?	[✓]	—	—
Are computation/transcription errors less than 10% of reported values?	[✓]	—	—
Are all "less than IDL" values properly coded with "U"?	[✓]	—	—
Was a brief physical description of samples given on Form I's?	[✓]	—	—
Were the result qualifiers used correctly with final data?	[✓]	—	—
ACTION: If no for any of the above, prepare Telephone Record Log, and contract laboratory for corrected data.			
Were any samples diluted beyond requirements of contract?	—	[✓]	—
If yes, were dilutions noted on Form I's?	[—]	—	✓
ACTION: If no, note under Contract-Problem/Non-Compliance of the "Data Assessment Narrative".			

A.1.7 Holding Times - (aqueous and soil samples)

(Examine sample traffic reports and digestion/distillation logs.)

Mercury analysis (28 days). . . . . exceeded?	✓	[—]	—
Cyanide distillation (14 days). . . . . exceeded?	—	[✓]	—

	YES	NO	N/A
Other Metals analysis (6 months). . . . exceeded?	___	[✓]	___

NOTE: Prepare a list of all samples and analytes for which holding times have been exceeded. Specify the number of days from date of collection to the date of preparation (from raw data). Attach to checklist.

ACTION: If yes, reject (red-line) values less than Instrument Detection Limit (IDL) and flag as estimated (J) the values above IDL even though sample(s) was preserved properly.

A.1.8 Raw Data

A.1.8.1	Digestion Log* for flame AA/ICP (Form XIII) present?	[✓]	__	___
	Digestion Log for furnace AA Form XIII present?	[✓]	__	___
	Distillation Log for mercury Form XIII present?	[✓]	__	___
	Distillation Log for cyanides Form XIII present?	[✓]	__	___
	Are pH values (pH<2 for all metals, pH>12 for cyanide) present in Digestion/Distillation Logs?	[✓]	__	___
	*Weights, dilutions and volumes used to obtain values.			
	Percent solids calculation present for soils/sediments?	[___]	__	✓
	Are preparation dates present on Digestion Log?	[✓]	__	___
A.1.8.2	Measurement read out record present? ICP	[✓]	___	___
	Flame AA	[___]	___	✓
	Furnace AA	[✓]	___	___
	Mercury	[✓]	___	___
	Cyanides	[✓]	__	___

		YES	NO	N/A
A.1.8.3	Are all raw data to support all sample analyses and QC operations present?	[✓]	__	__
	Legible?	[✓]	__	__
	Properly Labeled?	[✓]	__	__

ACTION: If no for any of the above, write Telephone Record Log and contact laboratory. Flag metal data as estimated if pH of sample is greater than 2. Flag cyanide data as estimated if pH sample is less than 12.

A.1.9 Data Validation and Verification

A.1.9.1 Calibration

A.1.9.1.1	Is record of at least 2 point calibration present for ICP analysis?	[✓]	__	__
	Is record of 5 point calibration present for Hg analysis?	[✓]	__	__

ACTION: If no for any of the above, write in the Contract Problem/Non-Compliance section of the "Data Assessment Narrative".

A.1.9.1.2	Is record of 4 point calibration present for:			
	Flame AA?	[__]	__	✓
	Furnace AA?	[✓]	__	__
	Cyanides?	[✓]	__	__

NOTE:
1. If less than 4 standards are measured in absorbance mode, then the remaining standards in concentration mode must be run immediately after calibration and be within ±10% of true value.
2. For all AA (except Hg) and Cyanide analyses, one calibration standard is at CRDL level. If not, write in the Contract-Problem/Non-Compliance section of the "Data Assessment Narrative".

	YES	NO	N/A

ACTION: Flag associated data as estimated if standards are not within ±10% of true values (except CRDL calibration standard). Do not flag the data as estimated in linear range indicated by good recovery of standard.

A.1.9.1.3 Is correlation *coefficient less than 0.995 for:

Mercury Analysis?	___	[✓]	___
Cyanide Analysis?	___	[✓]	___
Atomic Absorption Analysis?	✓	[___]	___

ACTION: If yes, flag the associated data as estimated.

A.1.9.2 Form II A (Initial and Continuing Calibration Verification)-

A.1.9.2.1 Present and complete for every metal and cyanide?	[✓]	__	___
Present and complete for AA and ICP when both are used for same analyte?	[___]	__	✓

ACTION: If no for any of the above, prepare Telephone Record Log and contact laboratory.

A.1.9.2.2 Circle all values on data summary sheet that are outside contract windows. Are all calibration standards (initial and continuing) within control limits?

Metals 90-110%	[✓]	___	___
Hg - 80-120%	[✓]	___	___
Cyanides 85-115%	[✓]	___	___

* The reviewer will calculate correlation coefficient.

	YES	NO	N/A
ACTION: Flag as estimated (J) all positive data (not flagged with a "U") analyzed between a calibration standard with %R between 75-89% (65-79% for Hg; 70-84% for CN) or 111-125% (121-135% for Hg; 116-130% for CN) recovery and nearest good calibration standard. Qualify results <IDL as estimated (UJ), if the ICV or CCV %R is 75-89% (CN, 70-84% ; HG, 65-79%). Reject (red-line) as unacceptable data if recovery of the ICV or CCV is outside the range 75-125% (CN, 70-130%; Hg, 65-135%). Qualify five samples on either side of verification standard out of control limits.			
Was continuing calibration performed every 10 samples or every 2 hours?	[__]	[✓]	__
ACTION: If no, flag the excess samples (eleventh and up) data as estimated (J).			
Was ICV for cyanides distilled?	[✓]	__	__
ACTION: If no, write in the Contract-Problem/Non-Compliance section of the "Data Assessment Narrative".			
A.1.9.3 Form II B (CRDL Standards for AA and ICP) -			
A.1.9.3.1 Was a CRDL standard (CRA) analyzed after initial calibration for all AA metals (except Hg)?	[✓]	__	__
*Was a mid-range calib. verification standard distilled and analyzed for cyanide analysis?	[✓]	__	__
Was a 2xCRDL (or 2xIDL when IDL>CRDL) analyzed (CRI) for each ICP run? (Note: CRI for AL,Ba,Ca,Fe,Mg,Na,or K is not required.)	[✓]	__	__
ACTION: If no for any of the above, flag as estimated all data falling within the affected ranges. The affected ranges are: AA Analysis - **True Value ± CRDL; ICP Analysis - **True Value ± 2CRDL; CN Analysis - **True Value ± 0.5 x True Value.			

*Find the results of mid-range standard in the raw data.
**True value of CRA, CRI or mid-range standard. Substitute IDL for CRDL when IDL > CRDL.

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		YES	NO	N/A
A.1.9.3.2	Was CRI analyzed after ICV/ICB and before the final CCV/CCB, and for every four hours of ICP run?	[✓]		
	ACTION: If no, write in Contract Problem/Non-Compliance Section of the "Data Assessment Narrative".			
A.1.9.3.3	Circle all values on summary sheet that are outside acceptance windows.			
	Are CRA and CRI standards within control limits: Metals 80 - 120%R?	[ ]	✓	
	Is mid-range standard within control limits: Cyanide 80 - 120%R?	[✓]		
	ACTION: Flag as estimated all data within the affected ranges if the recovery of the standard is between 50-79%; flag only positive data if the recovery is between 121-150%; reject (red line) all data if the recovery is less than 50%; reject only positive data if the recovery is greater than 150%.			
A.1.9.4	Form III (Initial and Continuing Calibration Blanks)			
A.1.9.4.1	Present and complete?	[✓]		
	For both AA and ICP when both are used for same analyte?	[ ]		✓
	Was an initial calibration blank analyzed?	[✓]		
	Was a continuing calibration blank analyzed after every 10 samples or every 2 hours (whichever is more frequent)?	[ ]	✓	
	ACTION: If no, prepare Telephone Record Log, contact laboratory and write in the contract-problems/ non-compliance section of the Data Assessment Narrative.			

		YES	NO	N/A
A.1.9.4.2	Circle all calibration blank values on Data Summary Sheet that are above CRDL (or 2 x IDL when IDL > CRDL). Are all calibration blanks (when IDL<CRDL) less than or equal to Contract Required Detection Limits (CRDL)?	[✓]	—	—
	Are all calibration blanks less than two times Instrument Detection Limit (when IDL>CRDL)?	[__]	—	✓
	ACTION: If no for any of the above, flag as estimated (J) all positive data less than or equal to calibration blank values analyzed between calibration blank with value over CRDL (or 2xIDL) and nearest good calibration blank. Flag five samples on either side of the calibration blank.			
A.1.9.5	FORM III (Preparation Blank) -			
	(Note: The preparation blank for mercury is the same as the calibration blank.)			
A.1.9.5.1	Was one prep. blank analyzed for: each 20 samples?	[✓]	—	—
	each batch?	[✓]	—	—
	each matrix type?	[__]	—	✓
	both AA and ICP when both are used for same analyte?	[__]	—	✓
	ACTION: If no for any of the above, flag as estimated (J) all associated positive data <10 x IDLs for which prep. blank was not analyzed.			
	NOTE: If only one blank was analyzed for more than 20 samples, then first 20 samples analyzed do not have to be flagged as estimated (J).			
A.1.9.5.2	Is concentration of prep. blank greater than CRDL when IDL is less than or equal to CRDL?	—	[✓]	—
	If yes, is the concentration of the sample with the least concentrated analyte less than 10 times the prep. blank value?	—	[__]	✓

		YES	NO	N/A
	ACTION: If yes, reject (red-line) all associated data greater than CRDL concentration but less than ten times the prep. blank value found in the raw data.			
A.1.9.5.3	Do concentrations of prep. blank fall below two times IDL when IDL is greater than CRDL?	[ ]		✓
	ACTION: If no, reject (red-line) all positive data that has a concentration less than 10 times the prep. blank value in the raw data.			
A.1.9.5.4	Is concentration of prep. blank below the negative CRDL?		[✓]	
	ACTION: If yes, reject (red-line) all associated data that has a concentration less than 10xCRDL.			
A.1.9.6	Form IV (ICP Interference Check Sample)			
1.9.6.1	Present and complete?	[✓]		
	(NOTE: Not required for furnace AA, flame AA, mercury, cyanide and Ca, Mg, K and Na.)			
	Was ICS analyzed at beginning and end of run (or at least twice every 8 hours)?	[✓]		
	ACTION: If no, flag as estimated (J) all samples for which Al, Ca, Fe, or Mg is higher than in ICS.			
A.1.8.6.2	Circle all values on Data Summary Sheet that are more than ± 20% of true or established mean value. Are all Interference Check Sample results inside of control limits (± 20%)?	[✓]		
	If no, is concentration of Al, Ca, Fe, or Mg lower than in ICS?	[ ]		✓
	ACTION: If no, flag as estimated (J) those positive results for which ICS recovery is between 121-150%; flag all sample results as estimated if ICS recovery falls within 50-79%; reject (red-line) those sample results for which ICS recovery is less than 50%; if ICS recovery is above 150%, reject positive results only (not flagged with a "U").			

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		YES	NO	N.S.
A.1.9.7	Form V A (Spiked Sample Recovery - Pre-Digestion/Pre-Distillation)- (Note: Not required for Ca, Mg, K, and Na (both matrices), Al, and Fe (soil only.)			
A.1.9.7.1	Present and complete for: each 20 samples?	[✓]	__	__
	each matrix type?	[__]	__	✓
	each conc. range (i.e. low, med., high)?	[__]	__	✓
	For both AA and ICP when both are used for same analyte?	[__]	__	✓
	ACTION: If no for any of the above, flag as estimated (J) all positive data less than four times spiking level for which spiked sample was not analyzed.			
	NOTE: If one spiked sample was analyzed for more than 20 samples, then first 20 samples analyzed do not have to be flagged as estimated (J).			
A.1.9.7.2	Was field blank used for spiked sample?	__	[✓]	__
	ACTION: If yes, flag all positive data less than 4 x spike added as estimated (J) for which field blank was used as spiked sample.			
	NOTE: Matrix spike analysis should be performed on a field blank when it is the only aqueous sample in SDG.			
A.1.9.7.3	Circle all values on Data Summary Sheet that are outside control limits (75% to 125%). Are all recoveries within control limits?	[__]	✓	__
	If no, is sample concentration greater than or equal to four times spike concentration?	[__]	✓	__
	ACTION: If yes, disregard spike recoveries for analytes whose concentrations are greater than or equal to four times spike added. If no, circle those analytes on Form V for which sample concentration is less than four times the spike concentration.			

	YES	NO	N/A
Are results outside the control limits (75-125%) flagged with "N" on Form I's and Form VA?	[✓]	__	__

ACTION: If no, write in the Contract - Problem/Non - Compliance section of "Data Assessment Narrative".

A.1.9.7.4 Aqueous

Are any spike recoveries:

(a) less than 30%?	✓	[__]	__
(b) between 30-74%?	✓	[__]	__
(c) between 126-150%?	__	[✓]	__
(d) greater than 150%?	__	[✓]	__

ACTION: If less than 30%, reject all associated aqueous data; if between 30-74%, flag all associated aqueous data as estimated (J); if between 126-150%, flag as estimated (J) all associated aqueous data not flagged with a "U"; if greater than 150%, reject (red-line) all associated aqueous data not flagged with a "U".

NOTE: If pre-digestion spike result is rejectable due to coefficient of correlation of MSA, analytical spike recovery, or duplicate injections criteria, disregard spike recovery on Form V. Flag the associated data as estimated(J).

A.1.9.7.5 Soil/Sediment

Are any spike recoveries:

(a) less than 10%?	__	[__]	✓
(b) between 10-74%?	__	[__]	✓
(c) between 126-200%?	__	[__]	✓
(d) greater than 200%?	__	[__]	✓

ACTION: If less than 10%, reject all associated data; if between 10-74%, flag all associated data as estimated; if between 126-200%, flag as estimated all associated data was not flagged with a "U"; if greater than 200%, reject all associated data not flagged with a "U".

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		YES	NO	N/A
A.1.9.8	Form VI (Lab Duplicates)			
A.1.9.8.1	Present and complete for: each 20 samples?	[✓]	___	___
	each matrix type?	[___]	___	✓
	each concentration range (i.e. low, med., high)?	[___]	___	✓
	both AA and ICP when both are used for same analyte?	[___]	___	✓

ACTION: If no for any the above, flag as estimated (J) all data >CRDL* for which duplicate sample was not analyzed.

Note: 1. If one duplicate sample was analyzed for more than 20 samples, then first 20 samples do not have to be flagged as estimated.
2. If percent solids for soil sample and its duplicate differ by more than 1%, prepare a Form VI for each duplicate pair, report concentrations in Hg/L on wet weight basis and calculate RPD or Difference for each analyte.

A.1.9.8.2	Was field blank used for duplicate analysis?	___	[✓]	___

ACTION: If yes, flag all data >CRDL* as estimated (J) for which field blank was used as duplicate.

NOTE: Duplicate analysis should be performed on a field blank when it is the only aqueous sample in SDG.

A.1.9.8.3	Are all values within control limits (RPD 20% or difference < ±CRDL)?	[✓]	___	___
	If no, are all results outside the control limits flagged with an * on Form I's and VI?	[___]	___	✓

ACTION: If no, write in the Contract - Problems/Non-Compliance section of "Data Assessment Narrative".

NOTE: 1. RPD is not calculable for an analyte of the sample - duplicate pair when both values are less than IDL.

* Substitute IDL for CRDL when IDL > CRDL.

		YES	NO	N/S
	2. If lab duplicate result is rejectable due to coefficient of correlation of MSA, analytical spike recovery, or duplicate injections criteria, do not apply precision criteria.			
1.9.8.4	Is any value for sample duplicate pair less than CRDL* and other value greater than or equal to 10 x *CRDL?	___	[✓]	___
	ACTION: If yes, flag the associated data as estimated (J).			
A.1.9.8.5	Aqueous Circle all values on Data Summary Sheet that are: RPD > 50%, or Difference > ± CRDL*			
	Is any RPD greater than 50% where sample and duplicate are both greater than or equal to 5 times *CRDL?	___	[✓]	___
	Is any **difference between sample and duplicate greater than *CRDL where sample and/or duplicate is less than 5 times *CRDL?	___	[✓]	___
	ACTION: If yes, flag the associated data as estimated.			
A.1.9.8.6	Soil/Sediment Circle all values on Data Summary Sheet that are: RPD > 100%, or Difference > 2 x CRDL*			
	Is any RPD (where sample and duplicate are both greater than or equal to 5 times *CRDL) : > 100%?	___	[___]	✓
	Is any **difference between sample and duplicate (where sample and/or duplicate is less than 5x*CRDL) : > 2x*CRDL?	___	[___]	✓

* Substitute IDL for CRDL when IDL > CRDL.
** Use absolute values of sample and duplicate to calculate the difference.

		YES	NO	N/A
	ACTION: If yes, flag the associated data as estimated.			
A.1.9.9	Field Duplicates			
A.1.9.9.1	Were field duplicates analyzed?	[✓]		
	ACTION: If yes, prepare a Form VI for each aqueous field duplicate pair. Prepare a Form VI for each soil duplicate pair, if percent solids for sample and its duplicate differ by more than 1%; report concentrations of soils in ug/l on wet weight basis and calculate RPDs or Difference for each analyte.			
	NOTE: 1. Do not calculate RPD when both values are less than IDL. 2. Flag all associated data only for field duplicate pair.			
A.1.9.9.2	Is any value for sample duplicate pair less than *CRDL and other value greater than or equal to 10 x *CRDL?		[✓]	
	ACTION: If yes, flag the associated data as estimated.			
A.1.9.9.3	Aqueous			
	Circle all values on Form VI for field duplicates that are: RPD > 50%, or Difference > ± CRDL*			
	Is any RPD greater than 50% where sample and duplicate are both greater than or equal to 5 times *CRDL?	✓	[ ]	
	Is any **difference between sample and duplicate greater than *CRDL where sample and/or duplicate is less than 5 times *CRDL?	✓	[ ]	
	ACTION: If yes, flag the associated data as estimated.			

* Substitute IDL for CRDL when IDL > CRDL.

** Use absolute values of sample and duplicate to calculate the difference.

	YES	NO	N/A

A.1.9.9.4 Soil/Sediment

Circle all values on Form VI for field duplicates that are:
RPD >100%, or

Difference > 2 x CRDL*

Is any RPD (where sample and duplicate are both greater than 5 times *CRDL) :

>100%? [ ] [ ] [✓]

Is any **difference between sample and duplicate (where sample and/or duplicate is less than 5x *CRDL):

>2x *CRDL? [ ] [ ] [✓]

ACTION: If yes, flag the associated data as estimated.

A.1.9.10 Form VII (Laboratory Control Sample) (Note: LCS - not required for aqueous Hg and cyanide analyses.)

A.1.9.10.1 Was one LCS prepared and analyzed for:

every 20 water samples? [✓] [ ] [ ]

every 20 solid samples? [ ] [ ] [✓]

both AA and ICP when both are used for same analyte? [ ] [ ] [✓]

ACTION: If no for any of the above, prepare Telephone Record Log and contact laboratory for submittal of results of LCS. Flag as estimated (J) all data for which LCS was not analyzed.

NOTE: If only one LCS was analyzed for more than 20 samples, then first 20 samples close to LCS do not have to be flagged as estimated.

* Substitute IDL for CRDL when IDL > CRDL.

**Use absolute values of sample and duplicate to calculate the difference.

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		YES	NO	N/A
A.1.9.10.2	Aqueous LCS			
	Circle all LCS values outside control limits (80 - 120%- except aqueous Ag and Sb).			
	Is any LCS recovery: less than 50%?	___	[✓_]	___
	between 50% and 79%?	___	[✓_]	___
	between 121% and 150%?	___	[✓_]	___
	greater than 150%?	___	[✓_]	___
	ACTION: Less than 50%, reject (red-line) all data; between 50% and 79%, flag all associated data as estimated (J); between 121% and 150%, flag all positive (not flagged with a "U") results as estimated; greater than 150%, reject all positive results.			
A.1.9.10.3	Solid LCS			
	NOTE: 1. If "Found" value of LCS is rejectable due to duplicate injections or analytical spike recovery criteria, regardless of LCS recovery, flag the associated data as estimated (J).			
	2. If IDL of an analyte is equal to or greater than true value of LCS, disregard the "Action" below even though LCS is out of control limits.			
	Is LCS "Found" value higher than the control limits on Form VII?	___	[_ _]	✓
	ACTION: If yes, qualify all associated positive data as estimated.			
	Is LCS "Found" value lower than the Control limits on Form VII?	___	[_ _]	✓
	ACTION: If yes, qualify all associated data as estimated.			

		YES	NO	N/S
A.1.9.11	Form IX (ICP Serial Dilution) -			
	NOTE: Serial dilution analysis is required only for initial concentrations equal to or greater than 10 x IDL.			
A.1.9.11.1	Was Serial Dilution analysis performed for: each 20 samples?	[✓]	__	__
	each matrix type?	[__]	__	✓
	each concentration range (i.e. low, med.)?	[__]	__	✓
	ACTION: If no for any of the above, flag all positive data greater than or equal to 10xIDLs as estimated (J) for which Serial Dilution Analysis was not performed, and summarize the deficiency on the DFO report.			
A.1.9.11.2	Was field blank(s) used for Serial Dilution Analysis?	__	[✓]	__
	ACTION: If yes, flag all associated data ≥ 10 x IDL as estimated (J).			
	NOTE: Serial dilution analysis should be performed on a field blank when it is the only aqueous sample in SDG.			
A.1.9.11.3	Are results outside control limit flagged with an "E" on Form I's and Form IX when initial concentration on Form IX is equal to 50 times IDL or greater.	[__]	__	✓
	ACTION: If no, write in the contract-problem/non-compliance section of the "Data Assessment Narrative".			
A.1.9.11.4	Circle all values on Data Summary Sheet that are outside control limit for initial concentrations equal to or greater than 10 x IDLs only. Are any % difference values: > 10%?	✓	[__]	__
	≥ 100%?	__	[✓]	__

	YES	NO	N/A
ACTION: Flag as estimated (J) all associated equal to or greater than 10xIDLs for which percent difference is greater than 10% but less than 100%. Reject (red-line) all associated sample results equal to or greater than 10xIDLs for which PD is greater than or equal to 100%.			
A.1.9.12 Furnace Atomic Absorption (AA) QC Analysis			
A.1.9.12.1 Are duplicate injections present in furnace raw data (except during full Method of Standard Addition) for each sample analyzed by GFAA?	[✓]		
ACTION: If no, reject the data on Form I's for which duplicate injections were not performed.			
A.1.9.12.2 Do the duplicate injection readings agree within 20% Relative Standard Deviation (RSD) or Coefficient of Variation (CV) for concentration greater than CRDL?	[✓]		
Was a dilution analyzed for sample with post digestion spike recovery less than 40%?	[ ]		✓
ACTION: If no for any of the above, flag all the associated data as estimated (J).			
A.1.9.12.3 Is *post digestion spike recovery less than 10% or greater than 150% for any result?		[✓]	
ACTION: If yes, reject (red-line) the affected data if recovery is <10%; reject data not flagged with "U" if spike recovery is >150%.			
NOTE: Reject the data only if the affected sample was not subsequently analyzed by Method of Standard Addition.			

* Post digestion spike is not required on the pre-digestion spiked sample when prediges spike recovery is within control limits of 75-125% or when SR>4xSA.

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		YES	NO	N/A
A.1.9.13	Form VIII (Method of Standard Addition Results)			
A.1.9.13.1	Present?	[✓]	--	--
	If no, is any Form I result coded with "S" or a "+"?	—	[ ]	✓
	ACTION: If yes, write request on Telephone Record Log and contact laboratory for submittal of Form VIII.			
A.1.9.13.2	Is coefficient of correlation for MSA less than 0.990 for any sample?	—	[ ]	✓
	ACTION: If yes, reject (red-line) affected data.			
A.1.9.13.3	Was *MSA required for any sample but not performed?	—	[✓]	—
	Is coefficient of correlation for MSA less than 0.995?	—	[ ]	✓
	Are MSA calculations outside the linear range of the calibration curve generated at the beginning of the analytical run?	—	[ ]	✓
	ACTION: If yes for any of the above, flag all the associated data as estimated (J).			
A.1.9.13.4	Was proper quantitation procedure followed correctly as outlined in the SOW on page E-16 through E-17?	[ ]	--	✓
	ACTION: If no, note exception under contract problem/ non-compliance of data assessment narrative, or prepare a separate list.			
A.1.9.14	Dissolved/Total or Inorganic/Total Analytes -			
A.1.9.14.1	Were any analyses performed for dissolved as well as total analytes on the same sample(s).	—	[✓]	—
	Were any analyses performed for inorganic as well as total (organic + inorganic) analytes on the same sample(s)?	—	[✓]	—

* MSA is not required on LCS and prep. blank.

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	YES	NO	N/A
NOTE: 1. If yes, prepare a list comparing differences between all dissolved (or inorganic) and total analytes. Compute the differences as a percent of the total analyte only when dissolved concentration is greater than CRDL as well as total concentration. 2. Apply the following questions only if inorganic (or dissolved) results are (i) above CRDL, and (ii) greater than total constituents. 3. At least one preparation blank, ICS, and LCS should be analyzed in each analytical run.			
A.1.9.14.2 Is the concentration of any dissolved (or inorganic) analyte greater than its total concentration by more than 10%?	___	[ ]	✓
A.1.9.14.3 Is the concentration of any dissolved (or inorganic) analyte greater than its total concentration by more than 50%?	___	[ ]	✓
ACTION: If more than 10%, flag both dissolved (or inorganic) and total values as estimated (J); if more than 50%, reject (red-line) the data for both values.			

A.1.9.15 Form I to IX

A.1.9.15.1 Are all the Form I through Form IX labeled with:			
Laboratory name?	[✓]	__	___
Case/SAS number?	[✓]	__	___
EPA sample No.?	[✓]	__	___
SDG No.?	[✓]	__	___
Contract No.?	[✓]	___	___
Correct units?	[✓]	___	___
Matrix?	[✓]	__	___

ACTION: If no for any of the above, note under contract problem/non-compliance section of the "Data Assessment Narrative".

	YES	NO	N/A
A.1.9.15.2 Do any computation/transcription errors exceed 10% of reported values on Forms I-IX for:			
(NOTE: Check all forms against raw data.)			
(a) all analytes analyzed by ICP?	___	[✓]	___
(b) all analytes analyzed by GFAA?	___	[✓]	___
(c) all analytes analyzed by AA Flame?	___	[ ]	✓
(d) Mercury?	___	[✓]	___
(e) Cyanide?	___	[✓]	___

ACTION: If yes, prepare Telephone Log, contact laboratory for corrected data and correct errors with red pencil and initial.

A.1.9.16 Form I (Field Blank) -

Circle all field blank values on Data Summary Sheet that are greater than CRDL, 2 x IDL when IDL > CRDL.

Do concentrations of field blank(s) fall below CRDL (or 2 x IDL when IDL > CRDL) for all parameters of associated aqueous and soil samples?	[___]	___	✓
If no, was field blank value already rejected due to other QC criteria?	[___]	___	✓

ACTION: If no, reject (except field blank results) all associated positive sample data less than or equal to five times the field blank value.

	YES	NO	N/A
A.1.9.17 Form X, XI, XII (Verification of Instrumental Parameters).			
A.1.9.17.1 Is verification report present for:			
Instrument Detection Limits (quarterly)?	[✓]	__	__
ICP Interelement Correction Factors (annually)?	[✓]	__	__
ICP Linear Ranges (quarterly)?	[✓]	__	__
ACTION: If no, contact DPO of the lab.			
A.1.9.17.2 Form X (Instrument Detection Limits) - (Note: IDL is not required for Cyanide.)			
Are IDLs present for: all the analytes?	[✓]	__	__
all the instruments used?	[✓]	__	__
For both AA and ICP when both are used for same analyte?	[__]	__	✓
ACTION: If no for any of the above, prepare Telephone Record Log and contact laboratory.			
Is IDL greater than CRDL for any analyte?	__	[✓]	__
If yes, is the concentration on Form I of the sample analyzed on the instrument whose IDL exceeds CRDL, greater than 5 x IDL?	[__]	__	✓
ACTION: If no, flag as estimated all values less than five times IDL of the instrument whose IDL exceeds CRDL.			

Title: Evaluation of Metals Data for the Contract Laboratory Program
Appendix A.1: Data Assessment - Contract Compliance (Total Review - Inorganics)

Date: Feb. 1993
Number: HW-2
Revision: 10

	YES	NO	N/A
A.1.9.17.3 Form XC (Linear Ranges)			
Was any sample result higher than high linear range of ICP.	___	[✓]	. .
Was any sample result higher than the highest calibration standard for non-ICP parameters?	___	[✓]	___
If yes for any of the above, was the sample diluted to obtain the result on Form I?	[___]	_ .	✓
ACTION: If no, flag the result reported on Form I as estimated(J).			
A.1.9.18 Percent Solids of Sediments			
Is soil content in sediment(s) less than 50%?	___	[_]	✓
ACTION: If yes, qualify as estimated all data not previously rejected or flagged due to other QC criteria.			

U.S. EPA - CLP

6
DUPLICATES

EPA SAMPLE NO.
TILLET (D)

Lab Name: CEIMIC Contract: 9000731

Lab Code: CEIMIC Case No.: 9000770 SAS No.: _____ SDG No.: VIHAI

Matrix (soil/water): WATER Level (low/med): LOW

% Solids for Sample: 0.0 % Solids for Duplicate: 0.0

Concentration Units (ug/L or mg/kg dry weight): _____

Analyte	Control Limit	Sample (S)	C	Duplicate (D)	C	RPD	Q	M
Aluminum		153.0	B	159.0	B	3.8		
Antimony		52.0	U	52.0	U			
Arsenic		3.0	U	4.4	B	200.0		
Barium		43.0	B	40.0	B	7.2		
Beryllium		4.0	B	4.0	B			
Cadmium		4.0	B	3.0	B	28.6		
Calcium		54800.0		49600.0		12.0		
Chromium		8.0	B	7.0	B	13.3		
Cobalt		18.0	U	18.0	U			
Copper		48.0		32.0		40.0		
Iron		953.0		2660.0		94.3		
Lead		1.5	B	8.5		140.0		
Magnesium		38300.0		34500.0		10.4		
Manganese		1260.0		1100.0		13.6		
Mercury		0.2	U	0.2	U			
Nickel		33.0	B	15.0	B	75.0		
Potassium		760.0	B	1190.0	B	44.1		
Selenium		10.0	U	10.0	U			
Silver		7.0	U	7.0	U			
Sodium		192000.0		167000.0		12.7		
Thallium		3.0	U	3.0	U			
Vanadium		25.0	B	50.0		66.7		
Zinc		162.0		124.0		26.6		
Cyanide		5.0	U	5.0	U			

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STANDARD OPERATING PROCEDURE

MERCURY HOLDING TIMES EXCEEDED

SAMPLE	LAB I.D.	DATE SAMPLE COLLECTED	DATE SAMPLE ANALYZED	# DAYS EXCEEDED
VIHA I	770-14	9-27-90	11-5-90	11
LaPlace	770-07	10-2-90	10-31-90	1
Eglin I	770-06	10-2-90	10-31-90	1
Tillet	770-08	10-2-90	10-31-90	1
Tillet D	770-08	10-2-90	10-31-90	1
Dimitri	770-01	10-1-90	10-31-90	2
Bryan	770-09	10-1-90	10-31-90	2
Matthias	770-03	10-1-90	10-31-90	2
Ramsey	770-04	10-1-90	10-31-90	2

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STANDARD OPERATING PROCEDURE Page 1 of 5

Title:	Evaluation of Metals Data for the Contract Laboratory Program Appendix A.1: Data Assessment - Contract Compliance (Total Review - Inorganics)	Date:	Feb. 1990
		Number:	HW-2
		Revision:	10

Case #	900770	Site	Tutu Well Site	Matrix:	Soil	
SDG#	VIHA I	Lab	Ceimic		Water	X
Contractor	Geraghty & Miller	Reviewer	Donna Lesch		Other	

A.2.1 The case description and exceptions, if any, are noted below with reason(s) for rejection or qualification as estimated values(s) J.

This data package includes the analysis of the samples for SDG VIHA I. These samples originated from St. Thomas on the 27th of September and the 1, 2, and 3 of October 1990.

Samples VIHA I, LaPlace, Eglin I, Tillet, Tillet(D), Dimitri, Bryan, Matthias, and Ramsey were analyzed beyond the holding time for Mercury. All non-detects (values less than the Instrument Detection Limit) are rejected and a red line is drawn through the data. The Mercury concentration value for LaPlace, the only positive hit, is qualified with a "J".

The metal logbook indicates that samples Dimitri and Tillet were preserved at a pH of 5. Samples correctly preserved for metals and Mercury analyses should have a pH of 2 or less. All data for these two samples are qualified with "J" (except Mercury and Cyanide). The Mercury values in the affected samples remain qualified with "R".

Title:	Evaluation of Metals Data for the Contract Laboratory Program Appendix A.1: Data Assessment - Contract Compliance (Total Review - Inorganics)	Date: Number: Revision:	Feb. 1990 HW-2 10

A.2.1 (continuation)

The calibration correlation coefficient is less than 0.995 for the atomic absorption analysis of Arsenic (0.99219). The affected samples are Bryan, Dimitri, Matthais, and Ramsey. The Arsenic concentration values for these samples are qualified with "J".

The correlation coefficient is less than 0.995 for the atomic absorption analysis of Thallium (0.98954). The affected samples are Matthias, Ramsey, LaPlace, Tillet, Tillet(D), and H2O blk Tutu. The Thallium concentration values for these samples are qualified with "UJ".

The Selenium analysis run on 10/29/90 at 16:48 contained 11 samples between the ICV and the CCV. The allowable number is 10 samples. The eleventh sample is not included in SDG VIHA I therefore no qualifiers are necessary.

The CRDL standards are out of control limits (80-120% Recovery) for several metals and in several analyses. The CRI run on 10/17/90 has the following deficiencies:

Metals	%R
Cadmium	150
Copper	136
Nickel	121
Zinc	128

TUT 001 1582

Table 1. Tutu Residential Wells Sampling Results, September 1990, Sample Delivery Group 900770

Sample Identification: Inorganic Analysis	770-08 Tillet	770-09 Tillet-D (Replicate)	770-10 H2O Blank Tutu	770-12 Gassett (Hartman I)	770-14 VIHA I
Aluminum	153 BJ	159 B	85 B	526	154 B
Antimony	52 UJ	52 U	52 U	52 U	54 BJ
Arsenic	3 UJ	4.4B	3 U	3 U	3 U
Barium	43 BJ	40 B	3 U	7 B	5 B
Beryllium	4 BJ	4 B	4 B	4 B	3 B
Cadmium	4 BJ	3 BJ	3 U	3 U	4 BJ
Calcium	54800 J	48600	74 U	31200	49400
Chromium	8 BJ	7 B	5 B	4 B	10
Cobalt	18 UJ	18 U	18 U	18 U	18 U
Copper	48 J	32 J	12 BJ	10 BJ	10 B
Iron	953 J	2660 J	27 BJ	418 J	29 BJ
Lead	1.5BJ	8.5J	1 UJ	1.4BJ	9 J
Magnesium	38300 J	34500	95 U	26300	33900
Manganese	1260 J	1100	2 U	853	2 U
Mercury	R	R	R	R	R
Nickel	33 BJ	15 BJ	11 UJ	11 U	15 B
Potassium	760 BJ	1190 B	300 B	880 B	2000 B
Selenium	10 UJ	10 UJ	2 UJ	10 UJ	1.4BJ
Silver	7 UJ	7 U	7 U	7 B	16 J
Sodium	192000 J	169000	158 B	236000	252000
Thallium	R	R	R	R	R
Vanadium	25 BJ	50 J	10 BJ	26 BJ	67 J
Zinc	162 J	124 J	4 UJ	5 BJ	16 B
Cyanide	5 UJ	5 U	5 U	5 U	9.7B

All concentrations are reported in micrograms per liter (ug/L).

J - Value is estimated.

U - Analyte is not detected.

R - Value is rejected.

B - Value is between instrument detection limit and contract required detection limit.

REFERENCE NO. 34

RCRA

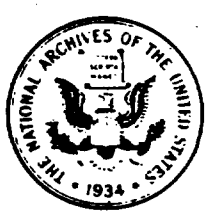
code of federal regulations

Protection of Environment

40

PARTS 190 TO 299

Revised as of July 1, 1988



TUT 001 1585

ate toxic gases, vapors or fumes in a quantity sufficient to present a danger to human health or the environment.

(6) It is capable of detonation or explosive reaction if it is subjected to a strong initiating source or if heated under confinement.

(7) It is readily capable of detonation or explosive decomposition or reaction at standard temperature and pressure.

(8) It is a forbidden explosive as defined in 49 CFR 173.51, or a Class A explosive as defined in 49 CFR 173.53 or a Class B explosive as defined in 49 CFR 173.88.

(b) A solid waste that exhibits the characteristic of reactivity, but is not listed as a hazardous waste in Subpart D, has the EPA Hazardous Waste Number of D003.

§ 261.24 Characteristic of EP toxicity.

(a) A solid waste exhibits the characteristic of EP toxicity if, using the test methods described in Appendix II or equivalent methods approved by the Administrator under the procedures set forth in §§ 260.20 and 260.21, the extract from a representative sample of the waste contains any of the contaminants listed in Table I at a concentration equal to or greater than the respective value given in that Table. Where the waste contains less than 0.5 percent filterable solids, the waste itself, after filtering, is considered to be the extract for the purposes of this section.

(b) A solid waste that exhibits the characteristic of EP toxicity, but is not listed as a hazardous waste in Subpart D, has the EPA Hazardous Waste Number specified in Table I which corresponds to the toxic contaminant causing it to be hazardous.

TABLE I—MAXIMUM CONCENTRATION OF CONTAMINANTS FOR CHARACTERISTIC OF EP TOXICITY

EPA hazardous waste number	Contaminant	Maximum concentration (milligrams per liter)
D004	Arsenic	5.0
D005	Barium	100.0
D006	Cadmium	1.0
D007	Chromium	5.0
D008	Lead	5.0
D009	Mercury	0.2
D010	Selenium	1.0
D011	Silver	5.0
D012	Endrin (1,2,3,4,10,10-hexachloro-1,7-epoxy-1,4,4a,5,6,7,8,8a-octahydro-1,4-endo, endo-5,8-dimethano-naphthalene.	0.02
D013	Lindane (1,2,3,4,5,6-hexachlorocyclohexane, gamma isomer.	0.4
D014	Methoxychlor (1,1,1-Trichloro-2,2-bis (p-methoxyphenyl)ethane).	10.0
D015	Toxaphene ($C_{10}H_{10}Cl_8$, Technical chlorinated camphene, 67–69 percent chlorine).	0.5
D016	2,4-D, (2,4-Dichlorophenoxyacetic acid).	10.0
D017	2,4,5-TP Silvex (2,4,5-Trichlorophenoxypropionic acid).	1.0

Subpart D—Lists of Hazardous Wastes

§ 261.30 General.

(a) A solid waste is a hazardous waste if it is listed in this subpart, unless it has been excluded from this list under §§ 260.20 and 260.22.

(b) The Administrator will indicate his basis for listing the classes or types of wastes listed in this Subpart by employing one or more of the following Hazard Codes:

Ignitable Waste	(I)
Corrosive Waste	(C)
Reactive Waste	(R)
EP Toxic Waste	(E)
Acute Hazardous Waste	(H)
Toxic Waste	(T)

Appendix VII identifies the constituent which caused the Administrator to list the waste as an EP Toxic Waste (E) or Toxic Waste (T) in §§ 261.31 and 261.32.

(c) Each hazardous waste listed in this subpart is assigned an EPA Hazardous Waste Number which precedes the name of the waste. This number must be used in complying with the

TUT 001 1586

REFERENCE NO. 35

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CARIBBEAN GEOLOGICAL INVESTIGATIONS

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1966

TABLES

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ABSTRACT

The oldest rock unit of the northern Virgin Islands is the ?Lower Cretaceous Water Island Formation (10,000–15,000 feet plus), which consists of keratophyre flows and tuffs, spilite flows, and radiolarian tuffs. Terrigenous sediments are absent, and the entire volcanic sequence appears to have been extruded on the ocean floor.

Overlying the Water Island Formation with a mild angular unconformity is the Virgin Island Group, consisting of the Louisenhoj Formation, Outer Brass Limestone, Tutu Formation, and Hans Lollik Formation, all of possible Albian age. The Louisenhoj Formation (8000–13,000 feet maximum) consists of augite andesite tuff and volcanic breccia with intercalated conglomerate (Cabes Point Conglomerate lithofacies) containing pebbles and cobbles of Water Island Formation lithologies. The eruptive center during Louisenhoj time was probably located close to Pillsbury Sound, between St. Thomas and St. John. In western St. John and eastern St. Thomas this formation consists of coarse cone debris derived largely from a postulated subaerial cone. In central and western St. Thomas pyroclastic rocks, frequently showing slumping, predominate.

The Outer Brass Limestone (200–600 feet) consists of thin-bedded, carbonaceous, radiolarian, tuffaceous limestone with intercalated tuff beds.

The Tutu Formation (4000–6000 feet exposed) is a relatively coarse volcanic wacke which consists almost entirely of unweathered Louisenhoj debris with a small quantity of limestone fragments. The Coki Point Megabreccia lithofacies is an intercalated slumped mass of andesite and limestone blocks, the latter containing a neritic fauna of corals, gastropods, pelecypods (including the rudist *Caprinuloidea*), and echinoids, and is of apparent Albian age. The Congo Cay Limestone, near the top of the Tutu Formation, crops out on only one of the American Islands.

The poorly exposed Hans Lollik Formation (6000–10,000 feet exposed) is the youngest unit present and lithologically resembles the Louisenhoj Formation.

Late Cretaceous or early Tertiary deformation caused mild folding, with dips averaging 40° north. There are two prominent sets of strike-slip faults: a dextral one trending northwest, and a sinistral one trending northeast. There is also a north-south set of normal faults. The sinistral strike-slip faults in many cases have a considerable normal component, and appear to parallel the principal fault of the Anegada Trough.

Late intrusive rocks include dioritic plutons (with minor acid differentiates), quartz-andesine porphyry, andesine-hornblende porphyry, lamprophyre, breccia dikes, and rare pegmatites. The emplacement of the plutons preceded much of the major faulting, but the late dikes followed this faulting and were commonly emplaced along fractures parallel to the fault planes.

Contact-metamorphic aureoles of hornblende hornfels and probably pyroxene hornfels facies surround the plutons.

ABST TOO JUL

Keratophyre magma is believed to have been a low-melting fraction of hydrated mantle material which was depressed during compressive deformation. Spilite, augite andesite, and diorite magmas were very similar and represent more completely fused mantle. The contrasting mineralogy of the spilite and augite andesite is thought to have originated from contrasting environments of extrusion. Whereas the spilite was extruded abyssally and the volatiles were largely retained until most of the heat loss had taken place, the augite andesite was erupted subaerially and the volatiles had separated from the magma at a high temperature well within the orifice of extrusion.

ACKNOWLEDGMENTS

This study was begun at Princeton University as a Ph.D. dissertation; since 1960 it has been continued at Rice University with support from the National Science Foundation (Grant G-14107). Half the cost of the original study was met by the Jackson Hole Preserve, Inc., through the National Park Services, which is currently developing part of St. John as a National Park. The remainder of the cost was borne by the Caribbean Research Fund of the Department of Geology, Princeton University. In addition, the writer gratefully acknowledges National Science Foundation Fellowships held during 1957–1958 and 1958–1959.

Any field study undertaken in a group of islands must depend largely on the generosity of local inhabitants for logistical arrangements and boat transportation, and it is with great indebtedness that the following assistance is acknowledged. Stewart M. Morgan and Deborah Finch arranged for housing on St. Thomas and otherwise greatly assisted the project. William Bachman, Macdonald Laplace, Ridge Folk, and Constantinos Coutlianos generously provided boat transportation to small islands. The Jackson Hole Preserve, Inc., provided housing at Caneel Bay Plantation on St. John. The staff of this hotel was of great assistance; the writer especially appreciates the assistance of Euan McFarlane and Barry Harris, who arranged boat transportation from Caneel Bay to many small islands. Mr. and Mrs. Arthur Lynch helped in many ways on St. John. During 1957 the National Park Service (Harold Hubler, Park Superintendent; Vincent Mrazek, Park Ranger; and Elwood Shade, Park Naturalist) provided housing at Lameshur Bay, St. John, and provided transportation facilities on that island. Superintendent John Lewis provided facilities during a later visit and John Good provided the photographs used for Plate 2.

Several specialists examined the fossil collections: L. J. Chubb identified the rudists, and P. Bronnimann, J. W. Wells, and N. Sohl examined other fossils.

Prof. H. H. Hess suggested the project and has provided countless helpful criticisms during the study. Prof. A. F. Buddington has made many valuable suggestions throughout the study. C. E. Helsley and M. Turner showed the writer much of the geology in the neighboring British Virgin Islands.

the final base map, have good shore-line detail. Mapping on St. John was done on 1:20,000 enlargements of the 1:40,000 U.S. Coast and Geodetic Survey map. Aerial photographs of approximately 1:30,000 scale were useful for some structural interpretations.

Exposures along the shore lines ranged in quality from excellent to very poor. Those inland, except in recent road cuts, were almost invariably very poor. The best outcrops on both St. Thomas and St. John are steep cliffs, which are in places impossible to traverse. More sheltered shore lines are easily walked, but rock exposures there are much poorer.

Laboratory investigations included study of several hundred thin sections, X-ray diffraction examination of rock samples and mineral separates, about 300 partial chemical analyses, and numerous mineral determinations by optical examination of crushed samples. About a dozen feldspars were determined by measurement of index of refraction of grains oriented on the universal stage, according to the method of Smith (1960). Approximately 100 additional plagioclase samples were determined by measurements of indices of refraction of unoriented grains. An extensive optical study of the feldspars, completed after this manuscript was first submitted, has been published elsewhere (Donnelly, 1963). Pyroxenes were determined by measurement of n_y and 2V, according to the method of Hess (1949).

SUMMARY OF STRATIGRAPHY OF ST. THOMAS AND ST. JOHN

The rock units of St. Thomas and St. John (Fig. 2) can be divided into three major groups: the Water Island Formation, which consists of keratophyres and spilites; the Virgin Island Group, which consists of andesitic pyroclastic rocks and sediments; and one or more dioritic plutons. The Water Island Formation possibly is late Lower Cretaceous. The Virgin Island Group is probably Albian (although the Hans Lollik Formation could be Eocene), and the diorites are early Tertiary.

The oldest rocks in the Virgin Islands are the keratophyres and spilites of the Water Island Formation. These volcanic rocks are predominantly flows and flow breccias, but keratophyric pyroclastic rocks are widespread. A few of the fine-grained tuffaceous beds contain well-preserved Radiolaria of undetermined age. Noteworthy in the Water Island Formation is the absence of terrigenous sediments. This characteristic, together with their apparently igneous mineralogy, has led the writer to the conclusion that they are probably volcanic rocks which were extruded on a relatively level ocean floor, prior to the existence of a trench or island platform.

In contrast to the postulated abyssal environment for the Water Island volcanic rocks, most of the overlying pyroclastic rocks of the Virgin Island Group were extruded subaerially. Both the volcanic and sedimentary rocks exhibit slump structures, and some megabreccias contain limestone blocks up to 100 feet long. The bulk of the sedimentary rocks in the Virgin Island

Group are coarse wackes consisting almost entirely of slightly weathered debris derived from the andesitic pyroclastic rocks. The deposition of this group may have accompanied the formation of the initial island platform and trench.

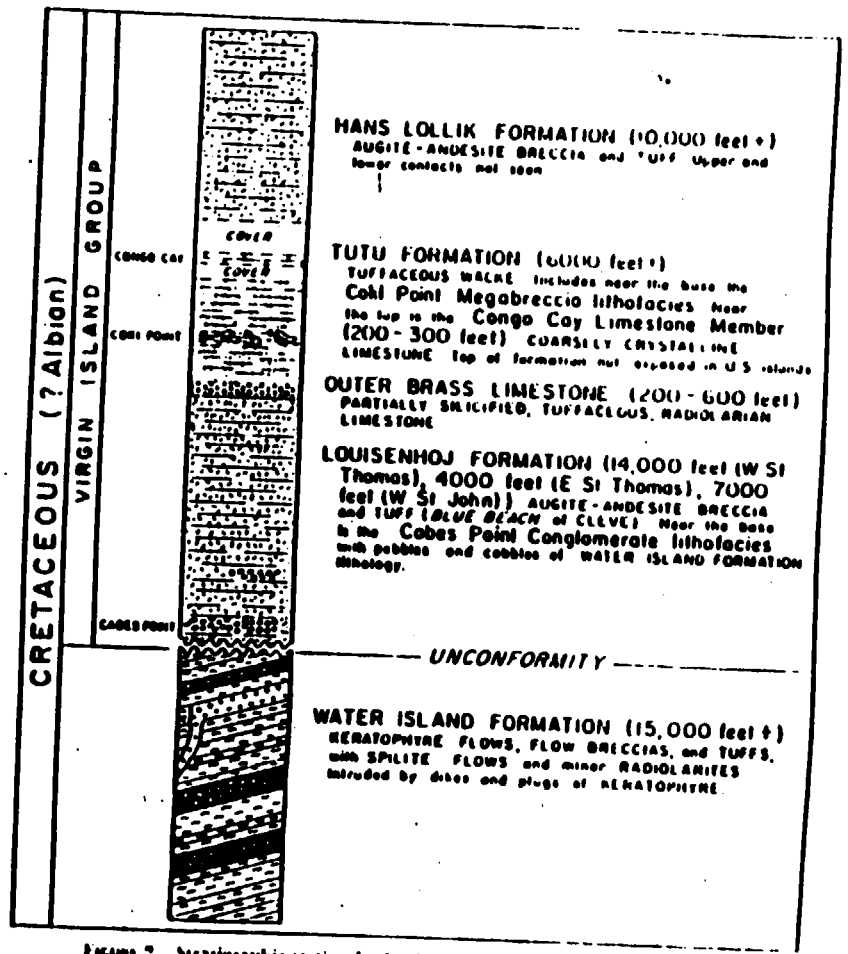

FIGURE 2. Stratigraphic section for St. Thomas and St. John, Virgin Islands.

Folding after deposition of the Virgin Island Group resulted largely from differential vertical movement and produced average dips of 10°, ranging from 15° to 90°. The associated strike-slip faults have horizontal offsets of less than 1 mile. Although contact metamorphic effects resulting from the emplacement of dioritic plutons are extensive, the western two thirds of St. Thomas and the southern third of St. John are essentially unmetamorphosed

WATER ISLAND FORMATION

GENERAL STATEMENT

The Water Island Formation of possible late Lower Cretaceous age consists almost entirely of keratophyre, spilite, and radiolarian tuff. The exposed thickness of this formation is 15,000 feet, based on projection of the highest and lowest horizons seen. A reasonable correction for lenticularity might lower the true thickness of the exposed section to 8000 or 10,000 feet. Water Island, in the harbor of Charlotte Amalie, St. Thomas, has been selected as the type locality because of the great variety of rock types there and the general excellence of exposures, although excellent exposures crop out extensively along the south shores of St. Thomas and St. John.

"Keratophyre", as used here, is an extrusive or hypabyssal intrusive volcanic rock consisting predominantly of albite and quartz, with chlorite, micaceous minerals, and iron oxides. Nearly all of the Virgin Islands keratophyres contain considerable free quartz, commonly as conspicuous phenocrysts. Those with quartz phenocrysts could be called "quartz keratophyre" but many aphanitic rocks here called "keratophyre" are chemically identical to the so called "quartz keratophyres" and the simplest term is preferred for all these rocks. A striking feature of keratophyres is the absence of phenocrysts (or pseudomorphs) of pyroxene, amphibole, and mica. Keratophyric flows and crystal tuffs are sodic, with a very low potassium content, but some apparently vitric tuffs are slightly more potassic. Keratophyre intrusive rocks have a higher potassium content and commonly contain secondary monoclinic K feldspar.

"Spilite" is a greenish seemingly altered extrusive or hypabyssal intrusive rock, consisting of chlorite and albite, with variable amounts of epidote, prehnite, and calcite. Fresh phenocrysts of clinopyroxene are generally present; amphibole and olivine were not seen in the Virgin Islands spilites. Amygdules are abundant and commonly contain most of the calcium content of the rocks as epidote, calcite, or prehnite, with quartz and chlorite. These spilites contain about the same amount of Na_2O as the augite andesites of the Louisenjoj Formation, and about 0.5 per cent more than Virgin Islands diabase dikes. Included with the spilites here is a partially albitized augite andesite which occurs near the top of the formation.

The name spilite has been applied in the past to many diverse rock types, some of which may be low-grade regionally metamorphosed andesites or basalts. Other spilites appear to have been unusually hydrous mafic intrusive rocks, and many are deuterically altered basalts or andesites. However, there is an impressive body of evidence that many so-called spilites, notably certain Ordovician, Devonian, and Cretaceous geosynclinal spilites, have characteristics which can be best explained by assuming an essentially magmatic origin for these rocks. It is to this latter group of rocks that the Water Island Formation spilites belong.

Such spilites may be thought of as rocks which have formed by albitization of andesites. However, this process is believed to occur during a late stage in the solidification of a hydrous mafic magma and is not caused by later metamorphism. Given a certain combination of physical and chemical conditions, spilitization of mafic extrusive rocks is inevitable. Hence the term, applied in an admittedly restrictive genetic (hence subjective) sense, is a useful one and should be retained. The author admits that low grade metamorphism may obliterate the mineralogical criteria necessary for the recognition of spilitization. Chemical analysis of a large and carefully selected suite of specimens might reveal whether or not the metamorphic rocks in question had been originally spilitized, but such analysis might also fail to do so, and the term should be applied with care to such rock suites.

KERATOPHYRES

Introductory statement. Keratophyre comprises about four fifths of the Water Island Formation. Most keratophyre occurs as flows and flow breccias with minor tuffs, both crystalline and vitric (the latter always devitrified) and, rarely, volcanic breccias. Keratophyric intrusive rocks are not uncommon; they occur as both dikes and plugs, commonly with very well developed columnar jointing.

Keratophyric flows are generally tens of feet in thickness. Few thick flows are completely exposed from top to base; those which are well exposed are striking only for their textural uniformity. Baking and chilling phenomena are absent. Flow banding, usually somewhat contorted, is seen locally (Pl. 3, fig. 1). Contacts between flow units are commonly difficult to identify as such, and attitudes of the flows are not always easily ascertained.

One thick keratophyre flow near the base of the section, on Ram Head, St. John, shows good field and petrographic evidence of vertical differentiation. The flow is about 165 feet thick, and near the center is reddish gray, grading to greenish gray downward and upward. Petrographic differences will be discussed later. The color change observed in the field would appear to be related to a differential degree of oxidation of iron within the flow, which is probably related to relative concentration of volatiles in the flow center during cooling.

Keratophyre flow breccias, occurring as discrete beds, are probably more common than flows in the keratophyre sequence but are difficult to distinguish from flows. The matrix of the flow breccias can frequently be distinguished from the fragments only by careful scrutiny of the outcrop; the patina of weathering which covers most keratophyres effectively obscures the fine details necessary to recognize these rocks. Fragments in flow breccias are subangular to subrounded. The matrix is almost identical to the fragments in polished section; however, the matrix weathers more rapidly, and in outcrop a flow breccia will appear rougher in gross texture than a flow. A few flow breccias consist of both keratophyre and spilite fragments. One

ture optics), and rare biotitic mica and a mafic mineral which has altered completely to a fine grained, very red substance. This could be either iddingsite, bowlingite, or some other clay mineral or combination of minerals. The glass fragments have diffuse outlines and could be shards. In no case, however, has the degree of preservation revealed the outlines of the original glass fragments. The appearance of these beds in thin section is very similar to the slightly devitrified tuffaceous beds found in explosive rhyolitic suites, but their explosive origin is not established by petrographic evidence.

STRATIGRAPHIC VARIATIONS

The Water Island Formation is remarkably uniform, consisting throughout of about one fifth spilite and the remainder keratophyre. The lower portion of the formation, seen best at Ram Head, St. John, and on Great St. James Island, consists dominantly of thick keratophyre flows with intercalated spilites. Breccias and pyroclastic rocks are minor and form only very thin units with a limited lateral extent. The upper portion of the formation, seen best in the vicinity of Charlotte Amalie, St. Thomas, and on Water Island itself differs principally in the greater percentage of pyroclastic units. Around the intrusive bodies of Haypiece Hill, Grambokola Hill, and Cabritaberg, the formation is dominantly pyroclastic, with only a few thin keratophyric flows. On Flag Hill, stratigraphically slightly lower than these pyroclastic rocks, a strikingly thick pyroclastic unit is intercalated in a dominantly flow sequence. No mineralogical distinctions between the lower and upper portions of the formation can be seen except that near the top of the formation there is one occurrence of oligoclase and albite with high-temperature optics, and there are three occurrences of albite with optics which deviate significantly from the low-temperature state and which have been called quasi low-temperature optics (Donnelly, 1963).

ENVIRONMENT

The most striking feature of the Water Island Formation is the complete absence of terrigenous sediment: the entire exposed thickness consists of volcanic rocks only slightly reworked locally by water. The second important feature of this unit is that most of the volcanic rocks, except for the uppermost 5 per cent of the formation, are flows. The pyroclastic rocks themselves consist entirely of relatively equant, angular fragments, and shards or pumiceous fragments are not seen. The quiescent eruption of apparently hydrated magmas must indicate that these magmas were erupted under a confining pressure of superincumbent sea water approximately equivalent to that of the deep sea bottom, which is sufficient to prevent the explosive expansion of a magmatic gas phase. Hydrated magmas erupted in this environment will experience separation of volatiles if the

partial pressure of these volatiles exceeds that of the sea water (about 500 atm at 15,000 feet). The expansion of these volatiles, however, will be in the order of a few times, not many thousand times, as would be the case if the magmas were erupted subaerially or in shallow water. Abyssal pyroclastic rocks will not be formed by explosion but by relatively quiet expansion of volatiles and sudden chilling by sea water. Dispersal of pyroclastic fragments will probably be effected by slow moving bottom currents, or convective currents initiated by the release of heat into the sea water. The absence of terrigenous sedimentary rocks indicates that there were no emergent islands which could have served as the source of weathered detritus. Slump structures or other evidences of deposition on slopes are present but are not abundant; in contrast, near the top of the formation there are several striking occurrences of evenly layered pyroclastic keratophyre with no bedding disturbances. Evidently this formation accumulated not only in abyssal depths but also on rather flat sea bottom. The appearance of slightly more explosive eruptives only at the very top of the Formation shows that the sea bottom may have been subsiding during the greater part of the accumulation but that subsidence was not rapid enough to maintain a constant water level at the eruptive center of the accumulated volcanic deposits. Alternatively, regional uplift near the end of Water Island time could have been responsible for the apparent shallowing of water.

VIRGIN ISLAND GROUP

LOUISENHOJ FORMATION

Introductory statement. Unconformably overlying the Water Island Formation and cropping out on about half the land area of St. Thomas and St. John is the Louisenhoj (Lōō ē' zan hoi) Formation, named for excellent exposures in road cuts in the vicinity of Louisenhoj, just north of Charlotte Amalie, St. Thomas. This thick sequence is predominantly augite andesite and varies in mode of deposition from pyroclastic to epiclastic. The maximum apparent thickness traversed is about 13,000 feet, but a reasonable correction for lenticularity might reduce this computed thickness by a third or more. Cleve (1871) called this rock type "Blue Beach" and this name has persisted: all of the natives of the Virgin Islands are familiar with "Blue Bitch" or "Blue Bit."

The formation is thickest and almost entirely pyroclastic (locally reworked tuff beds are considered essentially pyroclastic) in western St. Thomas. In eastern St. Thomas the formation is much thinner (1000 feet) and is composed almost entirely of coarse slumped and reworked pyroclastic debris probably originating from a small subaerial cone. In western St. John the formation is thicker (7000 feet minimum) and consists predominantly of coarse cone debris. Figure 6 shows an interpretation of the conditions which resulted in this distribution of rock types and thicknesses. Evidence for the

Cabes Point Conglomerate lithofacies. Near the base of the formation in the vicinity of Cruz Bay, St. John, and Cabes Point, Pearson Gardens, and Bunker Hill, St. Thomas, conglomerates are interbedded with andesitic pyroclastic and epiclastic rocks. These conglomerates consist almost entirely of well rounded keratophyre cobbles and pebbles derived from the underlying Water Island Formation. At Cruz Bay, however, these conglomerates are more or less mixed with pyroclastic debris, suggesting that subaerial erosion of the cone deposits and that of the underlying keratophyre beds were simultaneous. At Cabes Point the conglomerate is composed of well-rounded and fairly well-sorted keratophyre and spilite cobbles and pebbles. These conglomerate beds appear to have been deposited in shallow water, and were not products of turbidity-current deposition. They are well sorted, are not graded, and have relatively little matrix. Their presence indicates subaerial erosion, transport, and deposition of older rocks during early Louisenhoj time.

Water Island-Louisenhoj contact. There are few places where the contact between the Water Island and Louisenhoj Formations is well exposed. In St. John there is one excellent exposure of the contact along the west shore of Monte Bay, and there are poor exposures at Klein Bay. The exposure on Monte Bay shows a conglomerate of the Louisenhoj overlying a spilite bed. The spilite is quite fresh at the contact, and the overlying conglomerate contains a wide assortment of Water Island lithologies including, however, very few rocks identifiable with the underlying spilite. At Calvary Bay, St. John, there is an exposure of a conglomerate of the Louisenhoj Formation overlying keratophyre.

On St. Thomas the contact itself is poorly exposed, but an extensive exposure of Louisenhoj beds above the contact at the headlands between Brewer's Bay and the airport is of great interest because of the extent of apparently contemporaneous weathering displayed here. The Louisenhoj beds here consist dominantly of subaerially, varicolored andesitic ash interbedded with conglomeratic Water Island detritus. Some of the ash units are brick red and consist solely of albite, hematite, and a little illite (X-ray diffraction). The albitized plagioclase phenocrysts evidently withstood the weathering almost perfectly, but the entire mafic part of the rock has been converted to oxide. Other units consist of varicolored fragments ranging from deep red to green, evidently reflecting differential susceptibility to weathering. Still other units consist of greenish or grayish fragments in a uniformly purplish matrix. The basal subaerially weathered unit is less than 100 feet thick and was found at only this one locality. The color of the beds somewhat resembles that of the weathered hydrothermally altered rocks (discussed in a following section), but the latter grade into whitish unweathered rock within a few feet of the surface and are mineralogically quite distinct. The extent of this weathering is completely unlike any recent weathering of any rock types in these islands and undoubtedly reflects weathering contemporaneous with original deposition.

Another occurrence of contemporaneous weathering is poorly exposed at Wintberg Hill, St. Thomas. The poor natural exposures, which are of lightly metamorphosed rock, were originally thought to be of hydrothermally altered rock. However, recent (1963) excavations for road construction revealed the originally weathered nature of these rocks.

Mineralogy of mafic fragments. The principal minerals found in mafic fragments are plagioclase, clinopyroxene, chlorite, and pumpellyite, and also matrix and opaque minerals.

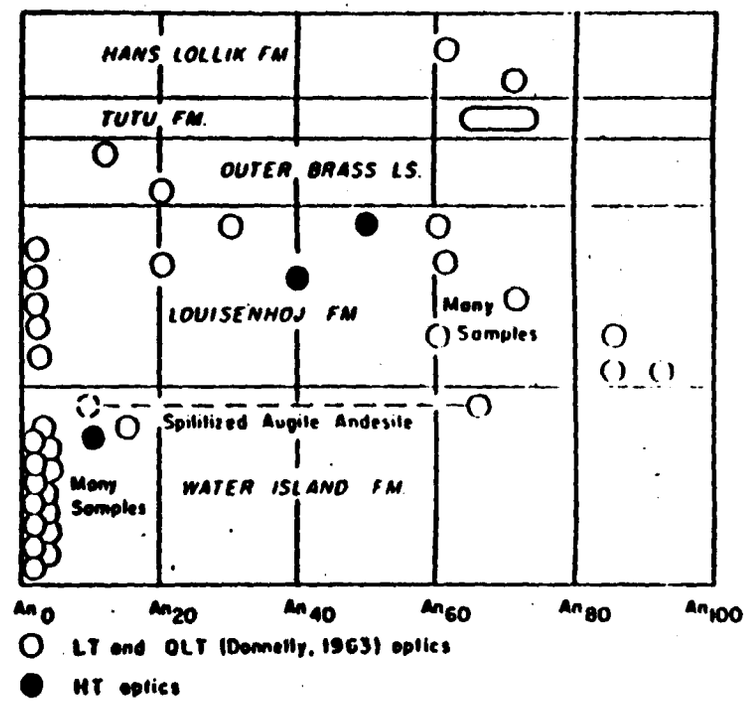

FIGURE 10. Compositions of plagioclases arranged according to stratigraphic position

PLAGIOCLASE: Most phenocrysts of the Louisenhoj andesites are labradorite, about An_{60} (Fig. 10). Near the base of the formation many pyroclastic rocks contain a distinctly more calcic plagioclase (An_{85} to about An_{95}.) Some of these pyroclastic rocks contain both bytownitic and labradoritic fragments, but a few contain only bytownitic (or anorthitic) fragments. The feldspars are sharply euhedral and slightly zoned. They show abundant simple twinning and some albite twinning. Groundmass plagioclases and plagioclases in the matrix of coarse pyroclastic rocks are very fine grained and cloudy. Many are distinctly more sodic than the phenocrysts and range in calcium content down to An_{30}. In many lapilli tuffs, the only feldspar found is albite (An_0);

abundant epidote and pumpellyite in the groundmass suggests that this albite is secondary after an originally more calcic plagioclase. No K feldspars were detected, either optically or by X-ray diffraction.

CLINOPYROXENE: In all cases the pyroxenes are calcic augite (Fig. 5). Compositions were based on measurements of 2V and n_y, according to the method of Hess (1949). The pyroxenes are all euhedral with well developed crystal faces and range up to 3 mm. Twinning on (100) is very common; in many grains multiple twinning on this plane was seen. No exsolution lamellae were seen in any grains. Orthopyroxene was not found in any pyroclastic rocks; rare serpentine pseudomorphs in some are possibly after olivine.

CHLORITE: Chlorite is abundant and widespread throughout the Louisenhoj Formation. These chlorites are very fine-grained and show moderate birefringence and dispersion. Much chlorite appears to have formed as a contemporaneous alteration product of andesite glass.

PUMPELLYITE: In a few andesite fragments pumpellyite was identified as an amygdule filling (along with chlorite), as crystals within chloritic, presumably originally vitric, fragments, or as obscure clusters of grains in the groundmass of slightly metamorphosed albitic andesites. Perhaps the most interesting occurrence of pumpellyite, however, is as an apparent devitrification mineral after calcic andesite glass. At one locality, large (up to 2 inches) angular, conchoidally fractured, apparently vitric fragments were found along with holocrystalline andesite fragments in a coarse tuff bed. These fragments appear to be either completely isotropic or only slightly birefringent under the microscope. The deep-green color, index of refraction (1.725 ± .01), and X-ray diffraction pattern (Table 1) of the "glass" show that it is an ultramicroscopic aggregate of iron-rich pumpellyite. The texture and presence of tiny plagioclase and clinopyroxene phenocrysts in this material suggest that it formed as a glass, with a chemical composition similar to that of calcic bytownite-augite-andesite fragments.

MATRIX MINERALS: Quartz, chlorite, feldspar (sodic plagioclase), and epidote are the common matrix minerals. Quartz, occurring as tiny spherulitic domains of chalcedony cementing together rock fragments and tuffaceous debris, is the most abundant matrix mineral. Labradorite and augite fragments are more or less abundant in the matrix. Most chlorite is in irregular amoeboid masses intergrown with quartz or calcite and suggesting in form an alteration or devitrification product of glass. This chlorite is very fine-grained and appears to be aggregated into radiating sheaves. Some chlorite has a peculiar, almost vesicular structure, probably resulting from complete chloritic alteration of vesicular glass. Calcite is abundant in the matrix of many pyroclastic rocks but seems in these to be a product of weathering. In many rocks the calcite has replaced the chalcedonic cement during weathering but has not replaced the chlorite.

OPAQUE MINERALS: Both magnetite and pyrite are fairly common accessory minerals in fragments in these rocks. Hematite is rare and confined to relatively minor reddish fragments near the base of the formation.

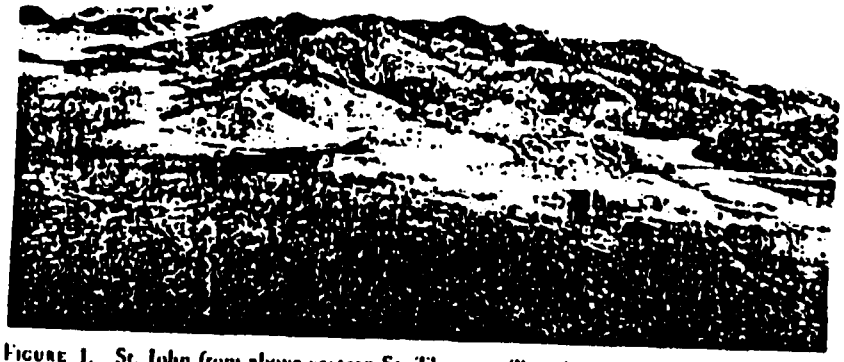

FIGURE 1. St. John from above eastern St. Thomas. Tortola is in the left background, and Cruz Bay in the center middleground. Concordant summits at an elevation of about 900 feet are shown.

FIGURE 2. Eastern St. John (middleground) and Tortola (background) from Bordeaux Mountain, St. John. Village of Emmaus in the foreground. Note prevalence of slope and submerged shore line.

ST. JOHN, U. S. VIRGIN ISLANDS

Photographs courtesy of the U. S. National Park Service

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U. S. Geological Survey
Water Resources Division

Caribbean District
Open - File Report

A SURVEY OF THE WATER RESOURCES OF ST. THOMAS, VIRGIN ISLANDS

TUT 001 1996

UNITED STATES DEPARTMENT OF THE INTERIOR

IN COOPERATION WITH THE

GOVERNMENT OF THE VIRGIN ISLANDS OF THE UNITED STATES

Caribbean District
Open-File Report

UNITED STATES
DEPARTMENT OF THE INTERIOR
Geological Survey

A SURVEY OF THE WATER RESOURCES OF ST. THOMAS, VIRGIN ISLANDS

by
D. G. Jordan and O. J. Cosner

Prepared in cooperation with the
Government of the Virgin Islands
of the United States

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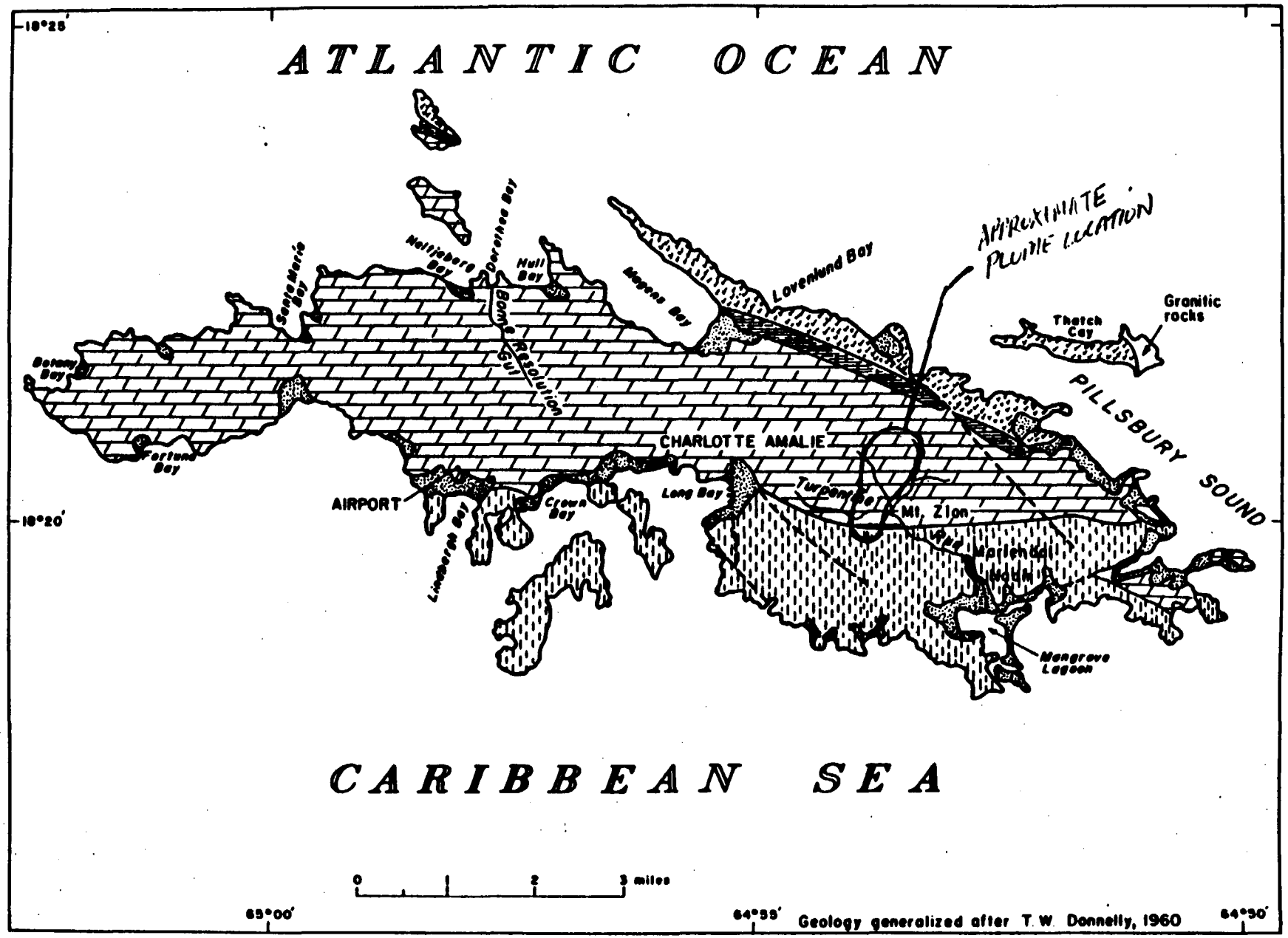
ATLANTIC OCEAN
CARIBBEAN SEA
18°25'
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65°00'
64°55'
64°50'
APPROXIMATE PLUME LOCATION
Granitic rocks
Thatch Cay
PILLSBURY SOUND
Lovenlund Bay
Magens Bay
Hull Bay
Hassel Island
Water Gut
Santa Maria Bay
Botany Bay
Fortuna Bay
CHARLOTTE AMALIE
AIRPORT
Crown Bay
Long Bay
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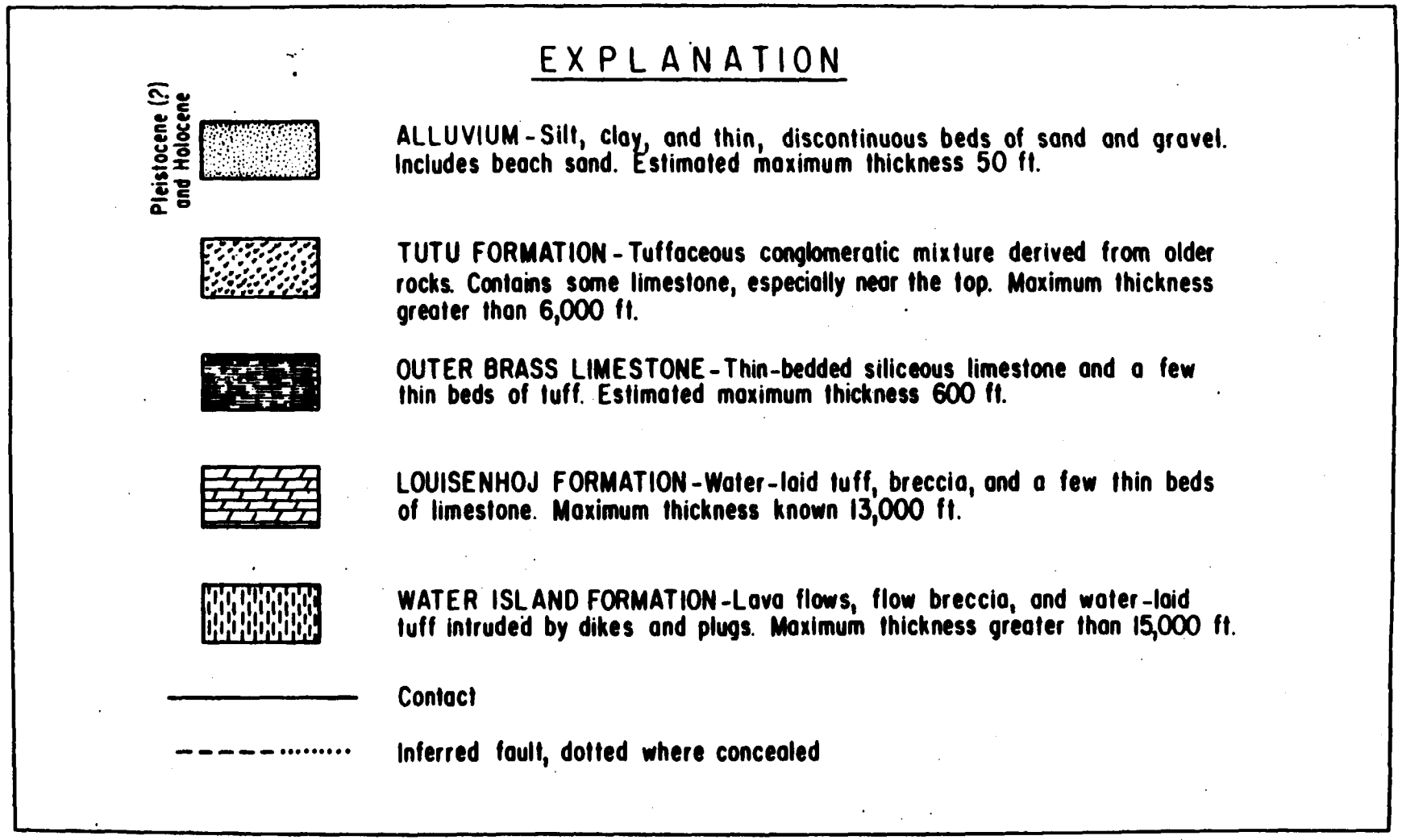

Figure 3.--Geology of St. Thomas.

Geology

The general geology of St. Thomas (fig. 3) has been studied for many years, but only recently have the geologic formations been named and described in detail (Donnelly, 1960, 1966). The names of geologic formations used in this report are after Donnelly. The names have not been adopted by the U.S. Geological Survey.

The volcanic and sedimentary rocks of St. Thomas are of Cretaceous (and older?) age. The oldest rocks, those of the Water Island Formation of Donnelly (1960) are predominantly lava flows and flow breccias deposited at great depth on the sea floor. Uplift and subareal erosion followed deposition.

The Louisenhoj Formation overlying the Water Island Formation was extruded from a volcanic center probably sited in what is now Pillsbury Sound between St. Thomas and St. John. Near the presumed location of the volcanic orifice the rocks are mostly very coarse reworked cone debris. Farther from the orifice, coarse material lessens and tuffs predominate. Near the base of the Louisenhoj Formation is a conglomerate composed chiefly of rock from the Water Island Formation.

The Outer Brass Limestone was deposited on the flanks of the Louisenhoj volcanic cone during a period of volcanic quiescence. It consists of 200 to 600 feet of thin-bedded graphitic silicified radiolarian limestone and a small amount of included tuffaceous material.

The Tutu Formation, the youngest rock exposed on St. Thomas proper, is composed almost entirely of angular debris derived from the Louisenhoj Formation and minor limestone debris from thin limestone deposited contemporaneously with the Tutu Formation.

The rocks were subsequently tilted to form a northward-dipping homocline. Dips range from 15 to 90 degrees and average about 50 degrees. Locally the formations are overturned.

The permeable zones that these rocks once may have had after deposition have been destroyed by metamorphism or by deposition of minerals in pore spaces. Ground-water movement is now limited to openings along joints and fault zones. The homoclinal structure is cut by sets of faults trending N 45° W, N 55° E and north. Three well-defined joint sets parallel each of the major fault directions. The valleys of the island have similar trends and are apparently the result of selective erosion of rock weakened by faulting and jointing. Prime zones of ground-water availability, therefore, follow the valleys.

Small alluvial deposits ranging from Pleistocene (?) to Holocene in age lie in the valley of Turpentine Run in east-central St. Thomas and the larger coastal embayments.

The alluvium of Turpentine Run lies in a narrow band seldom more than 200 feet in width along the stream. Maximum thickness of the alluvium is about 40 feet. Most of this alluvium, which is composed of silt, fine sand, and clay and contains discontinuous beds of sand and gravel 2 to 3 feet thick, lies in the Mt. Zion-Tutu area of the upper basin and in the narrow valley from Mariendal to Mangrove Lagoon in the lower basin. The alluvium extends out under the lagoon near the mouth of Turpentine Run. Although composed predominately of fine-grained material, the alluvium readily infiltrates streamflow when the ground-water level is below the base of the stream. As such, the alluvium forms a readily rechargeable aquifer, although it is of small extent and yield.

Some coastal embayments headed by intermittant streams contain small deposits of alluvium similar to that of Turpentine Run. Maximum thickness of these deposits is estimated to be 50 feet, and their areal extent seldom is greater than a few acres (an exception being the Long Bay and Airport areas near Charlotte Amalie). Near the sea, the alluvium interfingers with calcareous sand and at times contains lenses of mangrove-swamp deposits. Therefore, the deposits are of minor significance as sources of water.

OCCURRENCE AND MOVEMENT OF WATER

Water moves through a cyclic pattern--the hydrologic cycle--in which there are three storage areas: the sea, the land, and the atmosphere. On the land, surface water and ground water depend on: (1) the amount, intensity, and areal extent of the rainstorms; (2) the slope of the land; (3) the moisture content of the soil and vegetal cover; (4) the infiltration capacity of the soil and underlying rocks; and (5) the size,

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as supplemental sources of water for domestic use, stock, and irrigation.

Natural Water Resources

The natural water resources of the island--ground water and surface water--are the residue of rainfall after evapotranspiration. Rain, as such, is a water resource on St. Thomas, for in many places it is collected and stored for future use.

In the following pages only the "natural" water resources are discussed, and the sea is discussed only as it directly affects the natural resources.

Water from Streams and Other Surface Sources

Surface-water resources are negligible on St. Thomas. Streams are small and generally intermittent. There are no lakes, although, numerous farm ponds have been constructed. Hillside rainfall catchments for many years were an important source of water for public supply. Rooftop catchments are still the major source of water for most private homes.

During the study period, 1963-67, rainfall was above average only in 1965. There were 2 years of extreme drought: 1964, when rainfall was 27 inches; and 1967, when rainfall was 24 inches. Streamflow in particular was greatly affected. The worst probable conditions, therefore, could be studied.

Streamflow

Streams generally flow only after heavy rains. None of the streams on St. Thomas are perennial in the ordinary sense. A few spring-fed pools and short reaches of two streams flow throughout the year, but in extreme drought even these disappear.

The variability of streamflow is shown in the hydrographs, figures 9, 10, and 11, of Turpentine Run and Bonne Resolution Gut, the only two streams that generally have some flow throughout the year.

Streams head in the volcanic rock uplands, where valleys are steepsided and stream courses have steep gradients and are commonly strewn with boulders. Near the sea, larger valleys broaden, stream gradients are gentle, alluvial deposits are present, and boulders are less numerous. Drainage basins are small, few being larger than half a square mile in area. Turpentine Run is the only drainage basin exceeding a square mile in area.

Historical streamflow.--Historical reports, geologic evidence, and older residents indicate that streamflow was once greater than at present.

The decline in ground-water levels and in streamflow (as noted, the discharge of ground water supports base flow of the streams and springs) is attributed to changes in land use. In the not-too-distant past much of the island was under cultivation or in grass pasture. Now it is covered by a dense growth of deep-rooted brush. The brush, which has a greater transpiration rate than grass pasture and croplands, probably intercepts a large part of the water that previously reached the ground-water reservoir and was subsequently discharged as streamflow.

Several small spring-fed streams on the south coast from the vicinity of Long Bay to Fortuna Bay and along the north coast from Santa Maria Bay to Water Bay (fig. 12) no longer flow. Two of the springs on the south coast reportedly flowed 5 to 10 thousand gpd each. The water from Staabi Spring (9 on fig. 12), was piped into Charlotte Amalie for water supply. The other, on John Dunko Estates (8 on fig. 12) above Crown Bay, was once considered as a potential source of water for Charlotte Amalie.

Staabi Spring still contributes a trickle of water to streamflow. Small spring-fed pools still exist at Fortuna Bay and Estate Solberg. All other springs and streams on the south coast are dry, although many have small dams built on them, indicating former flow.

Calcareous tufa, deposited by former streams, is present in nearly all water courses on the north coast between Santa Maria Bay and Water Bay on the north coast. At Caret Bay, until a few years ago, streamflow was reportedly perennial. Spring-fed pools are still used for stock watering, and one in the vicinity of Estate Barrett is used for public supply.

Turpentine Run

Turpentine Run in eastern St. Thomas drains an area of 3.4 square miles. About two-thirds of the drainage basin lies in the interior and is surrounded by high hills. Discharge to the sea is through a relatively narrow V-shaped valley, 200

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feet wide at its narrowest place. The valley widens as it approaches the sea, where it empties into Mangrove Lagoon. About three-fourths of a mile from the sea a tributary valley drains a 0.5-square-mile subbasin.

Turpentine Run near Mt. Zion

The flow of Turpentine Run has been measured at the site of the Mt. Zion gage from time to time since 1920. At this point the stream drains a basin of 2.3 square miles. Flow from the basin is highly variable and is predominately storm runoff. Base flow (ground-water outflow) of the stream is meager and, at times, ceases altogether. It did not flow for 8 months in 1921 (Johnson 1936) and for 3 months in 1965 and probably has not at other times.

Discharge during 1958-62 was calculated on a daily basis, using rainfall at Estate Fort Mylner in conjunction with a rainfall-runoff ratio based on 1963 rainfall-runoff and stage recession of 1963 runoff. Discharge from 1963-67 was determined by the stage-discharge relation of a continuous recording gage established in late November 1962. Figure 13 presents the relation of monthly and annual discharge to monthly and annual rainfall. The rainfall-discharge relation is presented in a different manner in figure 14. Scatter in the monthly relation is caused by antecedent rainfall and soil-moisture conditions in the basin.

The annual discharge of Turpentine Run is a small percentage of the total rainfall on the basin (table 2). In a year of near-average rainfall, discharge is less than 2 percent of the rainfall on the basin. The lack of runoff is attributed in part to high evapotranspiration and, at times, lack of ground-water contribution from the greater part of the upper basin to base flow of Turpentine Run. In extremely dry periods all ground-water is discharged through a zone of hydrothermally altered rocks at Mt.Zion directly to the alluvium and bedrock aquifer in the lower basin.

Base flow.--Turpentine Run had only base flow about 90 percent of the time during 1963-67. Except for the drought years of 1964 and 1967, base flow was less than one-third of the total annual discharge. Base-flow contribution in 1963-64 is shown by the unshaded area in the hydrograph in figure 9. The 10-percentile line of the duration curves in figure 15 is essentially the dividing line between base flow and storm runoff.

Table 2.--Annual discharge, Turpentine Run near Mt. Zion

Year	Flow, million gallons	Rainfall, inches	Runoff, percent of rainfall
1958*	34.5	47.02	1.83
1959*	2.9	29.68	.34
1960*	290.0	71.34	10.20
1961*	24.3	48.46	1.25
1962*	21.4	41.10	1.30
1963	27.3	43.75	1.56
1964	1.5	28.05	.13
1965	32.9	42.83	1.92
1966	19.8	39.88	1.24
1967	3.0	22.91	.33

* Discharge computed from daily rainfall.

Flow in Turpentine Run during 1964, 1967, and the first 10 months of 1965 was almost entirely base flow. Discharge seldom exceeded 15,000 gpd and more than half the time was less than 5,000 gpd.

During 1963 and 1966, when rainfall was near normal, base flow was as large as 90,000 gpd and as small as 4,000 gpd. Average base flow was about 27,000 gpd in 1963 and 1966.

Monthly rainfall of about 4 inches is necessary to maintain base flow. When rainfall is less, base flow declines sharply. Once base flow has begun to decline, rainfall in excess of 4 inches for 2 or 3 consecutive months is necessary to reverse the downward trend, as shown by comparing monthly rainfall and discharge during the latter part of 1965 (fig. 13).

Storm runoff.--During periods of near-normal rainfall, storm runoff contributes the greater part of the total annual discharge. However, storm runoff prevails only a few days each year. Storm runoff in 1963 was 65 percent of the annual discharge. Nearly 40 percent of the annual discharge occurred in 4 days, the result of one storm of 4 inches in the upper basin.

Two curves drawn through the points plotted in figure 16 are related to antecedent storm runoff. One curve passes through points where storm runoff had occurred in the previous 15 days, whereas the other curve passes through points where storm runoff had not occurred in the previous 15 days. The curves, in a crude way, indicate the quantity

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of water recharged to the aquifers, evaporated, transpired, and needed to replace soil moisture. Maximum runoff from an individual storm was 20.5 million gallons (8.7 mg/sq mi) from the storm of December 10-15, 1965, when 4.3 inches of rain fell on the watershed. Runoff on this occasion was more than twice that from a 5.1-inch rain on the watershed August 28-29, 1963. The great difference in runoff was probably related in part to rainfall intensity but mostly to antecedent soil-moisture conditions.

Turpentine Run at Mariendal

Turpentine Run at the Mariendal gage has a drainage basin of 2.8 square miles, which includes the upper basin and a major tributary that joins the main stem about 1,500 feet upstream from the gage. Alluvium underlies the stream channel to a point about 1,500 feet upstream from the gage. All base flow infiltrates this alluvium before reaching the Mariendal gage, except on the rare occasions when the alluvium is saturated to the level of the stream. Consequently, flow at the gage is almost solely major-storm runoff (fig. 10).

Base flow.--Base flow at the Mariendal gage reportedly was continuous from May 1960 to September 1962 and was observed in October and November 1962. No further base flow occurred at Mariendal until December 1965, when there was flow for about a month between periods of storm runoff.

Storm runoff.--Storm runoff seldom lasts more than a few days, usually ceasing abruptly, owing to infiltration into the alluvium at the declining stages of the flow.

Because of the irregular distribution and intensity of rainstorms, the volume of runoff per square mile is generally not the same at Mt. Zion as it is at Mariendal. Nearly twice as much runoff per square mile has been recorded at Mariendal. However, flows as great as 100,000 gpd recorded at Mt. Zion never reached the Mariendal gage, owing to infiltration losses.

Maximum runoff from an individual storm was 34 million gallons (12 mg/sq mi) between December 10 and 15, 1965--the result of a series of rains totaling about 4.3 inches over the watershed. Runoff per square mile was nearly twice that at the Mt. Zion gage.

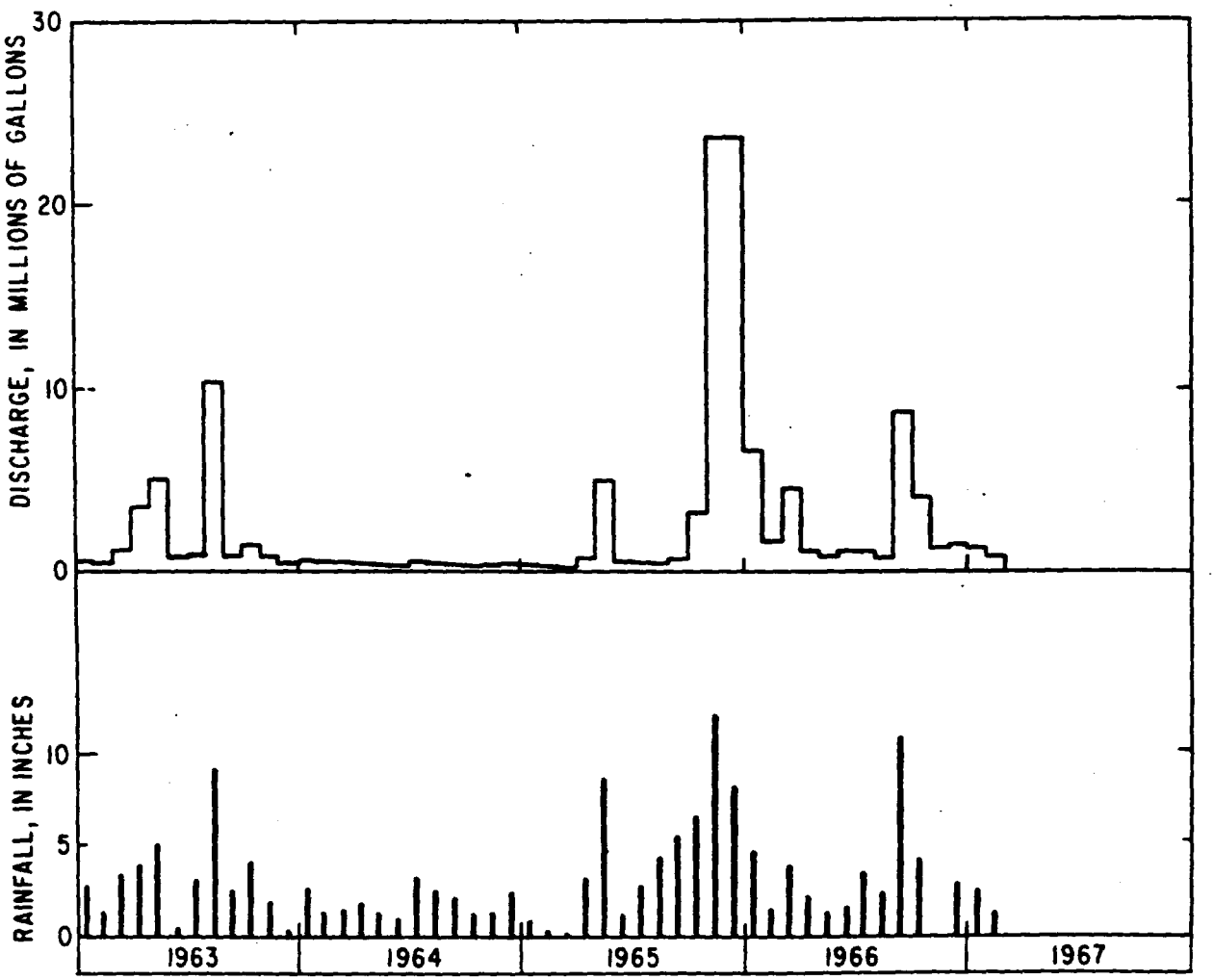

Figure 17.--Monthly discharge of Bonne Resolution Gut and monthly rainfall at Dorthea Agricultural Station.

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The effective porosity, or storage capacity, of the consolidated rock also is related to open interconnected fractures and joints. Effective porosity in the upper Turpentine Run basin is estimated to be 4 percent based upon changes in the ground-water level in response to rainfall. Effective porosity of the rocks in most of the island is estimated to be 1 percent or less.

Water in Unconsolidated Rock

Water-bearing unconsolidated deposits are present only in Turpentine Run Valley and in coastal embayments. These deposits consist of two different lithologic types, which have a variety of water-bearing characteristics. They can be divided into (1) a bouldery silt and clay alluvium, which contains lenses and beds of sand and gravel, and (2) beach deposits, predominantly coral sand and occasional interbedded zones of coral, beach rock, and organic silt and clay. In the coastal embayments, alluvial and beach deposits may interfinger.

The alluvial deposits are predominantly fine grained, and, although they have a high porosity, they have a low permeability and will yield water only slowly to wells. Water in these deposits is with few exceptions under water-table conditions. Sand and gravel beds and lenses in the alluvium are rare. Where present, however, they will yield water readily and act as a large collector system into which water from the less permeable alluvium will percolate. Occasionally the water in the sand and gravel beds is under artesian pressure because they are confined by the less permeable overlying alluvium.

The beach deposits, principally medium to coarse coral sand, have a moderate to high permeability and porosity and will yield water readily to wells. The moderate to high permeability of the beach deposits is often detrimental in that salt-water encroachment can easily occur.

Water Table

Ground water in St. Thomas is assumed to be under water-table conditions--that is, the water surface is unconfined, open to the atmosphere, and free to rise and fall. Sufficient data are not available to show contours of the surface of the water table throughout the island. In general, the water table roughly parallels the topography. The depth to the water table is a few feet below land surface in the coastal embayments but may be as much as 120 feet below land surface near the crest of the central ridge.

The water table responds to changes in the quantity of water stored in the ground-water reservoirs. The water table rises when recharge from rainfall or streamflow exceeds the discharge; it declines when discharge to springs, streams, or the sea, evapotranspiration from the water table, and withdrawal of water from wells exceed recharge.

Water-table fluctuations

The hydrograph of well 1 in figure 26 is typical of the water-level fluctuations in the rock aquifer of the south coast. Recharge follows the infrequent heavy rainstorm or smaller storms in a wet period. The overall low storage capacity of the rock causes a rapid rise in water levels, but the steep hydraulic gradients result in rapid losses and almost as rapid declines.

Figure 27 is the hydrograph of well 24 tapping the alluvium and weathered bedrock in the lower Turpentine Run Valley, and figure 28 is the hydrograph of well 21 in the alluvium of the upper basin. Recharge is received every time storm water runs off in the stream and water levels rise. Between times of storm runoff, ground-water levels are partly maintained by the infiltration of base flow from the stream when flow is present.

The hydrograph of well 19 in figure 29 shows the pattern of water-level fluctuations of the rock aquifer in upper Turpentine Run basin. The pattern is similar to that of the rock aquifer of the north coast and larger valleys on the south coast. Here, greater permeability and storage capacity and generally thicker soil and alluvium result in a slower but more prolonged response to recharge and a slower discharge. The "troughs" in the hydrograph during early 1965 were caused by pumpage (averaging 18,000 gpd) from a nearby well.

Recharge

The bedrock aquifer is principally recharged by infiltration of rain on the land surface. Streamflow and storm runoff locally recharge the alluvium, which may, in turn, contribute water to the bedrock aquifer in the major valleys and alluviated coastal embayments.

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Rainfall, vegetation, evaporation, surficial deposits, and exposure to solar radiation are the main factors affecting recharge to the aquifers.

Leaky-salt water and sewage mains in Charlotte Amalie and effluent from sewage plants in the Turpentine Run basin also contribute water to the aquifers as does effluent from septic tanks throughout the island. Recharge from these sources is detrimental as it is a potential source of pollution.

The bedrock aquifer is recharged infrequently and only after a heavy rain or series of lesser rains. The amount depends on the antecedent rainfall and the degree to which soil moisture has been depleted by evapotranspiration since the last rain. Extensive brush cover and the granular nature of the soil cause rapid evapotranspiration. Conversely, the granular nature of the soil will allow water to pass through the soil zone without the soil being completely saturated--saturation being required only along the conduits between the soil granules. This reduces the water needed to satisfy soil-moisture requirements before recharge can take place. Even then, under dry conditions, a major rainstorm of 2 inches or more, or the equivalent in lesser rains, is necessary to initiate recharge to the bedrock aquifer. The amount of rainfall necessary for recharge varies from one part of the island to another. On the north slope 1 inch of rain may cause recharge, whereas on the south slope, under dry conditions, 3 inches or more may be necessary for recharge.

The fluctuation of ground-water levels indicates that recharge to the aquifers on the south-facing slopes is less frequent than on the north-facing slopes. Less frequent recharge on the south slopes is attributed to the greater solar radiation received by these slopes, which results in increased evapotranspiration and a greater soil-moisture deficiency. Consequently, a greater volume of water is necessary to overcome the soil-moisture deficiency before recharge takes place.

Where the surficial deposits (saprolite or alluvium) are thick, ranging from 2 to 15 feet, as on the north slope in the vicinity of Dorothea, in upper Turpentine Run basin, and in the alluvial embayments, such as at Long Bay and the Harry S. Truman Airport, water is retained in the surficial deposits and takes a much longer time to reach the bedrock aquifer. Peak recharge to the bedrock aquifer may lag as much as a month behind the rainfall. In some places little recharge reaches the bedrock aquifer--as most is discharged to springs or streams directly from the saprolite or alluvium, as has been observed in the vicinity of Dorothea on the north slope.

Runoff from major rainstorms is the principal recharge to the aquifers of the coastal embayments and is an important source of recharge to the alluvium of Turpentine Run. Base flow of Turpentine Run and Bonne Resolution Gut at Dorothea Bay, when present, also contributes recharge to the unconsolidated aquifers in their respective basins.

For convenience of discussion, the island has been divided into five ground-water areas as shown in figure 30. Estimates of yield in these areas are given in table 5.

Table 5.--Estimated yield of ground-water areas. (See fig. 30)

Ground-water area	Area, sq mi	Estimated yield gpd	Estimated yield mg/yr	Annual recharge, inches
1	13.6	450,000	164	0.7
1 (Long Bay)	.3 1/	70,000 1/	25	4.9
1 (Lindberg Bay)	.2 1/	30,000 1/	11	4.3
2	3.4	350,000	128	2.2
2 Upper basin	2.3	300,000 4/	110	2.8
2 Lower basin	1.1	50,000 4/	18	1.1
3	4.6	250,000	91	1.2
4	.4 2/	100,000	36	5.3
5	10.0	100,000	36	.2
Total	32	1,250,000	455	

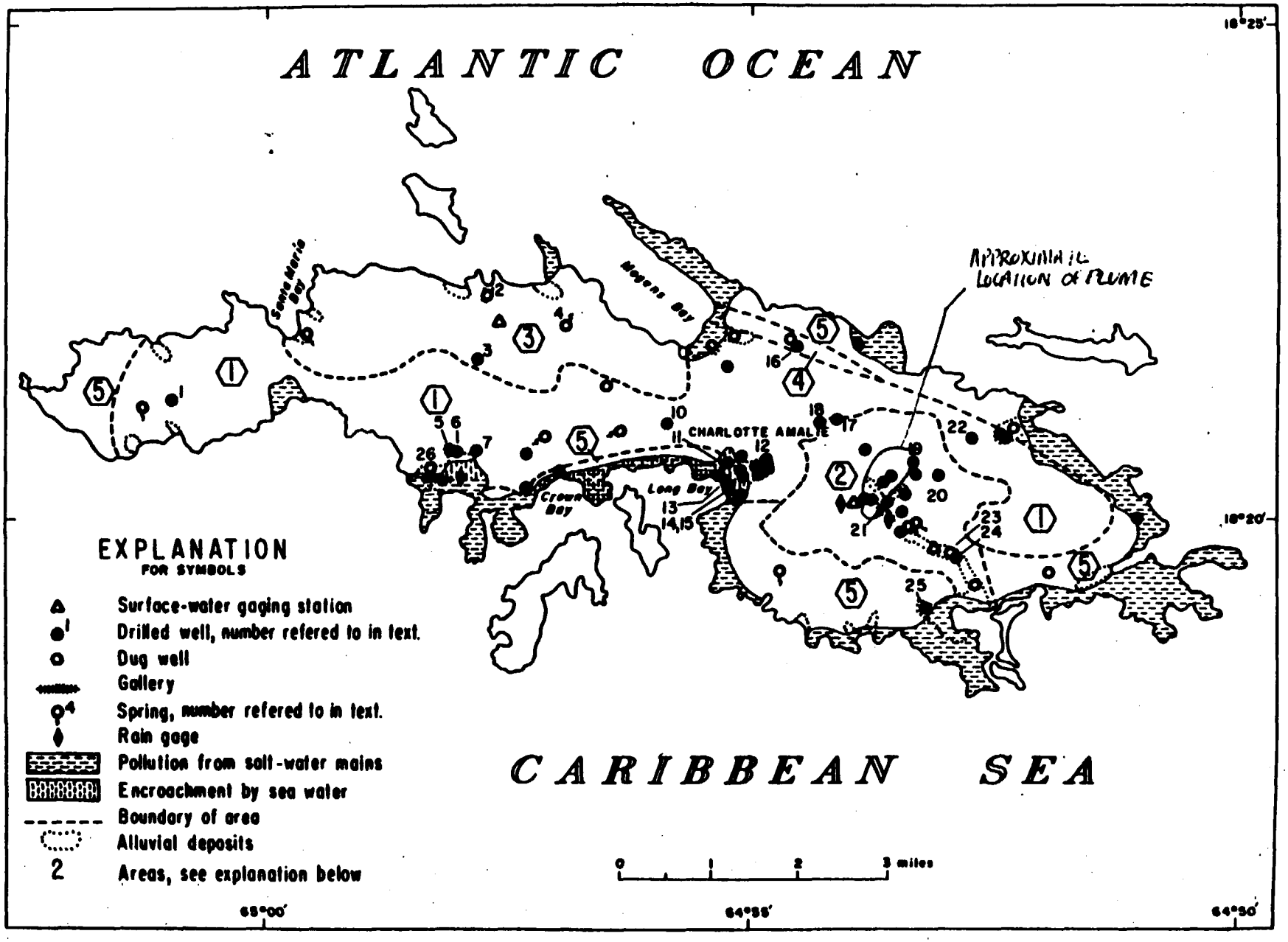
1/ Approximate area of alluvium only.
2/ Does not include drainage basins at Areas 1 and 5 which contribute recharge to Area 4 from surface-water runoff.
3/ Yield included in Area 1 total.
4/ Yield included in Area 2 total.

Ground-Water Areas

Area 1

Area 1 encompasses about half the land area. It is underlain principally by fractured volcanic tuff and breccia of the Louisenhoj Formation, on which 1 or 2 feet of soil have developed. On the south side of the island, from the vicinity of Charlotte Amalie westward to Brewers Bay, the volcanic rock has been extensively fractured. The fractures, however, have been filled with

TUT 001 1605


ATLANTIC OCEAN
CARIBBEAN SEA
APPROXIMATE LOCATION OF PLUME
CHARLOTTE AMALIE
Crown Bay
Long Bay
Magens Bay
Santa Maria Bay
EXPLANATION
FOR SYMBOLS
Surface-water gaging station
Drilled well, number refered to in text.
Dug well
Gallery
Spring, number refered to in text.
Rain gage
Pollution from salt-water mains
Encroachment by sea water
Boundary of area
Alluvial deposits
Areas, see explanation below
0 1 2 3 miles
18°25'
18°20'
65°00'
64°55'
64°50'

OCT 1969

AREAS EXPLANATION

Area 1

Wells in rock 50 to 300 feet in depth will yield up to 1,000 gpd. In some larger basins and alluviated embayments yields up to 10,000 gpd may be possible. Water contains 1,000 to 1,500 mg/l chloride. Wells drilled near the sea and below sea level may yield brackish water when drilled or if pumped at excessive rates.

Area 2

Wells in rock 50 to 250 feet in depth will yield up to 30,000 gpd. Generally, deeper wells have a higher yield. Short-term yields of selected wells may be as great as 150,000 gpd. Wells tapping alluvium of lower Turpentine Run will yield up to 10,000 gpd. Water contains about 1,000 mg/l dissolved solids and about 200 mg/l chloride. Little danger of salt-water encroachment except in lower Turpentine Run.

Area 3

Wells in rock 50 to 200 feet in depth will yield up to 5,000 gpd. In some larger drainage basins, yields up to 10,000 gpd may be possible. Water contains about 1,000 mg/l dissolved solids and about 200 mg/l chloride. Wells drilled near the sea and below sea level may yield brackish water when drilled or if pumped at excessive rates.

Area 4

Wells in limestone 50 to 150 feet in depth will yield up to 50,000 gpd. Short-term yields of selected wells may be as great as 150,000 gpd. Water contains about 1,500 mg/l dissolved solids and 200 to 300 mg/l chloride. Wells drilled near the sea or below sea level may yield brackish water when drilled or if pumped at excessive rates.

Area 5

Wells in rock 50 to 300 feet in depth will yield up to 1,000 gpd. In general yields are small. Water contains 1,000 to 1,500 mg/l dissolved solids and 300 to 500 mg/l chloride. Wells drilled on peninsulas and in coastal areas generally will encounter brackish water. Ground water polluted by leaky salt-water mains in Charlotte Amalie area.

Figure 30.--Ground-water areas of St. Thomas showing location of wells, springs, stream gages, and rain gages.

USI 001 1507

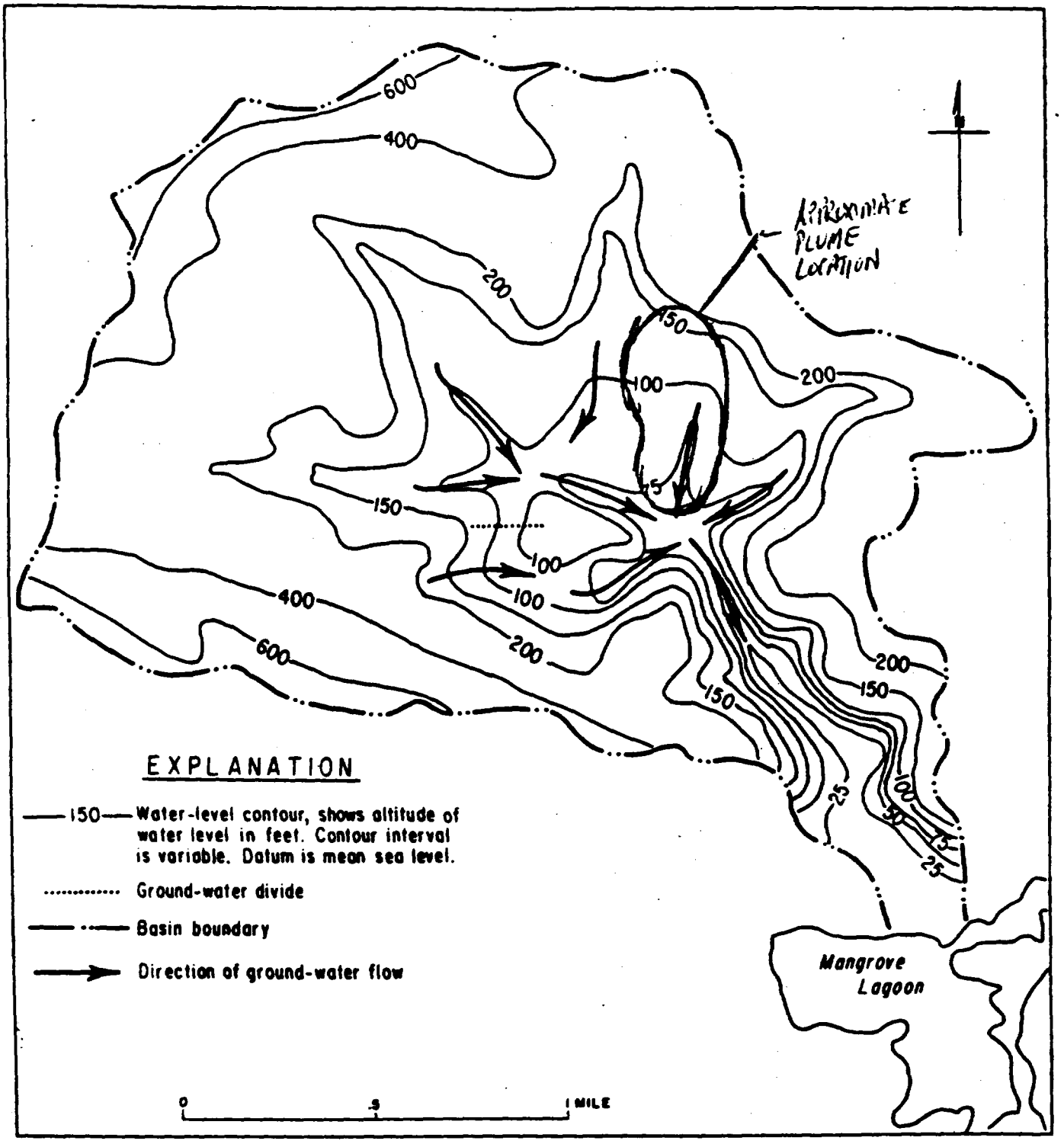


Figure 31.--Contours of ground-water surface in Turpentine Run basin, August 1965. Arrows show direction of flow.

TUT 001 1608

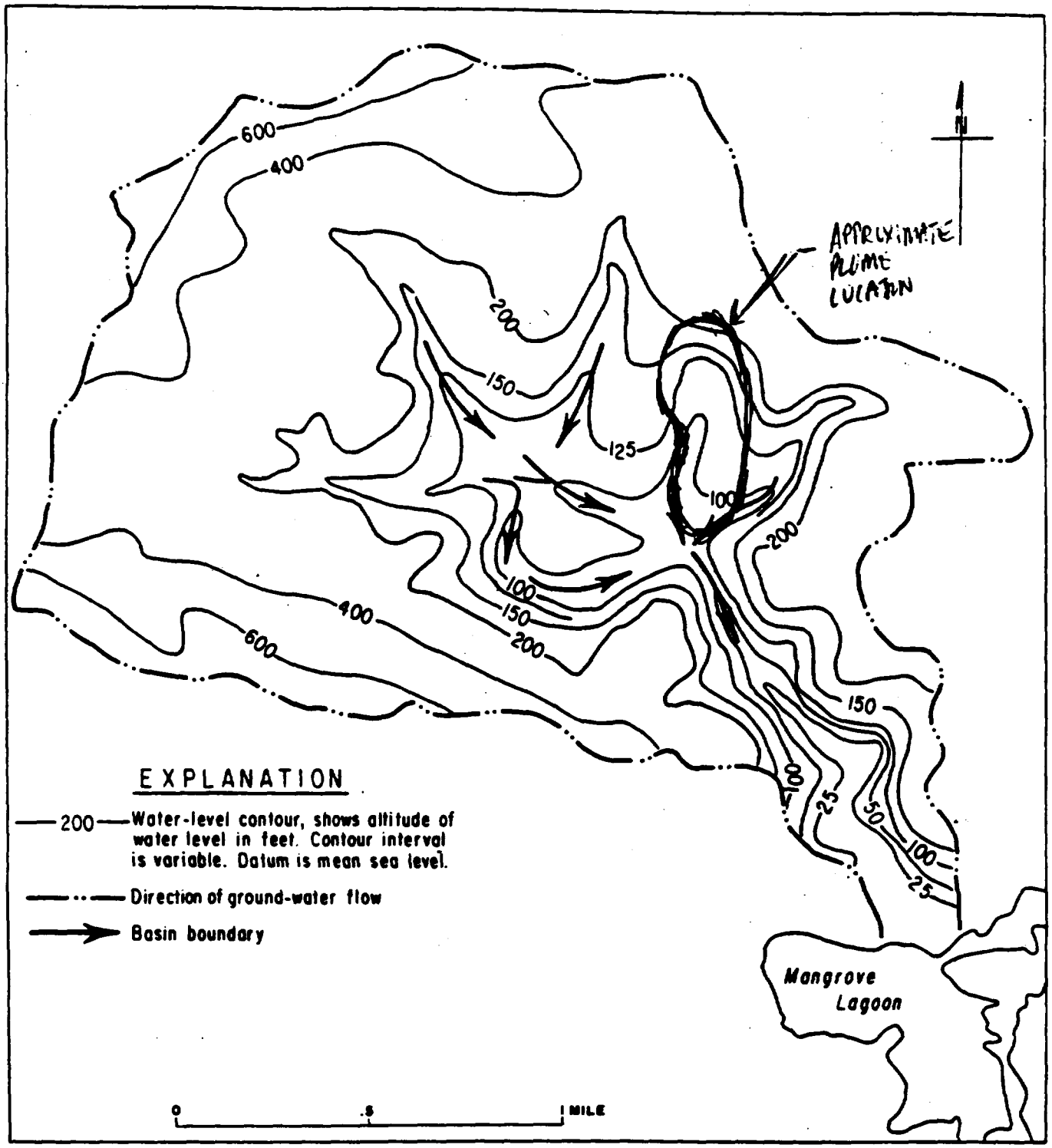


Figure 32.--Contours of ground-water surface in Turpentine Run basin, January 1966. Arrows show direction of flow.

TUT 001 1609

the lower basin, respectively. The hydrographs of the wells are similar, except that the hydrograph for well 24 shows the effect of recharge to the alluvium by storm runoff from rainstorms sufficient to cause runoff by exceeding the infiltration capacity of the soil, but not sufficient in volume to satisfy soil-moisture requirements and subsequently recharge the bedrock aquifer tapped by well 19.

Recharge to bedrock.--The principal bedrock aquifer is recharged from the occasional major rainstorm. Estimates of recharge from data obtained from the upper basin are probably applicable to most of Area 2.

Correlation of rainfall, runoff, and ground-water levels show that recharge is in part dependant upon antecedent rainfall and soil-moisture conditions. Generally at least 2 inches of rainfall in a 48-hour period is necessary for recharge. Apparently, 2 inches of rainfall is necessary to satisfy evaporation and soil-moisture requirements, and when rainfall is in excess of 2 inches the bedrock aquifer will be recharged. Annual recharge was computed on this basis, using rainfall at Estate Fort Mylner for the years 1958 through 1967. A summary is given in table 6.

Table 6.--Estimated annual recharge to bedrock aquifer of upper Turpentine Run basin

Year	Rainfall, inches	Recharge-causing rainstorms	Recharge		
			mg over basin	mg/sq mi	inches
1958	47.02	4	190	83	4.8
1959	29.68	0	0	0	0
1960	71.34	9	634	275	15.8
1961	48.46	6	159	69	4.0
1962	41.10	3	88	38	2.2
1963	43.75	6	208	90	5.2
1964	28.05	0	0	0	0
1965	42.30	4	124	54	3.1
1966	39.88	2	43	19	1.1
1967	22.91	1	36	16	.9

Recharge to the bedrock aquifer is dependent not only on the frequency but also the volume of major rainstorms. In 1963, for example, recharge and rainstorms were twice that of 1962, but the major difference was due to a 5-inch rain in 1963. Based on the frequency of occurrence of 48-hour rainstorms at Estate Fort Mylner, figure 33, an annual recharge of about 105 million gallons (46 mg/sq mi) is obtained, with an additional 55 million gallons (24 mg/sq mi) or more being recharged about every other year.

Recharge to alluvium.--The principal alluvial aquifer is in the lower reaches of Turpentine Run. The alluvium is recharged by base flow and storm runoff from upper Turpentine Run and by direct ground-water discharge from the upper basin.

The infiltration capacity of the alluvium in the lower reach of the stream is demonstrated by the fact that the 1,500-foot alluviated reach upstream from the Mariendal gage has, on occasions, infiltrated as much as 100,000 gpd of storm runoff. Infiltration into the alluvium between the Mariendal gage and the sea is estimated to be as much as 750,000 gpd.

With the exception of occasional storm runoff, the entire flow of Turpentine Run becomes recharge to the alluvium. In a year of average rainfall, this is about 20 million gallons. Ground-water discharge from the upper basin to the alluvium is probably 25 million gallons or more annually, but about 15 million gallons is lost to evapotranspiration.

Storage.--From October 1965 to January 1966 there were four major and several minor rainstorms over the upper Turpentine Run basin. These storms contributed about 190 million gallons of water to the aquifer. Ground-water levels rose about 10 feet throughout the basin. Calculated storage capacity of this part of the aquifer is about 4 percent by volume. A rough estimate would place about 500 million gallons of water in storage when the aquifer is full; that is, when it starts to contribute to the base flow in the three branches of Turpentine Run.

The bedrock aquifer in the lower basin is estimated to be capable of storing 100 million gallons. The low storage capacity of the lower basin is attributed to fewer open joints and fractures in the rocks of the Water Island Formation.

TUT 001 1610

The principal alluvial deposits lying along Turpentine Run in the lower basin when saturated to the base level of the stream, have a storage capacity estimated to be 5 million gallons of water above sea level.

Yield.--Annual recharge to the aquifer of the upper basin is about 105 million gallons, with a bonus of 55 million gallons or more about every other year--a working average of about 130 million gallons annually. Of this amount, about 10 million gallons is lost to base flow in Turpentine Run and 25 million gallons by subsurface ground-water discharge to the lower basin. The remainder, about 95 million gallons, is lost to evapotranspiration. Development of the aquifer would recover much of the water lost by evapotranspiration and also that lost by base flow and subsurface ground-water discharge. The estimated potential ground-water yield of the upper basin is 110 million gallons annually, or 300,000 gpd.

Recharge to the bedrock aquifer in the lower basin is assumed to be about 30 million gallons annually--less than that in the upper basin because of the general overall lower permeability as well as the dense vegetation and consequent greater soil-moisture demand. The alluvial aquifer, in turn, receives about 25 million gallons from ground-water flow and about 20 million gallons of surface-water flow from the upper basin. The dense brush and generally shallow water table cause large evapotranspiration losses. Probably three-fourths of the available ground water in the lower basin is lost to evapotranspiration. The remainder discharges to the sea. The potential yield of the lower basin is about 18 million gallons annually (50,000 gpd), equally divided between the bedrock and the alluvial aquifer.

Water use.--Before 1964 the use of ground water in the area was limited: the major water user was the Government abattoir at Nadir. Test drilling in 1964 proved drilled wells to be feasible, and with the advent of drilled wells, water use increased rapidly. Water, pumped by water haulers for sale to domestic users, and industrial use in the area is increasing. Estimates of ground-water pumpage and use are given in table 7.

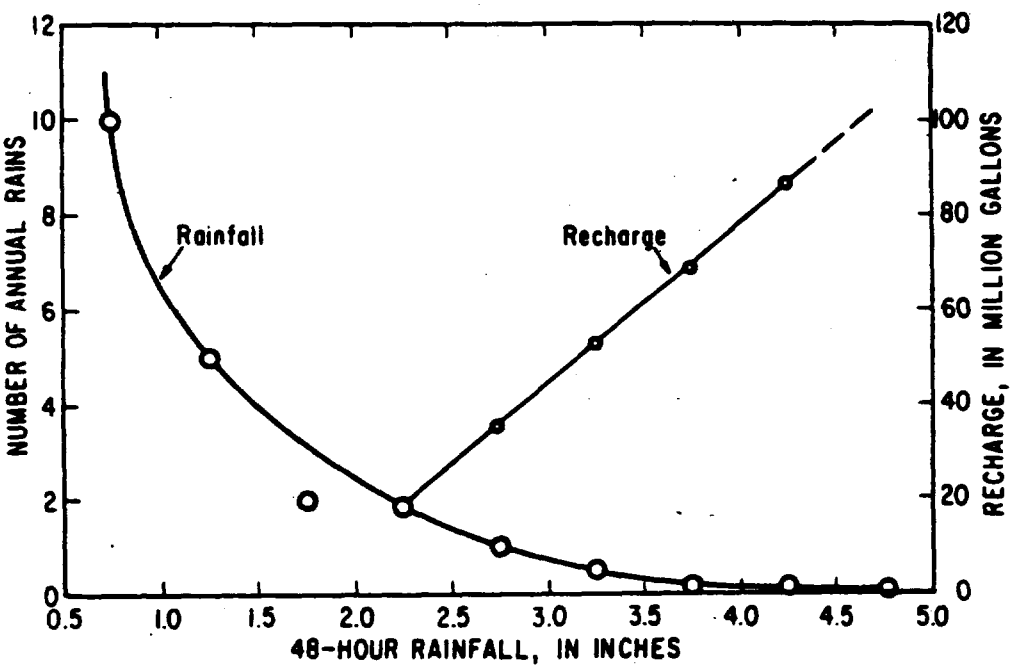


Figure 33.--Frequency of 48-hour rainstorm at Estate Fort Mylner (Mt. Zion) and recharge to aquifer of upper Turpentine Run basin.

TUT 001 1611

REFERENCE NO. 37

United States Department of the Interior
GEOLOGICAL SURVEY
Nisky Mail Boxes P18
Nisky Center
St. Thomas, USVI 00802

August 10, 1990

Ms. Caroline Kwan
U.S. Environmental Protection Agency, Region II
26 Federal Plaza, Room 747
New York City, NY 10278

Dear Ms. Kwan,

I recently compiled a table of wells for the Tutu Basin on St. Thomas, Virgin Islands for Joseph Troester, Hydrologist with the USGS in Puerto Rico. He suggested that I send a copy of the table to you as you are planning to sample some of the wells in the Tutu area. I hope the information will be helpful to you in selecting sites to sample for contamination.

As part of our well inventory for St. Thomas, we have identified additional wells in the Tutu area that were not located at the time that Robert Graves completed the potentiometric map of the basin. We also have some records of wells from the VI Department of Planning and Natural Resources files that we have not yet been able to inventory but will hopefully have finished within the next few weeks. Some of these well are in the area of contamination and may have not been previously sampled. If you would like to stop in our office when you are down here we would be glad to share with you any information we have in our files. Also, we would be available to show you any wells in the Tutu area that you may be unfamiliar with. If you have any questions or need any more information let me know. I look forward to meeting you.

Sincerely,

Judy I. Steiger

Judy I. Steiger
Hydrologist

enclosures

EXPLANATION

Number on PS map - Well number used on 'Potentiometric Surface of the Turpentine Run Basin Aquifer in Tutu Area, Eastern St. Thomas, U.S. Virgin Islands, September 11,1987.' by Robert Graves and Ralph Gonzalez

Use of Water -
- NU, not used
- C, Commerical
- D, Domestic
- A, Irrigation or Stock
- PS, Public Supply

Well Finish and Interval -
- P - perforated or slotted
- O - open hole
- X - open end

Water level below land surface -
- N - nearby well pumping
- R - well recently pumped
- P - pumping level
- E - estimated water level

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Lutu Basin Well Inventory
August 1990

Number on fig.	Number on PS map	Well name or owner	Use of Water	Site Identification Number	Date Constructed
1		NAT. PARK SERVICE	NU	182059064541200	10/09/63
2		VILLA BLANCA	C	182021064543400	08/29/85
3		BARBEL	NU	182009064543300	/ /
4	6	LOCKHART 3	NU	182016064535900	12/01/77
5	8	LOCKHART 5	NU	182015064540000	11/29/77
6	7	LOCKHART 4	NU	182016064540000	12/02/77
7		NEW HERNHUT MISSIO	NU	182002064540700	/ /
** 8	2	BRYAN 2	PS	182026064535800	08/29/78
9	3	BRYAN 3	NU	182025064535800	08/28/78
** 10	1	BRYAN 1	PS	182024064535800	03/08/78
11	4	LOCKHART 1	NU	182018064535900	12/05/77
12	5	LOCKHART 2	NU	182017064535900	11/24/77
13		KIRKERTERP	NU	182012064535400	/ /78
14		BAUGH	NU	182017064534900	04/ /67
15			NU	182009064534500	/ /
16		SHARP	NU	182010064534200	/ /
17		EGLIN	D	182011064534000	/ /
18		HARTHMAN	NU	182023064533800	/ /
19		HARTHMAN	D	182019064533500	03/21/78
20	26	VITELCO	NU	182018064533200	/ /
21	24	GASSETT MOTORS 1		182017064533000	/ /
22	29	E'S AND A'S 2		182016064532900	/ /
23	25	GASSETT MOTORS 2	NU	182018064533100	/ /
24	30	E'S AND A'S 3	C	182015064533000	04/20/78
25	31	E'S AND A'S 4	NU	182014064532900	/ /
26		FORT MYLNER	NU	182010064532900	10/ /38
* 27	22	CRUSHER WELL	NU	182021064532500	/ /78
LEVEL II 28	21	HARVEY	NU	182017064532200	/ /78
* LEVEL I 29	20	STEEL	A	182016064532000	/ /65
30	32	HODGE	NU	182012064531400	06/ /67
* LEVEL I 31	33	SMITH	D	182009064531300	/ /
* LEVEL I 32	34	MATTHIAS	D	182008064531400	/ /66
33		DELAGARDE	A	182001064530800	02/ /65
34		CHURCH OF GOD	NU	182025064532300	/ /81
35		VI GOVT	NU	182021064532000	/ /
36		EGLIN	NU	182021064531900	/ /
* 37	18	EGLIN 2	C	182020064521900	/ /
* 38	19	EGLIN 3	C	182019064531900	/ /
39	17	EGLIN 1	C	182020064532000	/ /65
** 40	9	DEMITRY		182042064533400	/ /
41		LEONARD	D	182038064533300	06/14/77
* 42	16	FOUR WINDS 2	NU	182027064531900	/ /81
43	15	FOUR WINDS 1	NU	182027064531800	/ /81
44	14	TILLET	NU	182029064531500	10/ /63
45		RAMSEY	C	182036064531600	08/05/78
46	11	VIHA 2	PS	182038064531200	12/21/77
47	10	VIHA 1	PS	182037064531100	01/01/78

* CONTAMINATED
** POTENTIAL TO RELEASE

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Tutu Basin Well Inventory
August 1990

Number on fig. ___.	Number on PS map	Well name or owner	Use of Water	Site Identification Number	Date Constructed
** 48	12	VIHA 3	PS	182048064531400	04/19/78
49	13	VIHA 4	NU	182049064530900	01/21/78
50			NU	181945064525500	/ /
51	36	POLY CARIB/DEVCO 1	--	181940064525200	/ /
52	37	POLY CARIB/DEVCO 2	--	181938064525100	/ /
53	38	POLY CARIB/DEVCO 3	--	181938064525000	/ /
54	39	POLY CARIB/DEVCO 4	--	181937064524900	/ /
55	40	WAPA	PS	181935064524400	01/22/64
56		LANTERN LAUNDRY	C	181935064524000	/ /
57			NU	181920064523900	/ /
59		SLAUGHTER HOUSE	NU	181920064524200	/ /
60	41	HUMANE SOCIETY	A	181921964524100	/ /
61		SLAUGHTER HOUSE	NU	181918064524400	/ /
62		RACETRACK	A	181917064524500	/ /82
63		GRIFFIN	D	181916964524300	/ /74
64		FLEMING	D	181916064524200	/ /
65		LAKE	D	181916064524100	/ /
66		ROLLINS	NU	181917064524200	/ /

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Tutu Basin Well Inventory
August 1990

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Number on fig.	Original Depth (feet)	Measured Depth (feet)	Casing Diameter (inches)	Well Finish	and Interval (feet below land surface)	Land Surface Elevation (feet)	Water level below land surface (feet)	
1	250	--	6	-	--	680	--	
2	375	--	6	P	20-50	400	--	
3	445	--	6	O	22-445	350	91.60	
4	145	--	6	O	60-145	188	3.77	
5	285	--	6	O	45-285	190	3.12	
6	145	--	6	O	45-145	189	4.01	
7	22	--	72	X	--	280	--	
8	140	--	6	-	--	220	15.47	N
9	140	--	6	-	--	218	13.53	N
10	140	--	6	-	--	215	15.37	R
11	185	--	6	O	50-185	192	7.32	
12	145	--	6	O	38-145	192	4.87	
13	85	72	6	-	--	170	19.24	
14	120	--	6	O	18-120	200	32.81	
15	--	10	120	X	--	150	2.21	
16	212	--	6	O	20-212	150	5.91	
17	--	13	72	X	--	150	7.04	
18	--	15	--	X	--	150	0.58	
19	325	--	6	O	36-325	150	17.70	P
20	--	131	6	-	--	137	22.37	
21	--	--	--	-	--	137	--	
22	--	--	--	-	--	126	--	
23	--	130	6	-	--	135	21.10	
24	220	--	6	-	--	126	11.3	
25	--	--	--	-	--	125	--	
26	18	--	133	X	--	120	--	
27	125	--	6	O	40-125	140	25.67	
28	160	--	5	-	--	138	23.57	
29	150	--	6	-	--	175	62.74	
30	80	--	6	O	20-80	111	25.73	
31	--	--	6	-	--	90	8.54	R
32	50	--	6	-	--	90	--	
33	70	--		-	--	68	--	
34	265	--	6	-	--	200	--	
35	--	27	108	X	--	160	13.29	
36	--	--	-	-	--	160	--	
37	225	--	6	O	40-225	149	14.37	
38	325	--	6	O	40-325	152	18.27	
39	107	--	6	O	85-107	144	--	
40	--	--	--	-	--	231	--	
41	70	--	6	O	44-70	205	43.5	E
42	285	--	6	-	--	165	8.02	
43	305	--	6	O	30-305	166	12.16	
44	100	--	6	O	15-100	186	22.46	
45	105	--	6	O	65-105	180	8.98	

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Tutu Basin Well Inventory
August 1990

page

Number on fig. ___.	Original Depth (feet)	Measured Depth (feet)	Casing Diameter (inches)	Well Finish and Interval (feet below land surface)		Land Surface Elevation (feet)	Water level below land surface (feet)	
46	150	--	6	O	37-150	235	61.95	
47	175	--	6	O	41-175	231	57.67	
48	142	--	6	O	73-142	239	19.41	R
49	140	--	6	O	69-140	278	41.29	
50	--	136		-	--	45	13.05	
51	--	--	-	-	--	--	--	
52	--	--	-	-	--	--	--	
53	--	--	-	-	--	--	--	
54	--	--	-	-	--	35	--	
55	60	--	6	O	38-60	60	19.25	R
56	--	--	6	-	--	40	33.42	R
57	15	--	120	X	--	25	--	
59	--	23	6	-	--	15	3.88	
60	--	20	6.5	-	--	9	3.5	R
61	--	--	6	-	--	15	4.04	
62	--	10	43	X	--	15	5.60	R
63	--	4	36	X	--	10	1.48	R
64	--	8	--	-	--	10	2.25	
65	--	8	36	X	--	10	2.45	R
66	--	7	36	X	--	10	2.63	

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Tutu Basin Well Inventory
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Number on fig. ___.	Date Water Level Measured	Remarks
1	/ /	
2	/ /	
3	04/11/90	
4	02/06/90	
5	02/06/90	
6	02/06/90	
7	/ /	Well was dug sometime between 1710-1760.
8	05/04/90	
9	05/04/90	
10	05/04/90	
11	02/06/90	
12	02/06/90	
13	06/11/90	
14	02/23/90	
15	06/11/90	
16	02/20/90	Well drilled in the 1960's.
17	02/20/90	Well dug around 1938.
18	02/21/90	60-72 inch well dug before 1943.
19	02/21/90	
20	05/08/90	
21	/ /	
22	/ /	
23	05/08/90	
24	02/07/90	
25	/ /	
26	/ /	Well covered over but maybe able to gain access.
27	01/13/90	
28	02/13/90	
29	02/13/90	Well caved into 105 feet.
30	03/01/90	
31	02/20/90	Well drilled in the 1960's.
32	/ /	Well drilled in the fall of 1966.
33	/ /	
34	/ /	Well is covered over.
35	03/01/90	Well dug before 1942.
36	/ /	
37	02/09/90	Owner reported depth to be 385 feet.
38	02/09/90	
39	/ /	Well deepened to 225 ft. in 1979(?).
40	/ /	
41	05/08/90	
42	02/07/90	
43	02/07/90	
44	02/23/90	

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Tutu Basin Well Inventory
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Number on fig. ___.	Date Water Level Measured	Remarks
45	02/23/90	
46	02/12/90	
47	02/12/90	
48	02/13/90	
49	02/13/90	
50	03/07/90	
51	/ /	
52	/ /	
53	/ /	
54	/ /	
55	02/27/90	
56	03/07/90	
57	/ /	Well was dug before 1944.
59	03/08/90	
60	03/08/90	
61	/ /	
62	03/08/90	
63	06/29/90	
64	06/29/90	
65	06/29/90	
66	06/29/90	

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TUTU BASIN WELL INVENTORY
August 1990

Number on PS map	Well Name or Owner	Use of water	Site Identification Number	Date Constructed	Original Depth (feet)	Measured Depth (feet)	Casing Diameter (inches)	Well Finish and Interval (feet below land surface)		Land Surface Elevation (feet)
	NAT. PARK SERVICE	NU	182059064541200	10/09/63	250	70	6	-	--	680
	VILLA BLANCA	C	182021064543400	08/29/85	375	--	8	P	20-50	400
	BARBEL	NU	182009064543300	/ /	445	--	6	O	22-445	350
9	LOCKHART 3	NU	182016064535900	12/01/77	145	--	6	O	60-145	188
8	LOCKHART 5	NU	182015064540000	11/29/77	285	--	6	O	45-285	190
7	LOCKHART 4	NU	182016064540000	12/02/77	145	--	6	O	45-145	189
	MEN HERNHUT MISSION	NU	182002064540700	/ /	22	--	72	X	--	280
2	BRYAN 2	PS	182026064535800	08/29/78	140	--	6	-	--	220
3	BRYAN 3	NU	182025064535800	08/28/78	140	--	6	-	--	216
1	BRYAN 1	PS	182024064535800	03/08/78	140	--	6	-	--	215
4	LOCKHART 1	NU	182018064535900	12/05/77	185	--	6	O	50-185	192
5	LOCKHART 2	NU	182017064535900	11/24/77	145	--	6	O	38-145	192
	KIRKERTERP	NU	182012064535400	/ /78	85	72	8	-	--	170
	BAUGH	NU	182017064534900	04/ /67	120	--	6	O	18-120	200
	PEDERSEN	NU	182009064534500	/ /	--	9	--	X	--	150
	SHARP	U	182010064534200	/ /	212	--	8	O	20-212	150
	E. EGLIN	D	182011064534000	/ /	--	13	72	X	--	150
	HARTMANN	NU	182023064533800	/ /	--	15	--	X	--	150
	HARTMANN	D	182019064533500	03/21/78	325	--	6	-	--	150
6	VITELCO	NU	182018064533200	/ /	--	131	6	-	--	137
24	GASSETT MOTORS 1	-	182017064533000	/ /	--	--	--	-	--	135
29	RODRIGUEZ AUTO 2	-	182016064532900	/ /	120	--	6	-	--	126
5	GASSETT MOTORS 2	NU	182018064533100	/ /	--	128	8	-	--	135
30	RODRIGUEZ AUTO 3	C	182015064533000	/ /	80	--	6	-	--	126
31	RODRIGUEZ AUTO 4	NU	182014064532900	04/20/78	220	--	6	-	--	125
	FORT MYLNER	NU	182010064532900	10/ /38	18	--	133	X	--	120
2	CRUSHER WELL	NU	182021064532500	/ /78	--	--	6	-	--	140
21	HARVEY	NU	182017064532200	/ /78	160	--	5	-	--	138
20	STEEL	A	182016064532000	/ /65	150	--	6	-	--	175
1	HODGE	D	182012064531400	06/ /67	80	--	6	O	20-80	111
33	L. SMITH	D	182009064531300	/ /	--	--	6	-	--	90
34	MATTHIAS	D	182008064531400	/ /66	50	--	6	-	--	90
	DELAGARDE	D-A	182001064530000	02/ /65	70	--	6	-	--	70
	CHURCH OF GOD	NU	182025064532300	/ /81	265	--	6	-	--	200
	VI GOVT	NU	182021064532000	/ /	--	27	168	X	--	145
	G. EGLIN	NU	182021064531900	/ /	--	--	-	-	--	160
	G. EGLIN 2	C	182020064532100	/ /	--	--	8	-	--	149
19	G. EGLIN 3	C	182019064531900	/ /	325	--	8	O	40-325	152
17	G. EGLIN 1	C	182020064532000	/ /65	--	--	6	-	--	144
	DEMITRY	-	182042064533400	/ /	300	--	6	-	--	231
	LEONARD	D	182038064533300	06/14/77	70	--	6	O	44-70	205
16	FOUR WINDS 2	NU	182027064531900	/ /81	285	--	6	-	--	165
	FOUR WINDS 1	NU	182027064531800	/ /81	305	--	6	O	30-305	166
	TILLET	NU	182029064531500	10/ /63	100	--	6	O	15-100	186
	RAMSEY	C	182036064531600	08/05/78	105	--	6	O	65-105	180

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TUTU BASIN WELL INVENTORY
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Well number on map	Number on PS map	Well Name or Owner	Use of Water	Site Identification Number	Date Constructed	Original Depth (feet)	Measured Depth (feet)	Casing Diameter (inches)	Well Finish and Interval (feet below land surface)		Land Surface Elevation (feet)
46	11	VIHA 2	MU	182038064531200	12/21/77	150	—	6	0	37-150	235
47	10	VIHA 1	PS	182037064531100	01/09/78	175	—	6	0	41-175	231
48	12	VIHA 3	PS	182048064531400	04/19/78	142	—	6	0	73-142	239
49	13	VIHA 4	MU	182049064530900	01/21/78	140	—	6	0	69-140	278
50		BENCH	MU	181945064525500	/ /	—	136		-	—	95
51	36	POLY CARIB/DEVCON 1	-	181940064525200	/ /	—	—	-	-	—	—
52	37	POLY CARIB/DEVCON 2	-	181938064525100	/ /	—	—	-	-	—	—
53	38	POLY CARIB/DEVCON 3	-	181938064525000	/ /	—	—	-	-	—	—
54	39	POLY CARIB/DEVCON 4	-	181937064524900	/ /	—	—	-	-	—	35
55	40	WAPA	PS	181935064524400	01/22/64	60	--	6	0	38-60	60
56		LANTERN LAUNDRY	C	181935064524000	/ /	—	—	6	-	—	
57		VI GOVT.	MU	181920064523900	/ /	15	—	120	4	—	25
58 59		SLAUGHTER HOUSE	MU	181920064524200	/ /	—	23	6	-	—	15
60	41	HUMANE SOCIETY	A	181921064524100	/ /	—	20	6.5	-	—	9
61		SLAUGHTER HOUSE	MU	181918064524400	03/08/90	—	—	6	-	—	15
		RACETRACK	A	181917064524500	/ /62	—	10	43	4	—	15
63		GRIFFIN	D	181916064524300	/ /74	—	4	36	4	—	10
64		FLEMING	D	181916064524200	/ /	—	8	—	-	—	10
65		LAKE	D	181916064524100	/ /	—	6	36	4	—	10
66		WILLIAMS	-	181917064524200	/ /	—	7	36	4	—	10
67		VI GOVT.	-	182039064534400	/ /	34	—	24	4	—	175
68		LUCKHART	MU	182017064542300	/ /	33	—	—	4	—	270
69		VERSAILLES ASSOC.	MU	182009064532800	/ /65	40	—	6	—	—	120
70	23	BAKERY	MU	182018064532800	03/21/78	325	60	6	-	—	130
71			MU	181936064524700	07/ /66	40	—	6	-	—	—

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TUTU BASIN WELL INVENTORY
August 1990

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Number on map	Water level below land surface (feet)	Date Water Level Measured	Remarks
45	8.98	02/23/90	
46	61.41	02/12/90	
47	57.67	02/12/90	
48	19.41	R 02/13/90	
49	41.29	02/13/90	
50	13.05	03/07/90	
51	--	/ /	
52	--	/ /	
53	--	/ /	
54	--	/ /	
55	19.25	R 02/27/90	
56	33.42	R 03/07/90	
57	--	/ /	Well was dug before 1944.
no #58 59	3.88	03/06/90	
60	3.59	R 03/08/90	
61	4.04	/ /	
62	5.60	R 03/08/90	
63	1.48	R 06/29/90	
64	2.25	06/29/90	
65	2.45	R 06/29/90	
66	2.63	06/29/90	
67	--	/ /	Well dug before 1942.
68	--	/ /	Well was dug before 1900 and is oval with diameter at widest point 20 ft..
69	--	/ /	
70	20.92	08/15/90	
71	--	/ /	

IUT 001 1623

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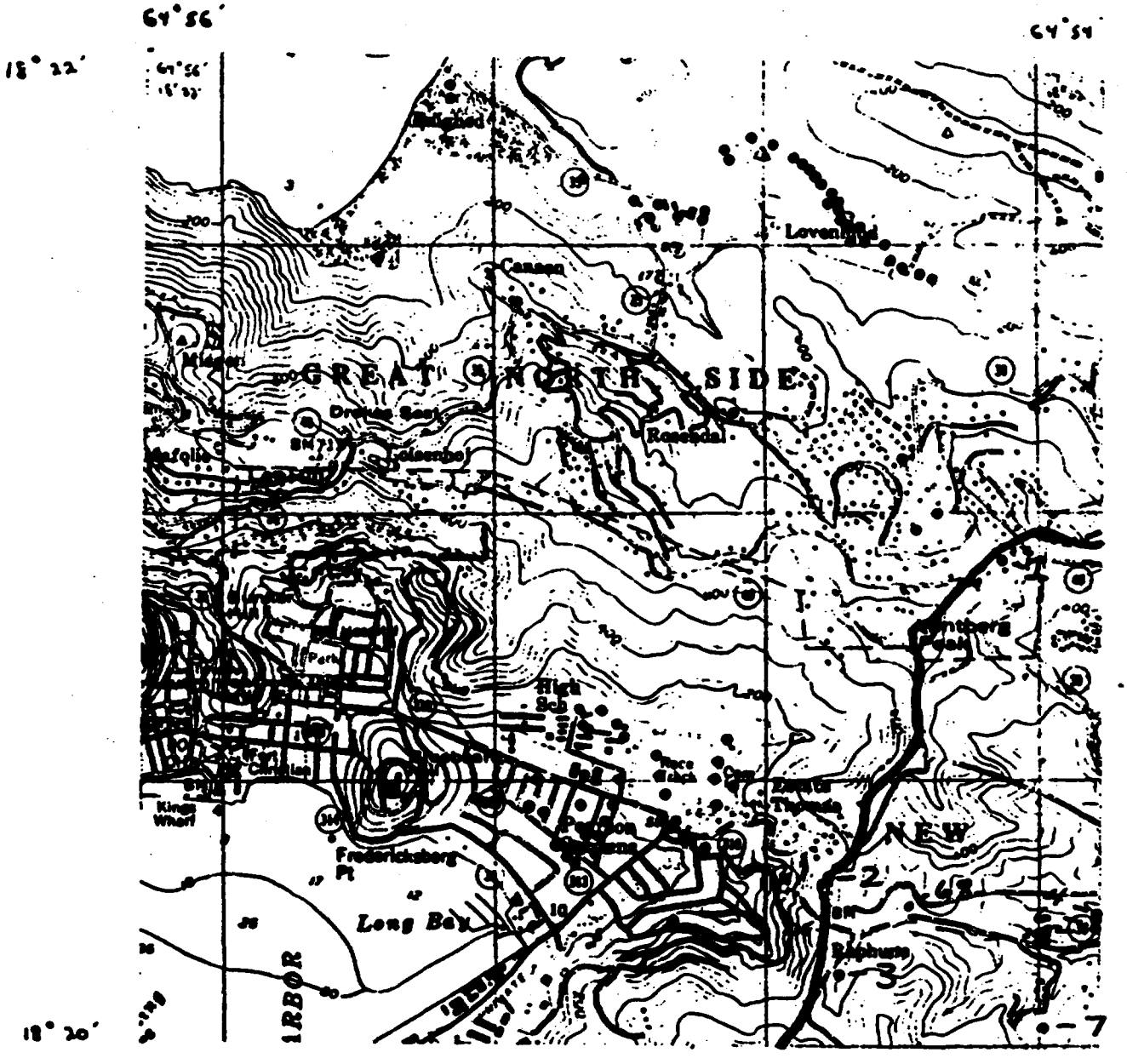

TUT 001 1624

Figure 9. Location of wells located north and east of latitude (lat.) longitude (long.) , south and east of lat. long. north and west of lat. long. , and south and west of lat. , long. , St. Thomas, U.S. Virgin Islands.

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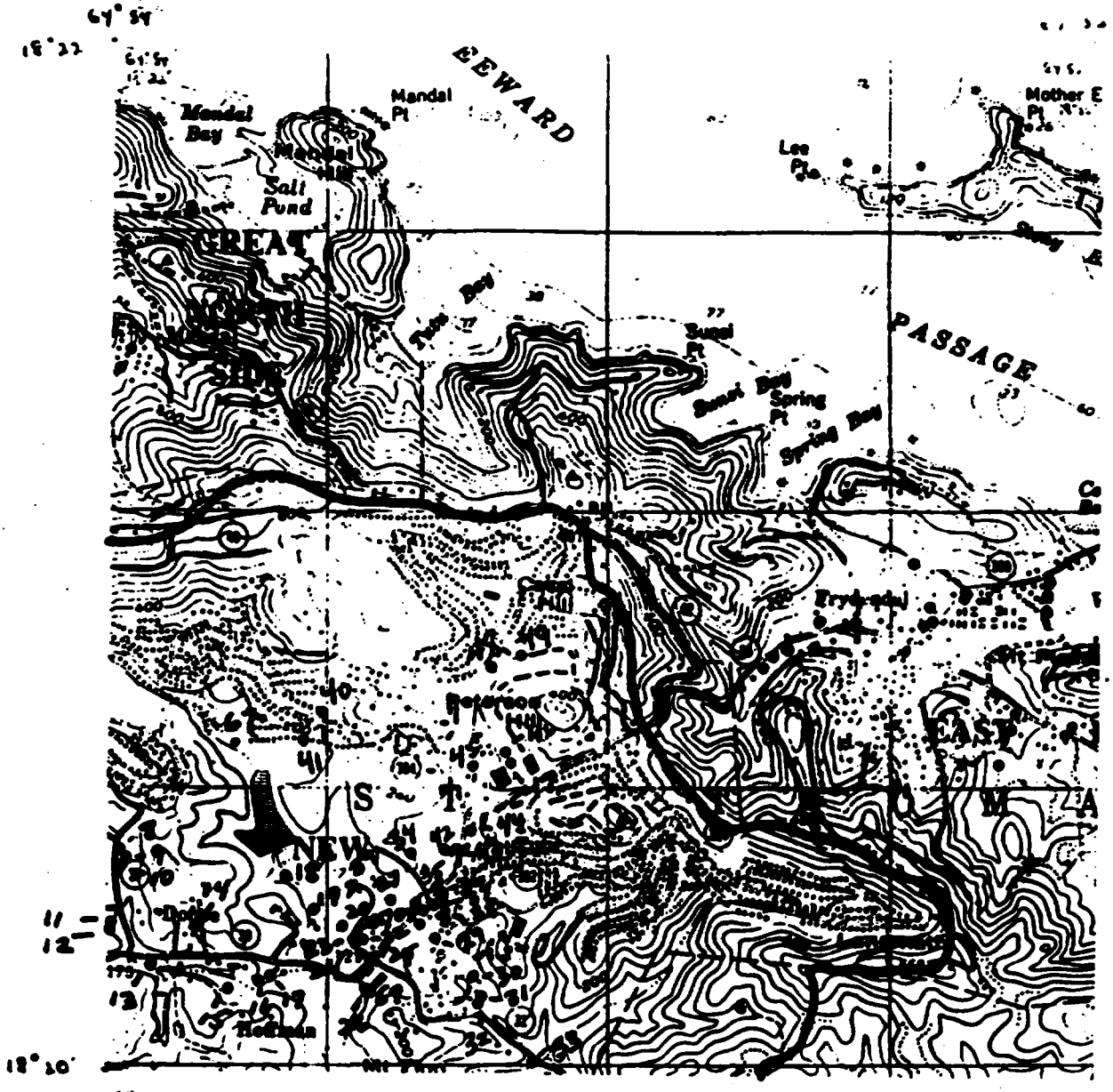
page 13



TUT 001 1625

Figure 6. Location of wells located north and east of latitude (lat.) longitude (long.) , south and east of lat. long. north and west of lat. long. , and south and west of lat. , long. , St. Thomas, U.S. Virgin Islands.

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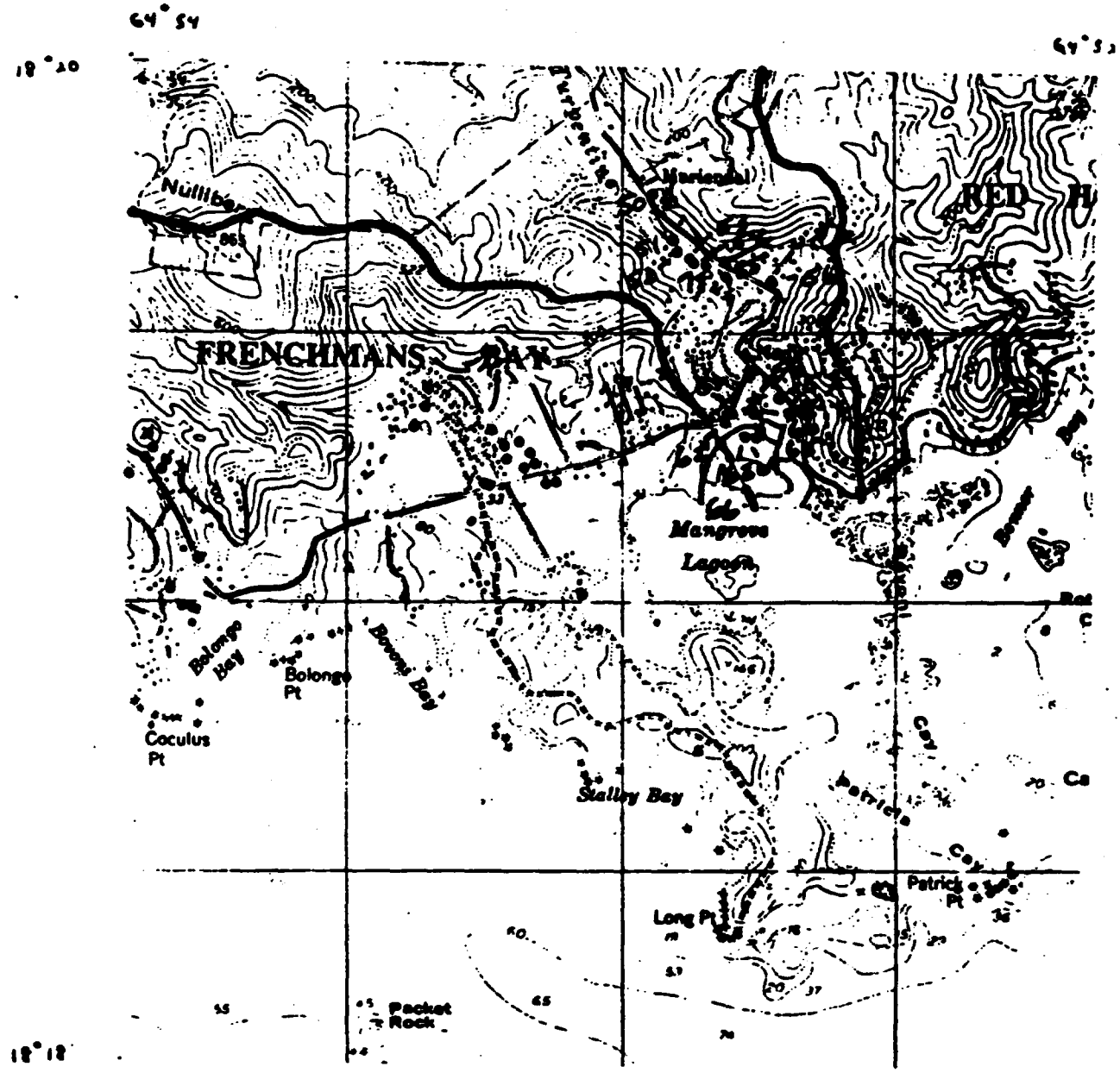

TUT 001 1626

Figure 15. Location of wells located north and east of latitude (lat.) longitude (long.) , south and east of lat. long. north and west of lat. long. , and south and west of lat. , long. , St. Thomas, U.S. Virgin Islands.

REFERENCE NO. 38

UNITED STATES GOVERNMENT

memorandum

DATE: March 27, 1991

REPLY TO ATTN OF: Judy I. Steiger, USGS, St. Thomas, VI

SUBJECT: Tutu well inventory

TO: Richard Feinberg, NUS Corp., Edison, New Jersey

Enclosed is a draft copy of the well inventory for the Tutu area of St. Thomas as you requested. There are three maps with the Tutu basin outlined in red. Tables of information on well construction, water levels, and use of water are attached to the appropriate maps. I hope this information will be useful to you. If you have any problems or need more information give me a call.

Judy I. Steiger

Judy I. Steiger

(809) 774-4307

U.S. GEOLOGICAL SURVEY
WATER RESOURCES DIVISION

JUDY I. STEIGER
HYDROLOGIST

RICHARD KESSLER
PHYSICAL SCIENTIST

TUT 001 1628

s Regularly on the Payroll Savings Plan

GRID 9

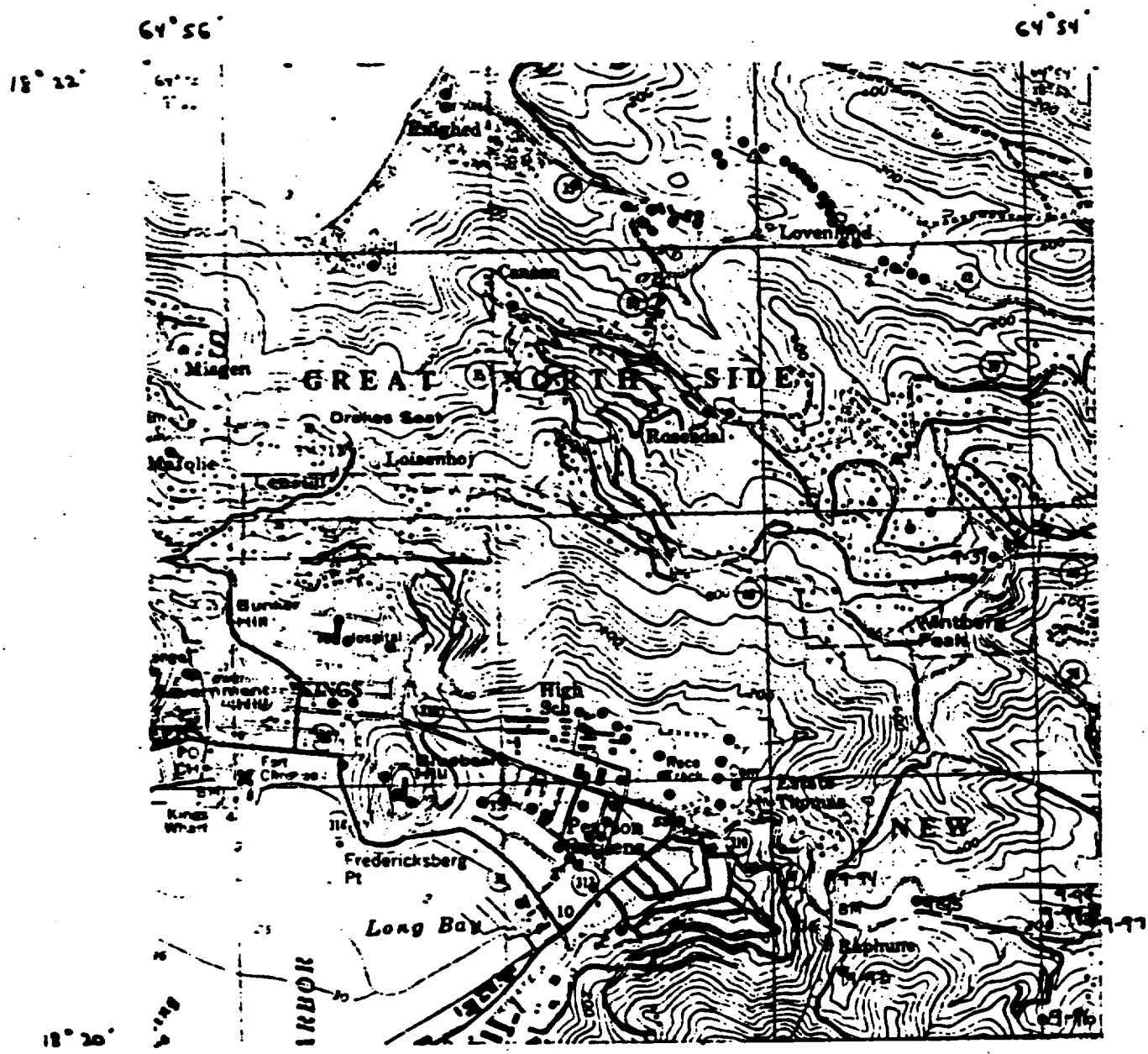

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Figure 11.

Table 6.--Description of wells located on figure 11 (Continued)

[C, commercial well; D, domestic well; ~~My municipal well~~; MU, well not in use; -- indicates data not available]

Well number on figure 11	Well name	Estate (see figure 2)	Use of water	Site identification number	Year constructed	Reported depth of well (feet)	Measured depth of well (feet)
9-87	LOCKHART NORTH WELL	THOMAS	MU	182037064544600	1977	--	165
9-88	DAILY NEWS	THOMAS	C	182035064544800	1988	180	--
9-89	VIRGIN ISLANDS MEDICAL ASSOCIATION	THOMAS	C	182033064544800	1986	110	--
9-90	LOCKHART SOUTH WELL	THOMAS	MU	182032064544600	1977	--	127
9-91	LOCKHART/ MELCHOIR	THOMAS	D	182030064544800	1977	325	--
9-92	T. FRETT	THOMAS	PS	182014064544100	--	305	--
9-93	L. BARBEL	RAPHUNE	MU	182009064543300	1978	445	--
9-94	VILLA BLANCA HOTEL	THOMAS	C	182021064543400	1985	375	--
9-95	LOCKHART DUG WELL	RAPHUNE	MU	182017064542300	--	33	--
9-96	NEW HERRNHUT MISSION	NEW HERRNHUT	MU	182002064540700	--	22	--
9-97	LOCKHART 5	DONOE	MU	182015064540000	1977	285	--
9-98	LOCKHART 4	DONOE	MU	182016064540000	1977	145	--
9-99	LOCKHART 3	DONOE	MU	182016064535900	1977	145	--

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Table 6.--Description of wells located on figure 11 (Continued)

[--, indicates data not available]

Well number on figure 11	Casing diameter (inches)	Type of well finish and finish interval (feet)	Land surface altitude of well (feet)	Depth to water below land surface datum (feet)	Date water level measured (month-day-year)	Yield (gallons per minute)
9-93	6	open hole 22-445	350	92	04-11-90	reported yield 5
9-94	6	slotted 20-50	400	--	--	--
9-95	--	--	270	--	--	--
9-96	72	--	280	--	--	--
9-97	6	open hole 45-285	190	3	02-06-90	reported yield 10-15
9-98	6	open hole 45-145	189	5	02-06-90	reported yield 35
9-99	6	open hole 60-145	188	4	02-06-90	reported yield 60

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Table 6.--Description of wells located on figure 11 (Continued)
[--, indicates data not available]

Well number on figure 11	Lithologic description and depth interval (feet)	Remarks
9-80	--	--Well owned by Wallace Turnbull and used in supply of apartments
9-81	--	--Well owned by Wallace Turnbull. and used in supply & approx. 15 apartm
9-82	Unconsolidated material 0-60 Bedrock 60	--
9-83	--	Well may be blocked at 38 feet. 4-inch casing inside of 6-inch casing.
9-84	--	--
9-85	--	--
9-86	--	--
9-87	--	--
9-88	Uconsolidated material 0-56 Bedrock 56	--
9-89	Unconsolidated material 0-45 Bedrock 45	--
9-90	--	--
9-91	--	--
9-92	--	Well drilled about 1986. Well [illegible] fresh and used in supply of 5 apartments
9-93	Unconsolidated material 0-16 Bedrock 16	--
9-94	Unconsolidated material 0-2 Bedrock 2	Estimated daily pumpage is 1,500 gallons.
9-95	--	Well was dug before 1900 and is oval with 20 feet diameter at widest point.
9-96	--	Well was dug during the 1700's.
9-97	Unconsolidated material 0-45 Bedrock 45	--

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TUT 001 1632

GRID 10

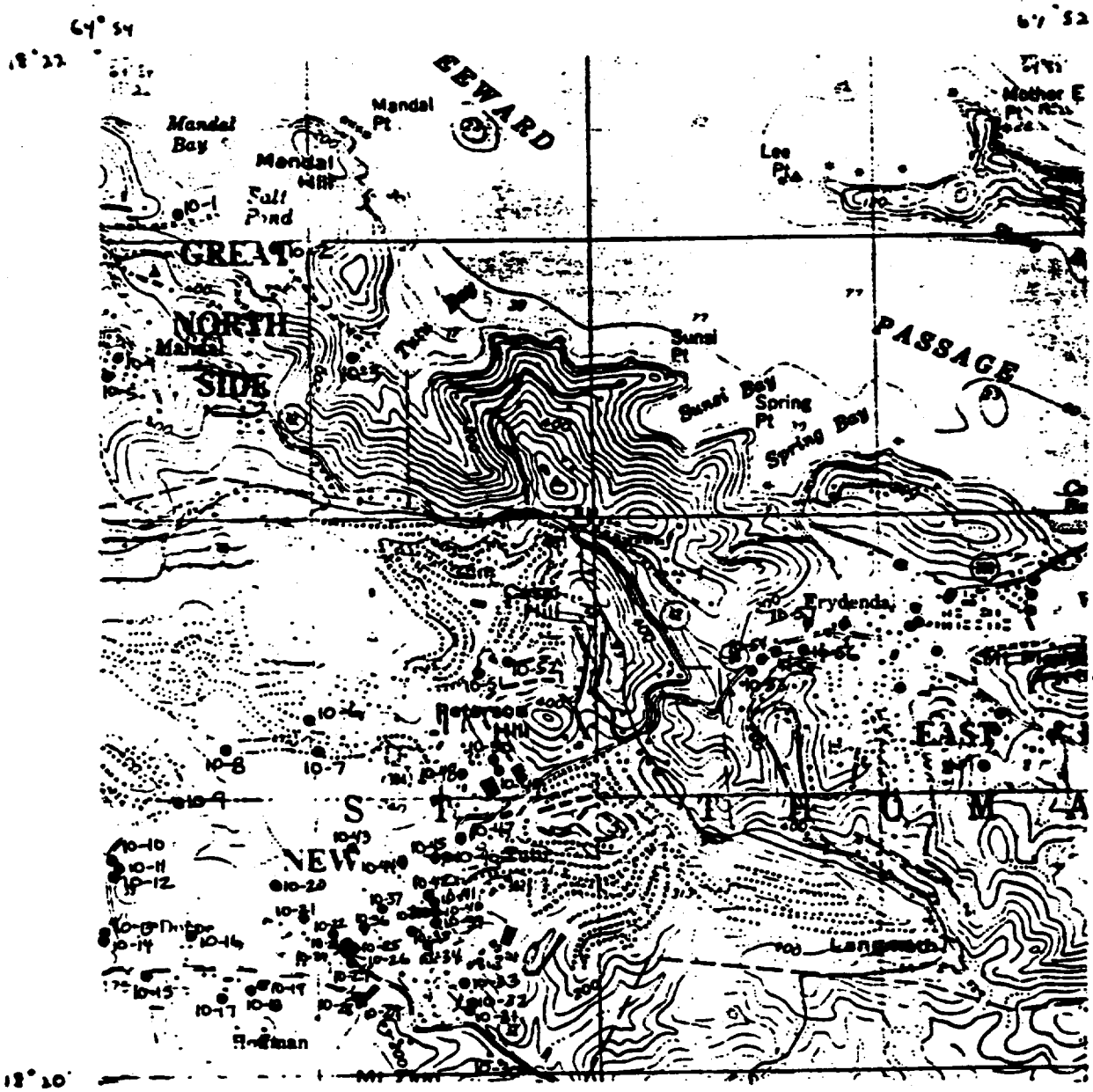

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Figure 12

Table 7.--Description of wells located on figure 12

D, domestic well; IS, institutional well; ~~M, municipal well~~; MU, well not in use; -- indicates data not available]

Well number on figure 12	Well name	Estate (see figure 2)	Use of water	Site identification number	Year constructed	Reported depth of well (feet)	Measured depth of well (feet)
10- 1	MANDAHL BEACH	MANDAHL	MU	182141064535000	--	--	58
10- 2	VIRGIN ISLANDS GOVERNMENT MANDAHL BEACH	MANDAHL	MU	182137064533800	--	--	10
10- 3	V. WALLACE	MANDAHL	D	182124064532900	1986	45	--
10- 4	PEACE CORPS SCHOOL	MANDAHL	IS	182125064535700	1967	90	--
10- 5	MANDAHL HOMESTEAD WELL	MANDAHL	MU	182122064535900	--	--	20
10- 6	DEMITRY	ANNA'S RETREAT	--	182042064533400	--	300	--
10- 7	ALPHA LEONARD	ANNA'S RETREAT	D	182038064533300	1977	70	--
10- 8	VIRGIN ISLANDS GOVERNMENT NEAR TREATMENT PLANT	ANNA'S RETREAT	MU	182039064534400	1925	34	--
10- 9	VIRGIN ISLANDS GOVERNMENT DONOE 3	DONOE	MU	182029064535200	--	400	--
10-10	M. BRYAN 2	DONOE	C PS	182026064535800	1978	140	--
10-11	M. BRYAN 3	DONOE	MU	182025064535800	1978	140	--
10-12	M. BRYAN 1	DONOE	C PS	182024064535800	1978	140	--
10-13	LOCKHART 1	DONOE	MU	182018064535900	1977	185	--
10-14	LOCKHART 2	DONOE	MU	182017064535900	1977	145	--
10-15	I. KIRKERTERP	HOFFMAN	MU	182012064535400	1978	85	72
10-16	J. BAUGH	CHARLOTTE AMALIE	MU	182017064534900	1967	120	--
10-17	PEDERSEN	HOFFMAN	MU	182009064534500	--	--	9
10-18	A. SHARP	CHARLOTTE AMALIE	D	182010064534200	--	200	--

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Table 7.--Description of wells located on figure 12

[C, commercial well; D, domestic well; MU, well not in use; --, indicates data not available]

Well number on figure 12	Well name	Estate (see figure 2)	Use of water	Site identification number	Year constructed	Reported depth of well (feet)	Measured depth of well (feet)
10-19	E. EGLIN	CHARLOTTE AMALIE	D	182011064534000	--	--	13
10-20	HARTHMAN DUG WELL	CHARLOTTE AMALIE	MU	182023064533800	--	--	15
10-21	HARTHMAN DOMESTIC WELL	CHARLOTTE AMALIE	D	182019064533500	1978	325	--
10-22	VITELCO	CHARLOTTE AMALIE	MU	182018064533200	--	--	131
10-23	GASSETT MOTORS 1	CHARLOTTE AMALIE	--	182017064533000	--	--	--
10-24	GASSETT MOTORS 2	CHARLOTTE AMALIE	MU	182018064533100	--	--	128
10-25	RODRIGUEZ AUTO 2	CHARLOTTE AMALIE	--	182016064532900	--	120	--
10-26	RODRIGUEZ AUTO 3	CHARLOTTE AMALIE	C	182015064533000	--	80	--
10-27	RODRIGUEZ AUTO 4	CHARLOTTE AMALIE	MU	182014064532900	1978	220	--
10-28	FORT MYLNER	CHARLOTTE AMALIE	MU	182010064532900	1938	18	--
10-29	VERSAILLES ASSOC.	CHARLOTTE AMALIE	MU	182009064532800	1965	40	--
10-30	DELAGARDE	CHARLOTTE AMALIE	D	182001064530800	1965	70	--
10-31	MATTHIAS	CHARLOTTE AMALIE	D	182008064531400	1966	50	--
10-32	L. SMITH	CHARLOTTE AMALIE	D	182009064531300	--	--	--
10-33	C. HODGE	ANNA'S RETREAT	D	182012064531400	1967	80	--
10-34	E. STEEL	ANNA'S RETREAT	D	182016064532000	1965	150	--
10-35	O. HARVEY	ANNA'S RETREAT	MU	182017064532200	1978	160	--
10-36	HARTHMAN NEAR GASSETT MOTORS	CHARLOTTE AMALIE	MU	182018064532800	1978	325	80
10-37	CRUSHER WELL	CHARLOTTE AMALIE	MU	182021064532500	1978	--	--
10-38	G. EGLIN 1	ANNA'S RETREAT	C	182020064532000	1965	--	--
10-39	G. EGLIN 3	ANNA'S RETREAT	C	182019064531900	--	325	--
10-40	G. EGLIN 2	ANNA'S RETREAT	C	182020064531900	--	--	--
10-41	TOM CAT LAUNDRY	ANNA'S RETREAT	MU	182021064531900	--	--	--

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Table 7.--Description of wells located on figure 12

[C, commercial well; D, domestic well; ~~M, municipal well~~; MU, well not in use; --, indicates data not available]

Well number on figure 12	Well name	Estate (see figure 2)	Use of water	Site identification number	Year constructed	Reported depth of well (feet)	Measured depth of well (feet)
10-42	VIRGIN ISLANDS GOVERNMENT NEAR CHURCH OF GOD	ANNA'S RETREAT	MU	182021064532000	--	--	27
10-43	HARTHMAN ESTATE WELL	CHARLOTTE AMALIE	--	182027064532900	1965	210	--
10-44	CHURCH OF GOD HOLINESS	ANNA'S RETREAT	MU	182025064532300	1981	265	--
10-45	FOUR WINDS PLAZA 2	ANNA'S RETREAT	MU	182027064531900	1981	285	--
10-46	FOUR WINDS PLAZA 1	ANNA'S RETREAT	MU	182027064531800	1981	305	--
10-47	E. TILLET	ANNA'S RETREAT	MU	182029064531500	1963	100	--
10-48	RAMSEY MOTORS	ANNA'S RETREAT	C	182036064531600	1978	105	--
10-49	VIRGIN ISLANDS HOUSING AUTHORITY 1	ANNA'S RETREAT	PS	182037064531100	1978	175	--
10-50	VIRGING ISLANDS HOUSING AUTHORITY 2	ANNA'S RETREAT	MU	182038064531200	1977	150	--
10-51	VIRGIN ISLANDS HOUSING AUTHORITY 3	ANNA'S RETREAT	PS	182048064531400	1978	142	--
10-52	VIRGING ISLANDS HOUSING AUTHORITY 4	ANNA'S RETREAT	MU	182049064530900	1978	140	--
10-53	C. F. ROSENBERG	FRYDENDAHL	C,D	182048064524000	1963	120	--
10-54	SUPER POOL RESTURANT	FRYDENDAHL	C	182049064524000	1988	110	--
10-55	SMITH BAY CENTER	FRYDENDAHL	C	182050064523800	1987	150	--
10-56	A. LEVIA	FRYDENDAHL	D	182051064523500	1966	110	--
10-57	U. PILGRIM	FRYDENDAHL	D	182054064523400	1967	80	--
10-58	FAT MAN'S / C. HUSBAND	FRYDENDAHL	D,C	182053064522900	1985	80	--
10-59	R. MERCER	FRYDENDAHL	MU	182100064522300	--	--	54

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TUT 001 1636

Table 7.--Description of wells located on figure 12 (Continued)

[--, indicates data not available]

Well number on figure 12	Casing diameter (inches)	Type of well finish and finish interval (feet)	Land surface altitude of well (feet)	Depth to water below land surface datum (feet)	Date water level measured (month-day-year)	Yield (gallons per minute)
10- 1	6	--	80	37	05-07-90	--
10- 2	102	--	20	8	05-04-90	--
10- 3	6	slotted --	30	--	--	reported yield 20
10- 4	6	open hole 20-90	210	--	--	--
10- 5	--	--	240	9	05-04-90	--
10- 6	6	--	231	--	--	--
10- 7	6	open hole 44-70	205	--	--	--
10- 8	84	--	175	--	--	--
10- 9	6	open hole 20-400	235	62	10-24-90	--
10-10	6	--	220	15	05-04-90	--
10-11	6	--	218	14	05-04-90	--
10-12	6	--	215	--	--	--
10-13	6	open hole 50-185	192	7	02-06-90	reported yield 15
10-14	6	open hole 38-145	192	5	02-06-90	reported yield 40
10-15	6	--	170	19	06-11-90	--
10-16	6	open hole 18-120	200	33	02-23-90	reported yield 3
10-17	--	--	150	2	06-11-90	--

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Table 7.--Description of wells located on figure 12 (Continued)

[--, indicates data not available]

Well number on figure 12	Casing diameter (inches)	Type of well finish and finish interval (feet)	Land surface altitude of well (feet)	Depth to water below land surface datum (feet)	Date water level measured (month-day-year)	Yield (gallons per minute)
10-18	6	open hole 20-200	150	6	02-20-90	reported yield 15
10-19	72	--	150	7	02-20-90	reported yield 4
10-20	--	--	150	1	02-21-90	--
10-21	6	--	150	18 pumping WL	02-21-90	--
10-22	6	--	137	17	05-08-90	--
10-23	--	--	135	--	--	--
10-24	6	--	135	22	05-08-90	--
10-25	6	--	126	--	--	--
10-26	6	--	126	11	02-07-90	reported yield 15
10-27	6	--	125	--	--	reported yield 15
10-28	133	--	120	--	--	--
10-29	6	--	120	--	--	--
10-30	6	--	70	--	--	--
10-31	6	--	90	--	--	reported yield 30
10-32	6	--	90	--	--	--
10-33	6	open hole 20-80	111	26	03-01-90	--
10-34	6	--	175	63	02-13-90	reported yield 8
10-35	5	--	138	24	02-13-90	--
10-36	6	open hole 36-325	130	21	08-16-90	reported yield 25

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TUT 001 1638

Table 7.--Description of wells located on figure 12 (Continued)

[--, indicates data not available]

Well number on figure 12	Casing diameter (inches)	Type of well finish and finish interval (feet)	Land surface altitude of well (feet)	Depth to water below land surface datum (feet)	Date water level measured (month-day-year)	Yield (gallons per minute)
10-37	6	--	140	26	01-13-90	--
10-38	6	--	144	--	--	reported yield 60
10-39	6	open hole 40-325	152	18	02-09-90	reported yield 60
10-40	6	--	149	14	02-09-90	reported yield 60
10-41	--	--	160	--	--	--
10-42	108	--	145	13	03-01-90	--
10-43	6	slotted 100-200	196	35	12-24-90	reported yield 30
10-44	6	--	200	--	--	reported yield 35
10-45	6	--	165	8	02-07-90	--
10-46	6	open hole 30-305	166	12	02-07-90	reported yield 12
10-47	6	open hole 15-100	186	22	02-23-90	reported yield 60
10-48	6	open hole 65-105	180	9	02-23-90	reported yield 60
10-49	6	open hole 41-175	231	58	02-12-90	reported yield 48
10-50	6	open hole 37-150	235	61	02-12-90	reported yield 47
10-51	6	open hole 73-142	239	--	--	reported yield 44
10-52	6	open hole 69-140	278	41	02-13-90	reported yield 46

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TUT 001 1639

Table 7.--Description of wells located on figure 12 (Continued)

[--, indicates data not available]

Well number on figure 12	Lithologic description and depth interval (feet)	Remarks
10- 1	--	--
10- 2	--	--
10- 3	~~35~~ unconsolidated material 0-45	--
10- 4	--	--
10- 5	--	Inside diameter is approximately 120 inches.
10- 6	--	--
10- 7	--	--
10- 8	--	--
10- 9	--	U.S. Geological Survey observation well.
10-10	Unconsolidated material 0-30 Bedrock 30	Estimated daily pumpage is 25,000 gallons.
10-11	Unconsolidated material 0-20 Bedrock 20	--
10-12	Unconsolidated material 0-28 Bedrock 28	Well reported dry.
10-13	Unconsolidated material 0-40 Bedrock 40	--
10-14	Unconsolidated material 0-30 Bedrock 30	--
10-15	--	Estimated daily pumpage is 38,000 gallons.
10-16	--	Yield was reported bailed.
10-17	--	Inside diameter 85-95 inches.
10-18	Unconsolidated material 0-10 Bedrock 10	Well drilled in the 1960's. Reported yield is bailed.

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Table 7.--Description of wells located on figure 12 (Continued)
[--, indicates data not available]

Number on figure 12	Lithologic description and depth interval (feet)	Remarks
10-39	--	--
10-40	--	Owner reported depth to be 385 feet. Previous inventory reported depth of 225 feet with casing to 40 feet.
10-41	--	--
10-42	--	Well dug before 1942.
10-43	--	Water is being used at temporary archaeologic site.
10-44	--	Well is covered over.
10-45	Unconsolidated material 0-30 Bedrock 30	Reported yield of 5-10 gallons per minute.
10-46	Unconsolidated material 0-~~46~~ 24 Bedrock ~~46~~ 24	--
10-47	--	--
10-48	Unconsolidated material 0-10 Bedrock 10	--
10-49	Unconsolidated material 0-32 Bedrock 32	-- well is owned by the V.T Housing Authority
10-50	Unconsolidated material 0-32 Bedrock 32	--
10-51	--	-- well is owned by the V.T Housing Authority
10-52	--	--
10-53	Unconsolidated material 0-12 Bedrock 12	--
10-54	Unconsolidated material 0-18 Bedrock 18	--
10-55	--	--

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Table 7.--Description of wells located on figure 12 (Continued)
[--, indicates data not available]

Well number on figure 12	Lithologic description and depth interval (feet)	Remarks
10-19	--	Well dug around 1938.
10-20	--	60-72 inch diameter well dug before 1943.
10-21	--	--
10-22	--	--
10-23	--	--
10-24	--	--
10-25	--	Well drilled in 1972 or 1973.
10-26	--	Well drilled in 1972 or 1973.
10-27	Unconsolidated material 0-20 Bedrock 20	--
10-28	--	Well covered over.
10-29	--	--
10-30	--	--
10-31	--	~~Well drilled in the fall of 1966.~~
10-32	--	Well drilled in the 1960's.
10-33	--	--
10-34	--	Well caved in to 105 feet.
10-35	--	--
10-36	Unconsolidated material 0-30 Bedrock 30	--
10-37	--	Owner reported depth 125 feet, previous inventory reported depth of 210 feet.
10-38	--	Well reported to be redrilled to 225 feet in 1979.

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TUT 001 1642

GRID 15

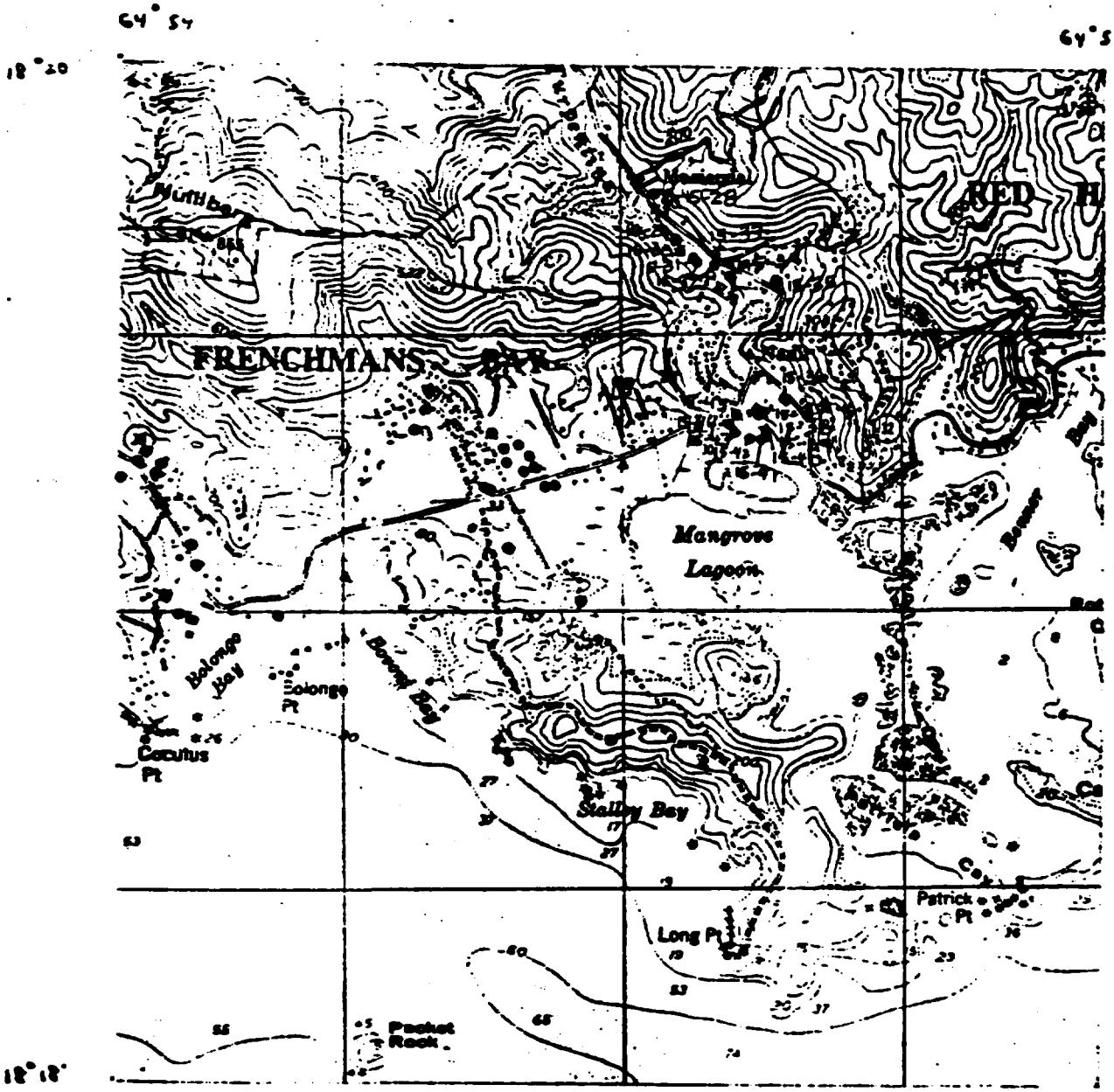

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Figure 17.

Table 10.--Description of wells located on figure 17

(A, agriculture or stock well; C, commercial well; D, domestic well; [illegible] well; I, industrial well; NU, well not in use; --, indicates data not available)

Well number on figure 17	Well name	Estate (see figure 2)	Use of water	Site identification number	Year constructed	Reported depth of well (feet)	Measured depth of well (feet)
15-22	A. LIMA 5	BOVONI	NU	181915064531000	1981	155	--
15-23	A. LIMA 6	BOVONI	NU	181913064530900	--	220	--
15-24	A. LIMA 7	BOVONI	NU	181912064531000	1988	200	--
15-25	M. LIMA	BOVONI	NU	181910064530800	--	--	11
15-26	LIMA SUPERETTE	BOVONI	C	181910064530600	1987	95	--
15-27	INDUSTRIOUS	BOVONI	D	181923064525800	1966	60	--
15-28	DENCH	MARIENDAHL	NU	181945064525500	--	140	136
15-29	POLY CARIB / DEVCON 1	MARIENDAHL	C	181940064525200	1981	160	--
15-30	POLY CARIB / DEVCON 2	MARIENDAHL	I	181938064525100	1980	250	--
15-31	POLY CARIB / DEVCON 3	MARIENDAHL	C	181938064525000	1982	250	--
15-32	POLY CARIB / DEVCON 4	MARIENDAHL	NU	181937064524900	1981	160	--
15-33	VESSEP	MARIENDAHL	--	181936064524700	1966	40	--
15-34	WATER AND POWER AUTHORITY - Dede well	MARIENDAHL	PS	181935064524400	1964	60	--
15-35	LANTERN LAUNDRY	MARIENDAHL	C	181935064524000	--	--	--
15-36	VI GOVERNMENT / DUG WELL NEAR ABATTOIR	NADIR	NU	181920064523900	--	15	--
15-37	ABATTOIR EAST WELL	NADIR	NU	181920064524200	--	--	23
15-38	HUMANE SOCIETY	NADIR	A	181921064524100	--	--	20
15-39	S. ROLLINS	NADIR	--	181917064524200	--	--	7
15-40	I. LAKE	NADIR	D	181916064524100	--	--	8

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Table 10.--Description of wells located on figure 17

[A, agriculture or stock well; D, domestic well; M, municipal well; NU, well not in use; --, indicates data not available]

Well number on figure 10	Well name	Estate (see figure 2)	Use of water	Site identification number	Year constructed	Reported depth of well (feet)	Measured depth of well (feet)
15-41	FLEMING	NADIR	--	181916064524200	--	--	8
15-42	M. GRIFFIN	NADIR	D	181916064524300	1974	--	4
15-43	J. SANCHEZ	NADIR	PS	181917064524501	--	15	--
15-44	Virgin Islands Govt. RACETRACK	NADIR	A	181917064524500	1982	--	10
15-45	Virgin Islands Govt. ABATTOIR WEST WELL	NADIR	NU	181918064524400	--	--	--

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Table 10.--Description of wells located on figure 17 (Continued)

[--, indicates data not available]

Well number on figure 17	Casing diameter (inches)	Type of well finish and finish interval (feet)	Land surface altitude of well (feet)	Depth to water below land surface datum (feet)	Date water level measured (month-day-year)	Yield (gallons per minute)
15-17	6	open hole 80-100	85	--	--	reported yield 5
15-18	6	slotted 30-60	33	28	07-13-90	reported yield 5
15-19	6	slotted 44-84	29	--	--	reported yield 30
15-20	6	slotted 25-85	26	21	07-17-90	reported yield 25
15-21	6	slotted 40-80	27	--	--	reported yield 25
15-22	6	slotted 60-100	22	19	07-17-90	reported yield 75
15-23	6	--	20	15	07-17-90	reported yield 90
15-24	6	slotted 65-85	20	18	07-17-90	reported yield 90
15-25	84	--	15	8	06-11-90	--
15-26	6	slotted 60-80	15	--	--	reported yield 40
15-27	6	open hole 30-60	40	--	--	--
15-28	6	open hole 35-140	45	13	03-07-90	--
15-29	6	slotted 60-80	35	--	--	reported yield 15
15-30	6	slotted 60-80	35	--	--	reported yield 18
15-31	6	slotted 80-100	35	--	--	reported yield 12

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TUT 001 1646

Table 10.--Description of wells located on figure 17 (Continued)

[--, indicates data not available]

Well number on figure 17	Casing diameter (inches)	Type of well finish and finish interval (feet)	Land surface altitude of well (feet)	Depth to water below land surface datum (feet)	Date water level measured (month-day-year)	Yield (gallons per minute)
15-32	6	--	35	--	--	reported yield ~~06,096R~~ 10
15-33	6	--	--	--	--	--
15-34	6	open hole 38-60	60	--	--	--
15-35	6	--	35	--	--	--
15-36	120	--	25	--	--	--
15-37	6	--	15	4	03-08-90	--
15-38	6	--	9	4	03-08-90	--
15-39	36	--	10	3	06-29-90	--
15-40	36	--	10	2	06-29-90	--
~~15-41~~	--	--	10	2	06-29-90	--
15-42	36	--	10	1	06-29-90	--
15-43	--	--	15	6	10-09-90	--
15-44	43	--	15	--	--	--
15-45	6	--	15	4	03-08-90	--

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Table 10.--Description of wells located on figure 17 (Continued)

[--, indicates data not available]

Well number on figure 17	Lithologic description and depth interval (feet)	Remarks
15-18	Unconsolidated material 0-18 Bedrock 18	--
15-19	Unconsolidated material 0-40 Bedrock 40	--
15-20	Unconsolidated material 0-35 Bedrock 35	--
15-21	Unconsolidated material 0-45 Bedrock 45	--
15-22	Unconsolidated material 0-45 Bedrock 45	--
15-23	--	Well drilled in 1986 or 1987.
15-24	Unconsolidated material 0-60 Bedrock 60	--
15-25	--	Well dug about 1900.
15-26	Unconsolidated material 0-40 Bedrock 40	--
15-27	--	--
15-28	--	--
15-29	--	--
15-30	Unconsolidated material 0-26 Bedrock 26	--
15-31	--	--
15-32	Unconsolidated material 0-42 Bedrock 42	4-inch casing inside of the 6-inch casing.
15-33	--	--

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TUT 001 1648

Table 10.--Description of wells located on figure 17 (Continued)
[--, indicates data not available]

Well number on figure 17	Lithologic description and depth interval (feet)	Remarks
15-34	Unconsolidated material 0-28 Bedrock 28	--Well owned by Water and Power Authority
15-35	--	--
15-36	--	Well was dug before 1944.
15-37	--	--
15-38	--	--
15-39	--	--
15-40	--	--
15-41	--	--
15-42	--	--
15-43	--	Well was constructed about 1970. Well casing is 3.5 feet by 2.5 feet. well used in supply of 5 apartments
15-44	--	--
15-45	--	--

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Well will be drilled soon. 3-7-90 RK

APPLICATION FOR GROUND WATER APPROPRIATION PERMIT

For St. Thomas

Date: 10/13/89

TO: V.I. WATER RESOURCES COMMISSION
Department of Public Works
P.O. Box 476
St. Thomas, V.I. 00801

PUBLIC WORKS DEPT.

'89 OCT 18 PM 7:55

In compliance with Title 12, Chapter 5, V.I. Code, the undersigned:

William Farrington, Triple F. Development
(Name of Property Owner)

776-3575 ?

P. O. Box 2842, St. Thomas, USVI 00801
(Mailing Address)

775-3615
Telephone Number

hereby applies for a permit to appropriate ground water. Proposed well(s) will be located at: Mariendahl #7-6 and #7-7, St. Thomas, USVI 00801
(Name of estate, lot number and island - attach sketch showing well location)

Proposed Use of Well(s): 3 (Check ONE use only)

DOMESTIC ☐
Number of apartments: _____
Number of people to be served: _____

FARM OPERATION ☐
Land acreage reserved for crops: _____
Type and number of livestock: _____

COMMERCIAL (WATER SALES): ☒
Estimated water production: 50,000 gallons per day.
Proposed cost of water at site: _____ per 1,000 gallons

MUNICIPAL: ☐
Area to be served: _____
Estimated population: _____

OTHER: ☐
Brief explanation _____

Plan for development or use of the water, including the capacities of any proposed impounding reservoirs, cisterns, storage tanks, etc.: concrete constructed cistern with a capacity of 50,000 gallons.

Estimated quantity of water proposed to be extracted daily: 75,000 gallons

Proposed term of permit: 3 years.

Name of Proposed Well Driller: Joseph Krupa

Signature of Property Owner

(Fee to accompany application)

TUT 001 1650

REFERENCE NO. 39

VIRGIN ISLANDS WATER RESOURCES COMMISSION

DRILLER'S REPORT

DRILLER'S LOG		
From	To	Material Description
0	6	Fill
6	36	Aluvium
36	56	Granite/gravel
56	85	Fractured rock
85	115	Basalt/solid

Person Filling Out This Form:
Name: Water Management, Inc.
P. O. Box 7128, St. Thomas, V.I.
(Mailing Address)

Remarks:

Well Driller's Permit No. ----------

Driller's License No. WDL-001-78

Appropriation Permit No. ----------

Owner: Devcon International

Address of Proposed Well:

11 Estate Mariondahl
(Estate & Lot No.)
St. Thomas, V. I.
(Island)

Location: ------- Lat. --------- Long. ----------

Type: (Drilled) Driven, Other
Started: 2-26-81 Finished 2-27-81
Total Depth: 115
Casing: PVC Galv. Black
Other (Ft.)
38 Ft. ----In 6 In. Dia.
---- Ft. ----In ----In. Dia.
---- Ft. ----In ----In. Dia.
Water Level:
Flowing? ---- If not, how far down?
--------Feet
Yield: Flow----------GPM
Pump- 65 GPM or ----------GPH
Drawdown from pumping.
------Ft. or ----Vac.
Use:--------Taste---------Odor----
Hardness---------Chloride---------
Iron----------

Permanent Pump Installation:
Manufacturer:----------
Type:----------HP----------
Capacity----------GPM
Installed By:----------

TUT 001 1652

W-1 13

VIRGIN ISLANDS WATER RESOURCES COMMISSION

DRILLER'S REPORT

DRILLER'S LOG		
From	To	Material Description
0	10	alluvial sand, rock
10	20	"
20	28	clay, large rock, water
Water and layers of broken rock encountered at:		
60'	6"	
78'	8"	
89	1'	
	91'	BOTTOM

Person Filling Out This Form:
Name: Jay Greblick Water Management
P.O. Box 7128, STT
(Mailing Address)

Remarks:
WELL #2

Well Driller's Permit No. ST-12-78
Driller's License No. WDL-001-78
Appropriation Permit No. 16-78-01
Owner: Mario Bryan

Address of Proposed Well:
Lot C, PWD#C9-215-T76,
Donoe Est, East End Quarter
(Estate & Lot No.)
St. Thomas
(Island)

Location: ------- Lat. --------- Long.
Type: Drilled, Driven, Other
Started: 2/18/78 Finished 3/8/78
Total Depth: 91
Casing: Galv. Black
Other (Ft.) 6" PVC
----Ft. ----In ----In. Dia.
----Ft. ----In ----In. Dia.
----Ft. ----In ----In. Dia.
Water Level:
Flowing? ---- If not, how far down?
28 Feet 60 est.
Yield: Flow ---------- GPM
Pump ----- GPM or ---------- GPH
Drawdown from pumping,
------Ft. or ----Vac.
Use: comm Taste ok Odor no
Hardness 570 Chloride 255
Iron ----------
TDS 1000 pH 8.5
Permanent Pump Installation:
Manufacturer: ----------
Type: ---------- HP ----------
Capacity ---------- GPM
Installed By: ----------

WM 25

VIRGIN ISLANDS WATER RESOURCES COMMISSION

E

DRILLER'S REPORT

Well #28-78

DRILLER'S LOG		
From	To	Material Description
0'	10'	Dirt & Clay
10'	20'	some rock & clay
20'	30'	rock to Blue Bitch
30'	40'	Blue bitch (trace of H20)
40'	50'	Bay salt
50'	60'	" "
60'	70'	" " tract of more H20
70'	80'	" "
80'	90'	" "
90'	95'	Green Rock
95'	100'	Brown spongy rock & BS.
100'	110'	Bay salt and green rock
110'	120'	Bay salt " green rock
120'	130'	Bay salt
130'	140'	Bay salt

Person Filling Out This Form:
Name: Jay Greblick
Water Management, Inc.
(Mailing Address)
P.O.Box 7128, St. Thomas, V.I.00801

Remarks:
Well depth of 140', casing is PVC 6" to 30'. Solid rock was struck at 22'. At 40' a trace of H20 discovered. 62' found to be soft to 63'. 66' to 70' found to be soft. 95' the rock turned to green and bay salt, not just bay salt. At 100' the rock turned to brown & spongy & bay salt. At 132' the rock was softer thru 140'
Bit time drilling was
3" 22 sec. for the Bay salt
3" in 16 sec. for the soft spots.
Very little H20 present.

"Dry"

Well Driller's Permit No. ST 22-78

Driller's License No. WDL 001-78

Appropriation Permit No. ----------

Owner: Mario Bryan

Address of Proposed Well:
Donoe Estate E. End Quarter
Lot C, PWD #C9-215-T76
(Estate & Lot No.)
St. Thomas
(Island)

Location: ------- Lat. --------- Long. ----------

Type: Drilled, ~~Driven, Other~~
Started: 8/26/78 Finished 8/28/78
Total Depth: 140'
Casing: PVC Galv. Black
Other (Ft.)
----Ft. ----In ----In. Dia.
----Ft. ----In ----In. Dia.
----Ft. ----In ----In. Dia.

Water Level:
Flowing? ---- If not, how far down?
--------Feet
Yield: Flow----------GPM
Pump-----GPM or ----------GPH
Drawdown from pumping,
------Ft. or ----Vac.
Use:--------Taste---------Odor----
Hardness---------Chloride---------
Iron----------

Permanent Pump Installation:
Manufacturer:----------
Type:----------HP----------
Capacity----------GPM
Installed By:----------

TUT 001 1654

JOLANDER WELL DRILLING, INC.
R.F.D. ?
CARMEL, MAINE 04419

App 20-?
D/P 14-?

WELL REPORT

H-TW-1

WELL OWNER: Hartman SR. (Name) Tutle Ave (Street Address) ST Thomas (City or Town)

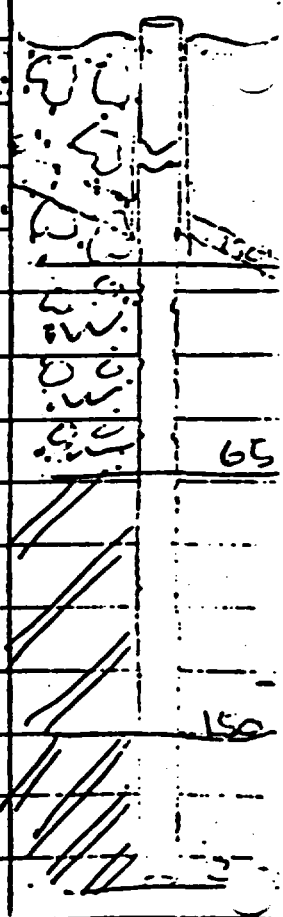
WELL DRILLER: Jolander / Budreau (Name) Box 9853 (Street Address) ST Thomas (City or Town)

PROPOSED USE OR USES (check): ☒ Domestic ☐ Irrigation ☐ Stock ☐ Municipal ☒ Industrial ☐ Test Well

CASING DETAILS	PUMPING TEST	WATER LEVEL	SCREEN DETAILS
LENGTH: 65 FEET	DURATION: 1/2 HOURS	(measure from land surface) STATIC: 14 FEET	MAKE:
DIAMETER: 6 INCHES	PUMPING RATE: 20 G.P.M.	WHEN PUMPING: FEET	LENGTH: FT. SLOT SIZE
KIND: P.V.C.			DIAMETER: IN.

WELL LOG

DEPTH FROM GROUND SURFACE	Give details of formations penetrated, such as: peat, silt, sand, gravel, clay, hardpan, shale, stone, rock. Include size of gravel (diameter) and sand (fine, medium, coarse), color of material, structure (loose, packed, cemented, soft, hard)
0 FT. to 50 FT.	OVERBURDEN
50 FT. to 55 FT.	Fractured Bed Rock
55 FT. to 60 FT.	" " "
60 FT. to 65 FT.	" " "
65 FT. to 150 FT.	MEDIUM HARD BLUE BRISH. ROCK
150 FT. to 210 FT.	HARD " " "
FT. to FT.	
FT. to FT.	
FT. to FT.	
FT. to FT.	
FT. to FT.	
FT. to FT.	
FT. to FT.	
FT. to FT.	



DATE WELL WAS COMPLETED: 3-16-78

DATE OF REPORT April 4. 1978

TUT 001 1655

WELL DRILLER Budreau J.P.
(Signature)

PAGE 5 of 6

JOLANDER WELL DRILLING, INC.

R. F. D. 2
CARMEL, MAINE 04419

WELL REPORT

11 - TW - 2

WELL OWNER: Hartman SR (Name) | TuTu Ave (Street Address) | ST Thomas (City or Town)

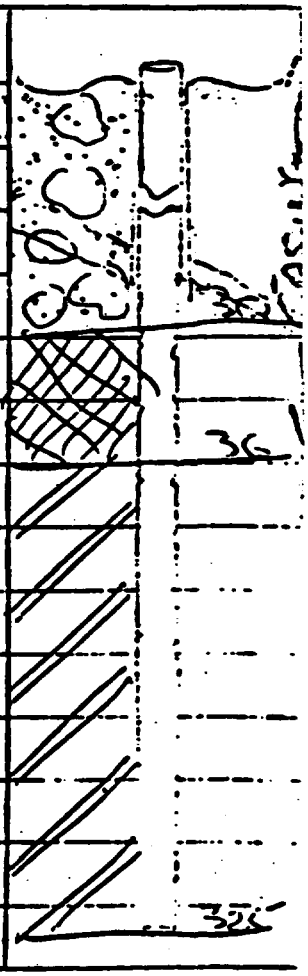
WELL DRILLER: Jolander/Budreau (Name) | Box 9853 (Street Address) | ST Thomas USVI (City or Town)

PROPOSED USE OR USES (check): ☒ Domestic ☐ Irrigation ☐ Stock ☐ Municipal ☒ Industrial ☐ Test Well

CASING DETAILS	PUMPING TEST	WATER LEVEL	SCREEN DETAILS
LENGTH: 36 FEET	DURATION: 1/2 HOURS	(measure from land surface) STATIC: FEET	MAKE:
DIAMETER: 6 INCHES	PUMPING RATE: 25 G.P.M.	WHEN PUMPING: FEET	LENGTH: FT. / SLOT SIZE
KIND: P V.C.			DIAMETER: IN.

WELL LOG

DEPTH FROM GROUND SURFACE	Give details of formations penetrated, such as: peat, silt, sand, gravel, clay, hardpan, shale, stone, rock. Include size of gravel (diameter) and sand (fine, medium, coarse), color of material, structure (loose, packed, cemented, soft, hard)
0 FT. to 30 FT.	OVERBURDEN (CLAY)
30 FT. to 32 FT.	FRACTURED BAD ROCK (LEDGE)
32 FT. to 325 FT.	BLUE BITCH
FT. to FT.	
FT. to FT.	
FT. to FT.	
FT. to FT.	
FT. to FT.	
FT. to FT.	
FT. to FT.	
FT. to FT.	
FT. to FT.	
FT. to FT.	
FT. to FT.	
FT. to FT.	



DATE WELL WAS COMPLETED: 3-21-78 DATE OF REPORT April 4, 1978

TUT 001 1656

WELL DRILLER Budreau J.P. (Signature)

JOLANDER WELL DRILLING, INC.

R.F.D. 2
CARMEL, MAINE 04419

WELL REPORT

H-TW-3

WELL OWNER: Hartmann Sr — Name — TU TU Ave — Street Address — ST Thomas — City or Town

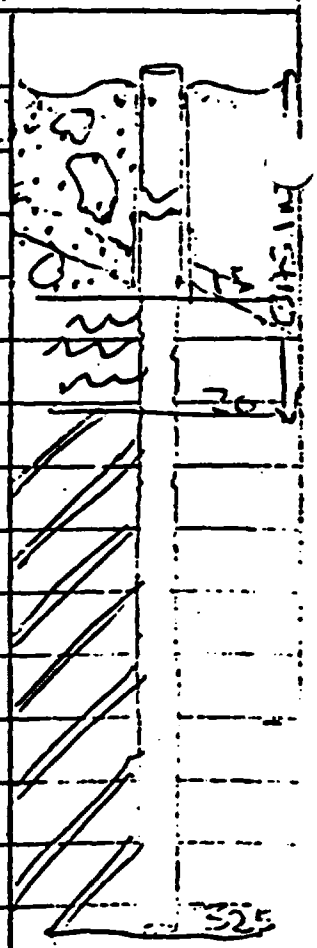
DRILLER: Rudeus Jolander — Name — Box 9833 — Street Address — ST Thomas — City or Town

PROPOSED USE OR USES (check): ☒ Domestic ☐ Irrigation ☐ Stock ☐ Municipal ☒ Industrial ☐ Test Well

CASING DETAILS	PUMPING TEST	WATER LEVEL	SCREEN DETAILS
LENGTH: 20 FEET	DURATION: 1 HOURS	(measure from land surface) STATIC: FEET	MAKE:
DIAMETER: 6 INCHES	PUMPING RATE: 15 G.P.M.	WHEN PUMPING: FEET	LENGTH: FT. / DIAMETER: IN. / SLOT SIZE
TYPE: P.V.C.			

WELL LOG

DEPTH FROM GROUND SURFACE	Give details of formations penetrated, such as: peat, silt, sand, gravel, clay, hardpan, shale, stone, rock. Include size of gravel (diameter) and sand (fine, medium, coarse), color of material, structure (loose, packed, cemented, soft, hard)
0 FT. to 15 FT.	OVERBURDEN
15 FT. to 20 FT.	BROKEN ROCK (NO WATER)
20 FT. to 32.5 FT.	BLUE BITOTH.
FT. to FT.	
FT. to FT.	
FT. to FT.	
FT. to FT.	
FT. to FT.	
FT. to FT.	
FT. to FT.	
FT. to FT.	
FT. to FT.	
FT. to FT.	
FT. to FT.	



DATE WELL WAS COMPLETED: 3-24-78

DATE OF REPORT April 9. 1978

UT 001 165/

WELL DRILLER Rudeus J.P.
(Signature)

Instl. AAJ - 78

PAGE TWO

WM 9

VIRGIN ISLANDS WATER RESOURCES COMMISSION

DRILLER'S REPORT

DRILLER'S LOG		
From	To	Material Description
0	32	clay & rocks
32	150	blue bit
32-	65	quite soft
65	110	very hard
110	140	layers of brown rock
140	150	very hard

Person Filling Out This Form:
Name: Duane Gess, Watter Management
P.O. Box 7128, ST. T.
(Mailing Address)

Remarks:

WELL NO. 1 ON APPLICATION MAP

Well Driller's Permit No. ST-1-78

Driller's License No. WDL-001-78

Appropriation Permit No. 4-78-01

Owner: V.I. Housing Authority, Box 7668

Address of Proposed Well:
Est. Anna's Retreat, Est. Tutu, Hidden Valle
(Estate & Lot No.)
St. Thomas
(Island)

Location: ---- Lat. ---- Long.

Type: Drilled, Driven, Other

Started: 12/22/77 Finished 1/9/78

Total Depth: ~~180~~ 175

Casing: Galv. Black
Other (Ft.) ~~37~~ 6" steel 41'
----Ft. ----In ----In. Dia.
----Ft. ----In ----In. Dia.
----Ft. ----In ----In. Dia.

Water Level:
Flowing? ---- If not, how far down?
36 ~~32~~ ----Feet

Yield: Flow----------GPM
Pump 48 ---GPM or ----------GPH

Drawdown from pumping,
9 ----Ft. or ----Vac.

Use:--------Taste---------Odor----
Hardness---------Chloride---------
Iron----------

Permanent Pump Installation:
Manufacturer: Goulds
Type: sub ----------HP 3
Capacity---- 50 ----------GPM
Installed By: WM

TUT 001 1658

VIRGIN ISLANDS WATER RESOURCES COMMISSION

DRILLER'S REPORT

DRILLER'S LOG		
From	To	Material Description
0	32	Clay & rock
32	65	Quite soft
65	110	Very hard
110	140	Layers of brn. rock
140	150	Very hard

Person Filling Out This Form:
Name: Duane Gess, c/o WM, Inc.
P.O. Box 7128, STT
(Mailing Address)

Remarks:

WELL NO. 2 ON APPLICATION MAP

Well Driller's Permit No. ST-1-78

Driller's License No. WDL-001-78

Appropriation Permit No. 4-78-02

Owner: V.I. Housing Authority
Box 7668, STT

Address of Proposed Well:
St. Anna's Retreat, Est. Tutu, Hidden Valley (Estate & Lot No.)
St. Thomas
(Island)

Location: ---- Lat. ---- Long.

Type: Drilled, Driven, Other
Started: 12/9/77 Finished 12/21/77
Total Depth: ---- ft.
Casing: Galv. Black
Other (Ft.) 37' 6" steel
---Ft. 6 In ---In. Dia.
---Ft. ---In ---In. Dia.
---Ft. ---In ---In. Dia.

Water Level:
Flowing? ---- If not, how far down?
12 Feet

Yield: Flow ---- GPM
Pump 47 GPM or ---- GPH
Drawdown from pumping,
22 Ft. or ---- Vac.
Use: comm Taste ok Odor none
Hardness 270 Chloride 275
Iron ---- TDS 750

Permanent Pump Installation:
Manufacturer: Goulds
Type: sub HP 3
Capacity 50 GPM
Installed By: WM

TUT 001 1659

TW 9

~~MW-10~~

VIRGIN ISLANDS WATER RESOURCES COMMISSION

DRILLER'S REPORT

DRILLER'S LOG		
From	To	Material Description
0	70	clay and rock
70	72	The bottom 2' gave very large amt of water- but not able to go past 70' with cable tool.
72	142	hard rock

Person Filling Out This Form:
Name: Duane Gess, Water Management
P.O. Box 7128, STT
(Mailing Address)

Remarks:

At 70' we hit a very hard rock or deposit of some kind. After 10 hrs. - no footage. Quit and redrilled after rotary rig arrived. Drilled add. 70' in 4 hrs. on 4/19/78.

(Continued on page 2)

WELL NO. 3 ON APPLICATION MAP.

Well Driller's Permit No. ST-1-78
Driller's License No. WDL-001-78
Appropriation Permit No. 4-78-03
Owner: V.I. Housing Authority

Address of Proposed Well:
Est. Anna's Retreat, Est. Tutu
(Estate & Lot No.)
St. Thomas, V.I.
(Island)

Location: ------- Lat. --------- Long. ---
Type: Drilled, Driven, Other
Started: 1/10/78 Finished 1/13/78 4/19
Total Depth: 142
Casing: Galv. Black
Other (Ft.) 73' steel, 6"
----Ft. ----In ----In. Dia.
----Ft. ----In ----In. Dia.
----Ft. ----In ----In. Dia.
Water Level:
Flowing? ---- If not, how far down?
~~70~~ 60 Feet
Yield: Flow----------GPM
Pump 44 --GPM or ----------GPH
Drawdown from pumping,
------Ft. or ----Vac.
Use:--------Taste---------Odor----
Hardness---------Chloride---------
Iron----------
Permanent Pump Installation:
Manufacturer: Goulds
Type: sub ----------HP 2hp
Capacity---- 50 ----------GPM
Installed By: WM

TUI 001 1660

~~WM-11~~

VIRGIN ISLANDS WATER RESOURCES COMMISSION

DRILLER'S REPORT

DRILLER'S LOG		
From	To	Material Description
0	10	boulders
10	65	clay & boulders
65	140	blue bit
water encounteres at:		
72'	4"	
78'	2"	
87'	3"	
105'	6"	
125'	2"	
138'	3"	

Person Filling Out This Form:
Name: Duane Gess, Water Management
P.O. Box 7128, STT
(Mailing Address)

Remarks:

(Gallery #4)
WELL NO. 4 ON APPLICATION MAP

Well Driller's Permit No. ST-1078

Driller's License No. WDL-001-78

Appropriation Permit No. 4-78-04

Owner: V.I. Housing Authority

Address of Proposed Well:

Est. Anna's Retreat, Est. Tutu
(Estate & Lot No.)
St. Thomas, V.I. 00801
(Island)

Location: ------- Lat. --------- Long.

Type: Drilled, Driven, Other
Started: 1/19/78 Finished 1/21/78
Total Depth: 140
Casing: Galv. Black
Other (Ft.) 69' steel 6"
----Ft. ----In ----In. Dia.
----Ft. ----In ----In. Dia.
----Ft. ----In ----In. Dia.
Water Level:
Flowing? ---- If not, how far down?
72 Feet
Yield: Flow 46 GPM
Pump -----GPM or ----------GPH
Drawdown from pumping,
27" Ft. or ----Vac.
Use: --------Taste--------Odor----
Hardness---------Chloride---------
Iron----------

Permanent Pump Installation:
Manufacturer: Goulds
Type: sub HP 2
Capacity 50 GPM
Installed By: WM

VIRGIN ISLANDS WATER RESOURCES COMMISSION

DRILLER'S REPORT

3/4/81

ST-149-81
Well Driller's Permit No.----------

Driller's License No. WDL-001-78

Appropriation Permit No.----------

Owner: THE PLAZA ASSOCIATES

Address of Proposed Well:

Est. Anna's Retreat
(Estate & Lot No.)
New Quarter #392 St. Thomas
(Island)

Location:------- Lat.---------Long

Type: Drilled. Driven. Other
Started:---------Finished--------
Total Depth: 305
Casing: Galv. Black
Other (Ft.)
30 Ft. ----In 6 In. Dia.
---- Ft. ----In ----In. Dia.
---- Ft. ----In ----In. Dia.
Water Level:
Flowing? ---- If not, how far down?
90 Feet
Yield: Flow----------GP
Pump---12 GPM or ----------GI
Drawdown from pumping.
------Ft. or ----Vac.
Use:--------Taste---------Odor--
Hardness---------Chloride-------
Iron----------

Permanent Pump Installation:
Manufacturer:----------
Type:----------HP---------
Capacity----------G
Installed By:----------

DRILLER'S LOG		
From	To	Material Description
0	6	Fill
6	24	Alluvium
24	65	Granite
65	72	Granite with fractures
72	160	Granite
160	164	Granite with fractures
165	305	Solid granite rock

Person Filling Out This Form:
Name:----------

(Mailing Address)

Remarks: Well #1

TUT 001 1662

VIRGIN ISLANDS WATER RESOURCES CORP.

DRILLER'S REPORT

DRILLER'S LOG		
From	To	Material Description
0	1	Blacktop & gravel
2	9	Soil, Brown, Dry
9	30	Alluvial, large Boulders, gravel
30	60	Bedrock, Well fractured and weathered, some water
60	90	Green bedrock, hard & tite, no water
90	120	Fractured Bedrock, some water
120	170	Hard & Tite
170	190	Fractured, Some Water
190	285	Hard & Tite, fractured but no water

Person Filling Out This Form:
Name: DON
(Mailing Address)

Remarks:
Drilled 9" Hole to 36'. Set 6" PVC and cemented same. Drilled out with 6" bit to 285' total depth.

Well completed as 6" open hole in bedrock.

Well Driller's Permit No. ST-149-81
Driller's License No. WDL-001-78
Appropriation Permit No. ----------
Owner: THE PLAZA ASSOCIATES
Address of Proposed Well:
Est. Anna's Retreat
(Estate & Lot No.)
New Quarter #392, St. Thomas
(Island)
Location: ------- Lat. --------- Long.
Type: Drilled, Driven, Other
Started: --------- Finished ---------
Total Depth: 285
Casing: Galv. Black Other (Ft.) PVC
40 Ft. 0 In 9 In. Dia.
285 Ft. 0 In 6 In. Dia.
---- Ft. ---- In ---- In. Dia.
Water Level: 90'
Flowing? ---- If not, how far down?
--------Feet
Yield: Flow------5 - 10-------GPM
Pump-----GPM or ----------GPH
Drawdown from pumping.
------Ft. or ----Vac.
Use:--------Taste---------Odor----
Hardness---------Chloride---------
Iron----------
Permanent Pump Installation:
Manufacturer:----------
Type:----------HP----------
Capacity----------GPM
Installed By:----------

TUT 001 1663

LOLANDER WELL DRILLING, INC.
R.F.D.
CARMEL, MAINE 04419

WELL REPORT

Dodge TW-1

WELL OWNER: Lockhart (Name) | Bowden Ave (Street Address) | St Thomas (City or Town)

WELL DRILLER: Lolander / Burdens (Name) | Box 9955 (Street Address) | St Thomas (City or Town)

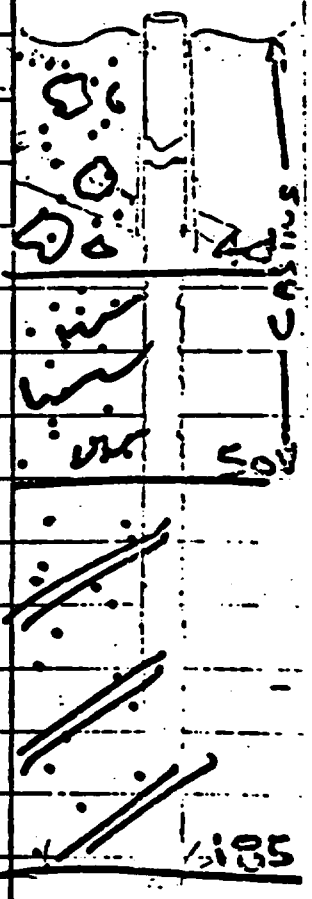
09-78-01

PROPOSED USE OR USES (check): ☒ Domestic ☐ Irrigation ☐ Stock ☐ Municipal ☒ Industrial ☐ Test Well

CASING DETAILS	PUMPING TEST	WATER LEVEL	SCREEN DETAILS
LENGTH: 50 FEET	DURATION: 1 HOURS	(measure from land surface) STATIC: 28 FEET	MAKE:
DIAMETER: 6" INCHES	PUMPING RATE: 30 G.P.M.	WHEN PUMPING: 48 FEET	LENGTH: FT. / SLOT SIZE
KIND: Prime Star			DIAMETER: IN.

WELL LOG

DEPTH FROM GROUND SURFACE	Give details of formations penetrated, such as: peat, silt, sand, gravel, clay, hardpan, shale, stone, rock. Include size of gravel (diameter) and sand (fine, medium, coarse), color of material, structure (loose, packed, cemented, soft, hard)
0 FT. to 40 FT.	GLACIAL BURDEN
40 FT. to 45 FT.	Fractured Bed Rock
45 FT. to 50 FT.	" " "
50 FT. to 185 FT.	STRATAFIDE BLUE BITCH.
FT. to FT.	
FT. to FT.	Sand well Size 1 HP
FT. to FT.	Jump + Being Pumped
FT. to FT.	daily at 18 GPM.
FT. to FT.	
FT. to FT.	Average Well.
FT. to FT.	
FT. to FT.	
FT. to FT.	
FT. to FT.	
FT. to FT.	



DATE WELL WAS COMPLETED: Dec 5 1977

DATE OF REPORT April 1 1978

TUT 001 1664

WELL DRILLER Burdens J.R

IOLANDER WELL DRILLING, INC.
R.F.D. 2
CARMEL, MAINE 04419

WELL REPORT

Phase 1W - R

WELL OWNER: Lockhart Doncher Area (Name) (Street Address) ST Thomas (City or Town)

WELL DRILLER: IOLANDER / Budreus (Name) Box 985 (Street Address) ST Thomas (City or Town)

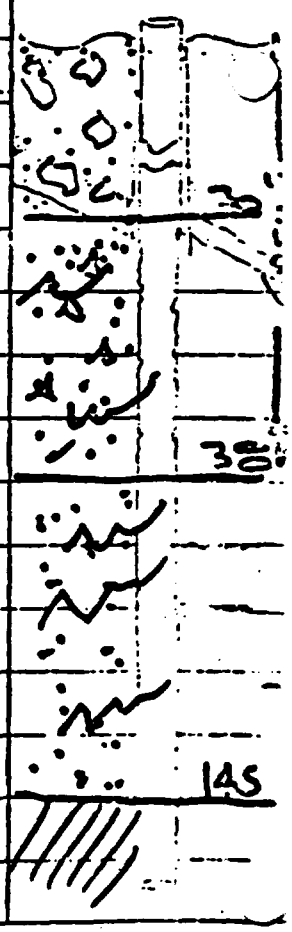
09-78-02

PROPOSED USE OR USES (check): [X] Domestic [ ] Irrigation [ ] Stock [ ] Municipal [X] Industrial [ ] Test Well

CASING DETAILS	PUMPING TEST	WATER LEVEL (measure from land surface)	SCREEN DETAILS
LENGTH: 38 FEET	DURATION: 1 HOURS	STATIC: 18 FEET	MAKE:
DIAMETER: 6 INCHES	PUMPING RATE: 40 125 G.P.M.	WHEN PUMPING: 60 FEET	LENGTH: FT. / SLOT SIZE
KIND: Plain steel			DIAMETER: IN.

WELL LOG

DEPTH FROM GROUND SURFACE	Give details of formations penetrated, such as: peat, silt, sand, gravel, clay, hardpan, shale, stone, rock. Include size of gravel (diameter) and sand (fine, medium, coarse), color of material, structure (loose, packed, cemented, soft, hard)
0 FT. to 30 FT.	OVERBURDEN
30 FT. to 35 FT.	Fractured Rock
35 FT. to 38 FT.	" "
38 FT. to 145 FT.	Brown & Gray Broken Formations
145 FT. to - FT.	Blue Birth.
FT. to FT.	
FT. to FT.	Said well is Being Pumped
FT. to FT.	with A 2 HP Pumping
FT. to FT.	at 40 G.P.M.
FT. to FT.	
FT. to FT.	
FT. to FT.	
FT. to FT.	
FT. to FT.	
FT. to FT.	



DATE WELL WAS COMPLETED: NOV 24 1977 DATE OF REPORT April 4 1978

TUT 001 1665

WELL DRILLER Budreus - J.R. (Signature)

PAGE 5 of 8

JOLANDER WELL DRILLING, INC.
R.F.D. 2
CARMEL, MAINE 04419

WELL REPORT

DOWOE TW-3

WELL OWNER: Lockhart — Name: Rondine Area — Street Address: St Thomas — City or Town

WELL DRILLER: Jolander / Rudewicz — Name: Box 985 — Street Address: St Thomas — City or Town

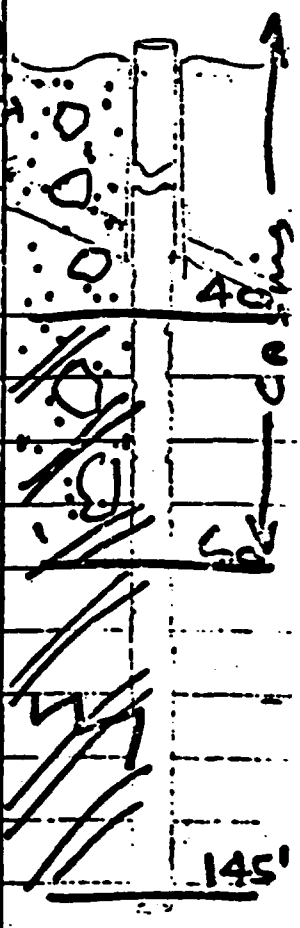
04-78-03

PROPOSED USE OR USES (check): ☒ Domestic ☐ Irrigation ☐ Stock ☐ Municipal ☒ Industrial ☐ Test Well

CASING DETAILS	PUMPING TEST	WATER LEVEL (measure from land surface)	SCREEN DETAILS
LENGTH: 60 FEET	DURATION: 1 HOURS	STATIC: 76 FEET	MAKE:
DIAMETER: 6 INCHES	PUMPING RATE: ~~60~~ 125 G.P.M.	WHEN PUMPING: ~~50~~ 60 FEET	LENGTH: FT. / SLOT SIZE
KIND: Prime steel			DIAMETER: IN.

WELL LOG

DEPTH FROM GROUND SURFACE	Give details of formations penetrated, such as: peat, silt, sand, gravel, clay, hardpan, shale, stone, rock. Include size of gravel (diameter) and sand (fine, medium, coarse), color of material, structure (loose, packed, cemented, soft, hard)
0 FT. to 40 FT.	OVERBURDEN. (Brown Clay & Rock)
40 FT. to 45 FT.	Hard Blue Rock & Soft Brown Rock strata
45 FT. to 50 FT.	" "
50 FT. to 55 FT.	" "
55 FT. to 60 FT.	" "
60 FT. to 145 FT.	Broken Blue Bitch.
FT. to FT.	
FT. to FT.	Sand well has a 7½ HP
FT. to FT.	Pump. Well is an extremely
FT. to FT.	good producing well
FT. to FT.	
FT. to FT.	Water Table Dropped From
FT. to FT.	Dec. To March - lots of
FT. to FT.	Surface water during Rainy
FT. to FT.	periods



DATE WELL WAS COMPLETED: Dec 1 1977 — DATE OF REPORT April 4, 1978

TUR 001 1666

WELL DRILLER Rudewicz - J.P. (Signature)

JOLANDER WELL DRILLING, INC.
R.F.D. 2
CARMEL, MAINE 04419

WELL REPORT

DONOE TW-4

WELL OWNER: Lockhart (Name) | Donoka Area (Street Address) | St Thomas (City or Town)

WELL DRILLER: Jolander Drlg / Burdeen (Name) | Box 985 (Street Address) | St Thomas (City or Town)

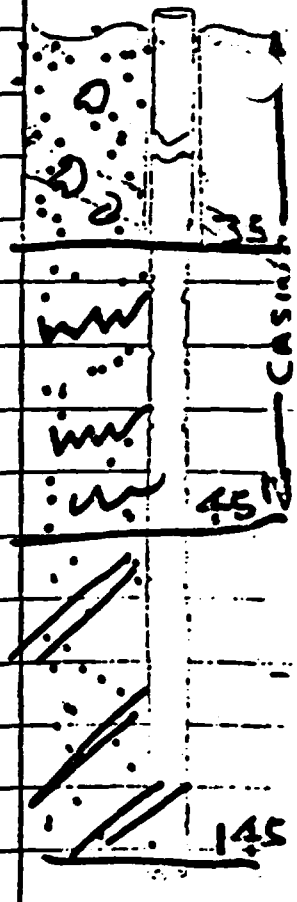
09-78-04

PROPOSED USE OR USES (check): ☒ Domestic ☐ Irrigation ☐ Stock ☐ Municipal ☒ Industrial ☐ Test Well

CASING DETAILS	PUMPING TEST	WATER LEVEL	SCREEN DETAILS
LENGTH: 45 FEET	DURATION: 1 HOURS	(measure from land surface) STATIC: 17 FEET	MAKE:
DIAMETER: 6 INCHES	PUMPING RATE: ~~35~~ 75 G.P.M.	WHEN PUMPING: 60 FEET	LENGTH: FT. / SLOT SIZE
KIND: PLAIN STEEL			DIAMETER: IN.

WELL LOG

DEPTH FROM GROUND SURFACE	Give details of formations penetrated, such as: peat, silt, sand, gravel, clay, hardpan, shale, stone, rock. Include size of gravel (diameter) and sand (fine, medium, coarse), color of material, structure (loose, packed, cemented, soft, hard)
0 FT. to 35 FT.	OVERBURDEN
35 FT. to 40 FT.	BROKEN WEATHERED BED ROCK
40 FT. to ~~45~~ FT.	" " " "
45 FT. to 145 FT.	STRATAFIED BROWN & BLUE ROCK
FT. to FT.	
FT. to FT.	Well is being pumped at
FT. to FT.	40 GPM with a 2 HP
FT. to FT.	Pump in Well is four
FT. to FT.	producing well
FT. to FT.	These wells have been
FT. to FT.	pumped 4 TO 5 Days a week
FT. to FT.	6 Hours a day since
FT. to FT.	Dec. 1977
FT. to FT.	
FT. to FT.	



DATE WELL WAS COMPLETED: Dec. 2 1977

DATE OF REPORT April 4. 1978

THT 001 1667

WELL DRILLER: Burdeen J-P
(Signature)

JOLANDER WELL DRILLING, INC.
R.F.D. 2
CARMEL, MAINE 04419

WELL REPORT

Route Two - 5

WELL OWNER: Lockhart (Name) Dawson (Street Address) ST Th (City or Town)

WELL DRILLER: Jolander / Budenus (Name) Box 9853 (Street Address) St Thomas (City or Town)

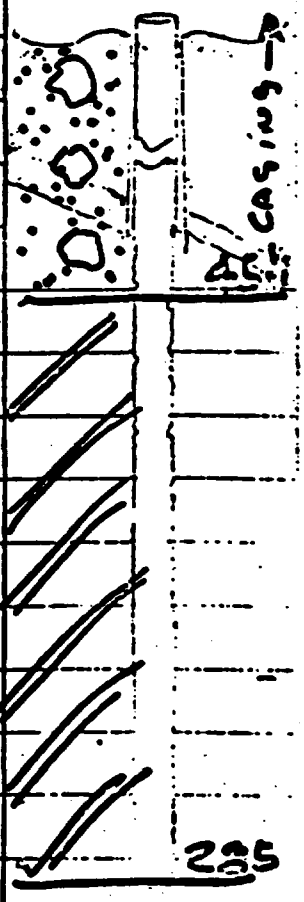
09-76-05

PROPOSED USE OR USES (check): ☒ Domestic ☐ Irrigation ☐ Stock ☐ Municipal ☒ Industrial ☐ Test Well

CASING DETAILS	PUMPING TEST	WATER LEVEL	SCREEN DETAILS
LENGTH: 45 FEET	DURATION: 1 HOURS	(measure from land surface) STATIC: 45 FEET	MAKE:
DIAMETER: 6 INCHES	PUMPING RATE: ~~5~~ 3 G.P.M.	WHEN PUMPING: ~~45~~ 100 FEET	LENGTH: FT. / DIAMETER: IN. / SLOT SIZE
KIND: Prime Steel			

WELL LOG

DEPTH FROM GROUND SURFACE	Give details of formations penetrated, such as: peat, silt, sand, gravel, clay, hardpan, shale, stone, rock. Include size of gravel (diameter) and sand (fine, medium, coarse), color of material, structure (loose, packed, cemented, soft, hard)
0 FT. to 45 FT.	OVER BURDEN (Brown Clay)
45 FT. to 285 FT.	Blue Bitch Rock
FT. to FT.	
FT. to FT.	
FT. to FT.	
FT. to FT.	Said well is being pumped
FT. to FT.	with a 1 HP at
FT. to FT.	10 to ~~25~~ 15 GPM
FT. to FT.	
FT. to FT.	Very Poor Producing
FT. to FT.	Well -
FT. to FT.	
FT. to FT.	
FT. to FT.	
FT. to FT.	



DATE WELL WAS COMPLETED: Nov 29 1978

DATE OF REPORT April 4 1978

TUT 001 1668

WELL DRILLER Budenus JR
(Signature)

PAGE 1b

JOLANDER WELL DRILLING, INC.

R. F. D. 2
CARMEL, MAINE 04419

WELL REPORT
No. 54-78-01

WELL OWNER: ROBERT RAMSEY | TUTU, | ST. THOMAS, U.S.V.I. 00801
(Name | Street Address | City or Town)

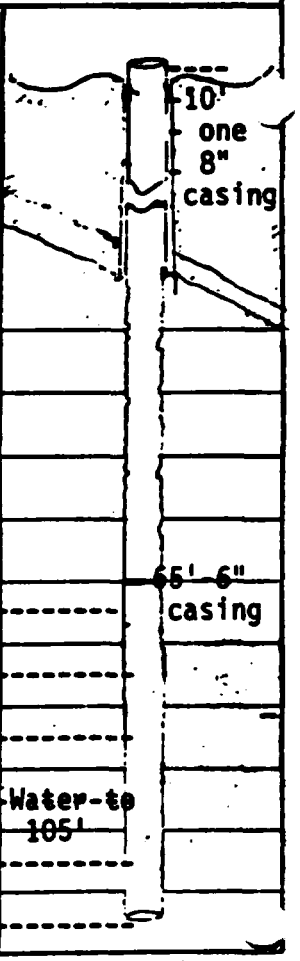
WELL DRILLER: JOLANDER WELL DRILLING INC. | P.O. BOX 10031 | ST. THOMAS, U.S.V.I. 00801
(Name | Street Address | City or Town)

PROPOSED USE OR USES (check): ☒ Domestic ☐ Irrigation ☐ Stock ☐ Municipal ☐ Industrial ☐ Test Well

CASING DETAILS	PUMPING TEST	WATER LEVEL	SCREEN DETAILS
LENGTH: 65' FEET	DURATION: 2 HOURS	(measure from land surface) STATIC: 12 FEET	MAKE:
DIAMETER: 6" INCHES	PUMPING RATE: 60 G.P.M.	WHEN PUMPING: FEET	LENGTH: FT. SLOT SIZE
KIND: PVC			DIAMETER: IN.

WELL LOG

DEPTH FROM GROUND SURFACE	Give details of formations penetrated, such as: peat, silt, sand, gravel, clay, hardpan, shale, stone, rock. Include size of gravel (diameter) and sand (fine, medium, coarse), color of material, structure (loose, packed, cemented, soft, hard)
0 FT. to 10 FT.	Overburden
10 FT. to 65 FT.	Brown Streak Rock
FT. to FT.	Very Fractured
55 FT. to 105 FT.	Blue Rock, Fractured
FT. to FT.	
FT. to FT.	
FT. to FT.	
FT. to FT.	
FT. to FT.	
FT. to FT.	
FT. to FT.	
FT. to FT.	
FT. to FT.	
FT. to FT.	



DATE WELL WAS COMPLETED: ~~August 5, 1978~~ DATE OF REPORT: August 5, 1978

WELL DRILLER: Darrell Jolander
(Signature)

VI 001 1669

REFERENCE NO. 40

Recd 9-5-87

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WELL APPROPRIATION PERMITS ISSUED
ST. THOMAS/ST. JOHN

(as of July 31, 1987)

PROPERTY OWNER	TERM OF PERMIT		LOCATION OF WELL	GPD	PERMIT NO.	PURPOSE	WELL DRILLER
AASA Water Supply	2/14/78	2/14/87	#3 Estate Charlotte Amalie	75,000	ST-020-78	commercial	Jolander
ADKINS, Courtland	3/10/78	3/10/90	#7 Estate Charlotte Amalie	500	ST-022-78	domestic	St. Thos.Dairi
A'J ISEW ENTERPRISES	4/14/80	4/14/87	Lindberg Bay #70T	6,000	ST-101-80	hotel/condo	Goetz
AMERICAN YACHT CHARTER	[redacted]	1/02/88	Smith Bay #18A (sea water)	50,000	ST-079-79	marina	Greblick
ANCHORAGE CONDO ASSOC.		5/13/86	#8-57-4 Estate Nazareth	50,000	ST-154-81	hotel/condo	Goetz
ANDREN SUTO, INC.	2/14/78	2/14/90	Contant #17C	500	ST-018-81	domestic	Jolander
ATLAS MOTOR INN	12/31/80	6/22/87	Estate Bakkeroe #5	100,000	ST-076-79	hotel/condo	Greblick
ATLAS MOTOR INN	6/08/84	6/08/86	Estate Bakkeroe - East Point	43,000	ST-181-83	hotel/condo	Krupa
ATLAS MOTOR INN	7/24/82	7/24/86	Estate Bakkeroe #2K (sea water)	500	ST-168-82	hotel/condo	Krupa
BALTZER, Alan	3/21/86	3/21/88	#10E Lerkenlund	500	ST-216-86	domestic	Krupa
BALL, Vernon	6/22/81	6/22/87	Frydendal #11-4	10,000	ST-122-80	commercial	Greblick
BARNES, Leo	3/22/78	3/22/86	Estate Raphune #1	10,000	ST-023-78	domestic	Buderas
BENJAMIN, Luther and COLLINS, Gordon	7/23/87	7/23/89	#17A Smith Bay	500	ST-247-87	gas sta/store	Krupa
BERRY, Dante	1/13/84	1/13/91	Lerkenlund #3FA & 3HI	500	ST-183-84	domestic/agr.	Goetz
BERRY, Joseph	11/30/84	11/30/86	Est. St. Peter #6E	500	ST-194-84	agricultural	Goetz
BETTERMANDS ASPHALT CORP.	8/18/82	8/18/87	Haypiece Hill, Sub Base	500	ST-169-82	asphalt plant	Krupa
BIRD'S NOOK NOOK	5/23/85	5/23/87	Frenchman's Bay #15-12	500	ST-203-85	domestic	Goetz
BLANTON, Henry	7/27/81	7/27/88	Estate Nazareth #9-2	500	ST-162-81	domestic	Greblick

[redacted]

JUL 001 16/1

WELL APPROPRIATION PERMITS ISSUED
ST. THOMAS/ST. JOHN
(as of July 31, 1987)

PROPERTY OWNER	TERM OF PERMIT		LOCATION OF WELL	GPD	PERMIT NO.	PURPOSE	WELL DRILLER
[illegible], Randolph	6/20/80	6/20/87	Estate Nazareth #12F	450	ST-125-80	domestic	Jolander
BLUEBEARD'S CASTLE	10/22/85	10/22/87	Taarnebjerge #1	7,500	ST-209-85	flushing	Krupa
BLUEBEARD'S CASTLE	[illegible]	11/5/88	Taarnebjerge #2	500	ST-236-86	agricultural	Goetz
BOYDEN, John	[illegible]	8/21/87	#35 First Ave., Estate Thomas	500	ST-130-80	domestic	Greblick
BOLONGO BAY HOTEL CORP.	[illegible]	3/21/88	Bolongo Lot #105	500	ST-128-86	agricultural	Krupa
BOSCHULTE, Louis	7/27/81	7/27/88	#77 Estate Solberg	500	ST-161-81	domestic	Greblick
BOYLAN, Jeffrey	4/07/88	4/07/88	Dorothea #16H	500	ST-219-86	domestic	Krupa
BRIN, Henri	5/20/80	5/20/87	Hull Bay #2D	500	ST-110-80	agricultural	Jolander
BRIN, John	6/14/78	6/14/90	Frydenhoj #33	400	ST-038-78	domestic	Jolander
BRYAN, Carl J.	7/27/77	7/27/97	Estate Dorothea #2Ca	1,000	ST-001-78	agricultural	Greblick
BRYAN, Edwin	7/02/80	7/02/82	Estate St. Peter #6G2	500	ST-128-80	domestic	Jolander
BRYAN, John F.	1/02/80	1/02/87	Estate Dorothea #3K	8,000	ST-081-80	agr/commercial	Goetz
BRYAN, Leopold	10/22/80	10/22/82	Estate Hull #4	500	ST-134-80	agricultural	Greblick
BRYAN, Mario	2/07/78	2/07/80	Donoe Lot C (3 wells)	80,000	ST-016/78 ST-027-78 ST-028-78	commercial	Greblick
CALVARY BAPTIST CHURCH	11/21/79	11/21/85	Altona & Welgunst #200	500	ST-075-79	church	Jolander
CARIBE BAY PLANTATION	10/12/82	10/12/87	Estate Cmeel Bay #8	5,000	ST-171-82	hotel/condo	Krupa
CARIBBEAN HOTEL CORP.	11/30/84	11/30/86	#14 Lower John Dunkoe	56,000	ST-182-84	hotel/condo	Krupa
CARTY, Marmion	1/31/83	1/31/90	Scott Free #58A	500	ST-173-83	domestic	Krupa

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PROPERTY OWNER	TERM OF PERMIT		LOCATION OF WELL	GPD	PERMIT NO.	PURPOSE	WELL DRILLER
CARTY, Marmion	10/01/79	10/01/91	#3 Second Street, Est. Thomas	400	ST-072-79	domestic	Greblick
CARTY, Maxwell	5/13/86	5/13/88	#10 Tenth Street, Est. Thomas	(test)500	ST-227-86	domestic	Krupa
CHARLES, Reynald	[illegible]	2/28/83	#17 Estate Bovoni	500	ST-146-81	domestic	Greblick
CHARLES, Reynald	[illegible]	2/12/87	Estate Dorothea #228	500	ST-197-85	agricultural	Goetz
CHARLEY'S TRUCKING	[illegible]	6/23/89	Bolongo #106	(test) 500	ST-241-87	commercial	Krupa
CHRISTOPHER, Claudius	5/17/87	5/17/90	Anna's Fancy #168	500	ST-029-78	domestic	Clarke
CHURCH OF GOD OF HOLINESS	4/02/81	4/02/83	Anna's Retreat #212	500	ST-151-81	church	Jolander
COLLEGE OF THE V.I.	5/13/82	5/13/88	#1John Brewers Bay	50,000	ST-055-82(2)	college	Greblick
COLLEGE OF THE V.I.	8/10/78	5/13/88	#66 John Brewers Bay	20,000	ST-055-78(1)	college	Greblick
COMPASS POINT DEV. CORP.	2/13/86	2/13/88	Frydenhoj #41-6-1	(test) 500	ST-213-86	domestic	Goetz
CONTANT INVESTORS	8/21/81	8/21/87	Contant #111	500	ST-132-80	domestic	Jolander
CONTROLLED CONCRETE	6/28/79	6/28/85	Estate Mariendahl #11	40,000	ST-066-79	commercial	Greblick
COSTA BAY EAST	4/15/80	4/15/87	Estate Nazareth #8-1-7	35,000	ST-103-80	hotel/condo	Jolander
COSTA BAY WEST	6/01/78	8/04/88	Estate Nazareth #8-1-7	150,000	ST-034-78	hotel/condo	Greblick
D & C DEVELOPMENT	1/29/86	1/29/88	Dorothea #17, 18 and 19	35,000	ST-211-86	hotel/condo	Buderas
DEBLD HOUSING CORP.	6/22/81	6/22/83	Anna's Retreat #215	(test) 500	ST-155-81	commercial	Jolander
DECH, Eustace	2/16/79	2/16/81	Mariendahl #10	15,000	ST-06-79	commercial	Greblick
DEPT. OF EDUCATION Bertha Boschulte School	5/30/82	5/30/84	Bovoni	15,000	ST-118-80	school	Jolander

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WELL APPROPRIATION PERMITS ISSUED
ST. THOMAS/ST. JOHN
(as of July 31, 1987)

PROPERTY OWNER	TERM OF PERMIT		LOCATION OF WELL	GPD	PERMIT NO.	PURPOSE	WELL DRILLER
DEPT. OF EDUCATION Edith Williams School	5/20/80	5/20/84	Charlotte Amalie #1	500	ST-115-80	school	Jolander
DEPT. OF EDUCATION Joseph Gomez School	[redacted]	5/20/87	Ann's Retreat #142	500	ST-114-80	school	Jolander
DEPT. OF EDUCATION Kirwan Terrace School		5/13/84	#68A Lindberg Bay	7,000	ST-016-82	school	Greblick
DEPT. OF HEALTH	11/20/80	11/20.86	Estate Thomas #45	45,000	ST-139-80	hospital	Jolander
DEPT. OF HEALTH	2/04/80	2/04/90	Hospital Ground	500	ST-090-80	hospital	Jolander
DEPT. OF HOUSING AND COMMUNITY RENEWAL	2/04/80	2/04/88	Estate Altona	500	ST-091-80	domestic	Greblick
DEPT. OF PUBLIC WORKS	1/02/80	1/02/87	Bovoni Sanitary Landfill	144,000	ST-083-80	firefighting	Jolander
DEPT. OF PUBLIC WORKS	2/25/80	2/25/82	Estate Thomas Race Track	(test) 500	ST-100-80	municipal	Greblick/Jolander
DEPT. OF PUBLIC WORKS	8/22/79	8/22/89	Estate Concordia Well Field	58,000		municipal	
DEPT. OF PUBLIC WORKS	8/22/79	8/22/89	Fair Plain Well Field	750,000		municipal	
DEPT. OF PUBLIC WORKS	8/22/79	8/22/89	La Vallee Well Field	30,000		municipal	
DEPT. OF PUBLIC WORKS	8/22/79	8/22/89	La Grange Well Field	72,000		municipal	
DEPT. OF PUBLIC WORKS	8/22/79	8/22/89	Barren Spot Well Field	100,000		municipal	
DEPT. OF PUBLIC WORKS	8/22/79	8/22/89	Adventure Well Field	85,000		municipal	
DORWAN, Roy & Doreen	5/13/86	5/13/88	John Dunkoe #79-13	500	ST-226-86	domestic	Krupa
DOUCETT, Theodore & Lorna	4/07/83	4/07/85	Estate Fortuna 4-4-8	500	ST-176-83	domestic	Krupa
DRUNE, INC.	1/25/83	1/25/85	Estate Ross #8AD	10,000	ST-172-83	domestic	Krupa

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WELL APPROPRIATION PERMITS ISSUED
ST. THOMAS/ST. JOHN
(as of July 31, 1987)

PROPERTY OWNER	TERM OF PERMIT		LOCATION OF WELL	GPD	PERMIT NO.	PURPOSE	WELL DRILLER
BOLIN, Gene	8/21/78	4/19/87	Anna's Retreat #2	25,000	ST-043-78	commercial	Greblick
FARID M-HAJ	6/23/87	6/23/89	#11C Estate Lindberg Bay	500	ST-246-87	domestic	Goetz
FAUGUI., Winston	[redacted]	7/27/83	#57-15 Smith Bay	500	ST-163-81	domestic	owner
FELIX, Otis	1/13/88	1/13/88	Estate Contant #12	500	ST-184-84	domestic	Goetz
FLAG HILL PROPERTIES	1/19.81	1/19/88	Estate Bakkeroe #3A of 3	500	ST-144-81	domestic	Jolander
FLETT, Thomas	12/15/80	12/15/87	#14PE Estate Thomas	500	ST-142-80	domestic	Greblick
GEORGE, Beatrice	3/14/80	3/14/87	#27A Hospital Ground	400	ST-098-80	domestic	Jolander
GIFT HILL GARDENS	10/04/78	10/04/85	#3 Beverhoudtsberg (STJ)	500	ST-058-78	agricultural	Greblick
GIRARD, Pamela	5/17/78	5/17/80	Estate Adrian #6A & 5B (STJ)	250	ST-033-78	domestic	St.Thos.Dairies
GIRARD, Victor	11/5/86	11/5/88	4-5-5 Estate Rosendahl	500	ST-238-86	agricultural	Goetz
GREAT CRUZ BAY DEVELOPMENT	5/23/85	5/23/87	#300A Chocolate Hole (STJ)	(test) 500	ST-204-85	hotel/condo	Goetz
HALPERN, Arthur	11/28/83	11/28/85	Frenchman's Bay #15-66	2,000	ST-182-83	agricultural	Krupa
HARVEY, Osborne	8/02/78	8/02/85	Anna's Retreat #5	500	ST-051-78	domestic	Jolander
HAYNES, Earle Sr.	4/27/78	4/27/90	Estate Frydenhoj #94	100	ST-046-78	domestic	Clarke
HEINRICHTON, Clarence	12/15/80	12/15/82	#330 Hospital Ground	500	ST-141-80	domestic	Greblick
HODGE, George & Maria	1/31/78	1/31/90	#20 Eight Street, Est. Thomas	500	ST-014-78	domestic	Greblick
HUGHES, Maria	6/23/78	6/23/90	Contant #15C	500	ST-041-78	animal clinic	Jolander
HUSBAND, Cynthia	5/22/85	5/22/87	#3A Estate Frydendahl	500	ST-202-85	restaurant	Goetz

WELL APPROPRIATION PERMITS ISSUED
ST. THOMAS/ST. JOHN
(as of July 31, 1987)

PROPERTY OWNER	TERM OF PERMIT		LOCATION OF WELL	GPD	PERMIT NO.	PURPOSE	WELL DRILLER
[illegible], Elliot	8/21/80	8/21/87	Frenchman's Bay #15-65	500	ST-131-80	domestic	Jolander
ISAAC, Fernando	11/30/79	11/30/81	Upper John Dunkow #2-2	350	ST-077-79	domestic	Greblick
JEPPESEN, Arthur	4/15/80	4/15/87	#20 Tenth Street, Est. Thomas	500	ST-102-80	domestic	Jolander
JOHNSON, Aubrey	[illegible]	4/05/85	Smith Bay #5	500	ST-024-78	domestic	Clarke
JOSEPH, Albert & Enid	[illegible]	6/23/89	#4 Estate Bolongo	500	ST-244-87	domestic	Krupa
JOSEPH, J & C	8/27/80	3/12/87	Lindberg Bay #11A	15,000	ST-013-80	commercial	Greblick
KAUFMAN, Henry	8/14/86	8/14/88	St. Quaco #6B-15 (STJ)	500	ST-234-86	agricultural	Krupa
KING, Avon D. C.	7/26/85	7/26/87	Contant #33B	500	ST-206-85	domestic	(unknown)
LAURUS, Henry	4/05/78	4/05/90	#29 Anna's Fancy	420	ST-026-78	domestic	Clarke
LANTHIN LAUNDRY	6/22/81	6/22/83	Estate Mariendahl #2BA	20,000	ST-015-81	laundry	Jolander
LEE, Joseph	12/04/78	12/04/85	St. Joseph & Rosendahl #6D	500	ST-061-78	agricultural	Jolander
LEEWARD ISLANDS CORP.	4/22/85	4/22/87	#17 Crown Bay Fill (sea water)	(test) 500	ST-201-85	domestic	Goetz
LEWARD, Alpha	6/02/78	6/02/90	Anna's Retreat #129-45	500	ST-035-78	domestic	Greblick
LE PORT OF CALL LTD.	7/10.86	7/10/88	Lot #3 St. Peter #12	500	ST-230-86	domestic	Goetz
LETTSOME, Victor	6/20/80	6/20/87	Gylling Street #8	500	ST-126-80	domestic	Greblick
LIMA, Alfredo	9/23/81	9/23/85	Bovoni #2-2	35,000	ST-164-81	commercial	Goetz
LIMA, Alfredo	3/21/86	3/21/88	Bovoni #7	500	ST-217-86	domestic	Goetz
LIMO, Mariano	2/27/87	2/27/89	Bovoni #4BA	(test) 500	ST-239-87	laundromat	Goetz
LIMETREE BEACH HOTEL	5/08/81	5/08/86	Frenchman's Bay #100	75,000	ST-153-81	hotel/condo	Goetz

JUL 001 1676

WELL APPROPRIATION PERMITS ISSUED
ST. THOMAS/ST. JOHN
(as of July 31, 1987)

PROPERTY OWNER	TERM OF PERMIT		LOCATION OF WELL	GPD	PERMIT NO.	PURPOSE	WELL DRILLER
LINDEN CORP.	5/13/86	5/13/88	#210-3A Altona & Welgunst	(test) 500	ST-228-86	laundromat	Krupa
LOCKHART, Herbert et al	12/07/77	1/02/90	Donoe #1	125,000	ST-009-78	commercial	Buderas
LOCKHART, Herbert et al	[redacted]	1/02/90	Estate Thomas #6A	100,000	ST-011-78	commercial	Buderas
LOCKHART, H. E.	[redacted]	5/13/88	Estate Thomas #46B	(test) 500	ST-225-86	laundry	Krupa
MACKOVER, Frank	4/07/83	4/07/85	#1 Havensight	500	ST-178-83	agricultural	Krupa
MACK, Arnold	12/07/77	12/07/89	Scott Free #17	500	ST-007-78	domestic	Clarke
MAGENS BAY AUTHORITY	3/30/83	3/30/85	Magens Bay Beach	500	ST-185-84	recreational	Goetz
MAGENS POINT HOTEL	6/23/87	6/23/89	#7 St. Joseph & Rosendahl	500	ST-245-87	swimming pool	Goetz
MAGENS POINT, INC.	10/04/78	5/13/86	#7 St. Joseph & Rosendahl	15,000	ST-059-78	hotel/condo	Goetz
MAHO BAY CAMPS, INC.	6/23/87	6/23/89	#3D Maho Bay	(test) 500	ST-249-78	campsite	Goetz
MAHOGANY RUN CO.	2/14/79	6/22/85	Estate Lovenlund #C1 & 2	100,000	ST-065-79	hotel/condo	Jolander
MAHOGANY RUN CO.	2/14/79	6/22/85	Estate Lovenlund #A1 & 2	100,000	ST-064-79	hotel/condo	Jolander
MAJESTIC CONSTRUCTION	7/09/84	7/09/86	#10 Susannaberg (STJ)	500	ST-190-84	domestic	Goetz
MANGROVE BAY REALTY	12/28/79	12/28/86	#34 Estate Mandahl	500	ST-080-79	hotel/condo	Jolander
MARCHA, Joseph	2/14/78	2/14/87	#68A Lindberg Bay	500	ST-019-78	domestic	Greblick
MARSH, Eudora	6/23/87	6/23/89	#3 Estate Emmaus (STJ)	(test) 500	ST-248-87	laundry	Conklin/Johansse
MILLIGAN, Leslie	5/17/78	5/17/80	#56 Smith Bay	350	ST-031-78	domestic	St.Thos.Dairies
MORNING DAY CONSTRUCTION	6/23/87	6/23/89	Estate Thomas #54	(test) 500	ST-243-87	commercial	Krupa
MOJICA, Emilio Tapia	5/17/78	5/17/85	Estate Contant #31	500	ST-30-78	domestic	Jolander

JUL 001 1677

WELL APPROPRIATION PERMITS ISSUED
ST. THOMAS/ST. JOHN
(as of July 31, 1987)

PROPERTY OWNER	TERM OF PERMIT		LOCATION OF WELL	GPD	PERMIT NO.	PURPOSE	WELL DRILLER
MORRISON, Grace	3/04/81	3/04/88	#11 Bolongo Bay	500	ST-150-81	domestic	Greblick
MORSEN/MORSEN/HASSAN	7/09/84	7/09/86	#9CA & 20 Estate Contant	(test) 500	ST-189-84	domestic	Goetz
MEYERS, Donald	[illegible]	5/12/87	#13 First Avenue, Est. Thomas	500	ST-108-80	domestic	owner
NEIMBRAM, Brumney	[illegible]	4/07/90	Lindberg Bay #53	500	ST-180-83	domestic	Krupa
NEUMANN, Alfred	[illegible]	4/07/90	Estate St. Peter #18-3-B	500	ST-179-83	domestic	Krupa
O'BRIEN, Edward	7/09/84	7/09/86	#24C Mafolie	500	ST-187-84	domestic	Goetz
OLIVE, Lionel	8/23/78	8/23/90	Contant #3A	250	ST-048-79	domestic	Buderas
OLIVE, L & R	2/04/80	2/04/87	Estate Nazareth #2V7	500	ST-094-80	domestic	Jolander
PETERSEN, Marvin	6/08/84	6/08/86	#4B-1 Estate Fortuna	500	ST-186-84	domestic	Goetz
POINT PLEASANT	12/07/77	5/13/88	Estate Smith Bay #4C	6,000	ST-006-78	hotel/condo	Clarke
POTTERS CONSTRUCTION CO.	2/27/87	2/27/89	#18-7 Estate Smith Bay	(test) 500	ST-240-87	laundromat	Goetz
PUBLIC WORKS ACCELERATION AUTH.	5/12/80	5/12/87	1st Ave. & 1st St., Est. Thomas	500	ST-109-80	domestic	Buderas
QUESTEL, E & B	7/09/84	7/09/86	#2 Misgunst	1,440	ST-188-84	hotel/condo	Krupa
RAMAH, Gerald	10/30/81	10/30/88	#9-7 Vessup Bay	500	ST-165-81	domestic	Greblick
RAMNARAN, Ramsaran	2/16/79	2/16/86	#5A-31 Estate Fortuna	2,000	ST-067-79	agricultural	Greblick
RAMSAY, R & R	8/09/78	8/09/85	Anna's Retreat #405	500	ST-054-78	garage	Jolander
RICHARDS, Alice	6/07/78	6/07/90	Frydenhoj #61	300	ST-037-78	domestic	Clarke
RIVERA, Antonio	8/02/78	8/02/80	Contant #54	500	ST-053-78	domestic	Jolander
ROLLER, Hugo A.	4/07/86	4/07/88	Carolina, Parcel #8-4-1 STJ	500	SJ-220-86	domestic	Goetz

001 1678

WELL APPROPRIATION PERMITS ISSUED
ST. THOMAS/ST. JOHN
(as of July 31, 1987)

PROPERTY OWNER	TERM OF PERMIT		LOCATION OF WELL	GPD	PERMIT NO.	PURPOSE	WELL DRILLED
ROSEN, Jerome	7/10/86	4/07/88	Wintberg #1B1-A	500	ST-229-86	domestic	Krupa
ST. JOHN HOMES, INC.	4/07/88	4/07/88	Parcel #18, Est. Enighed, STJ	500	ST-222-86	domestic	Goetz
ST. THOMAS BEACH RESORT	[redacted]	3/30/87	Bolongo Bay #53-58	(test) 500	ST-199-85	domestic	Goetz
ST. THOMAS DAIRIES	[redacted]	3/14/87	Lovenlund #2	500	ST-095-80	dairy farm	Jolander
ST. THOMAS DAIRIES	2/10/88	2/10/88	Lovenlund #4	(test) 500	ST-212-86	agricultural	Goetz
ST. THOMAS PARTNERSHIP	1/08/86	1/08/87	Frydendahl #49	320,000	ST-195-85	hotel/condo	Goetz
SALEM, Rifat	2/24/81	2/24/83	Estate Thomas #9-E	500	ST-145-81	domestic	Jolander
SAMUEL, Rosa S.	5/09/86	5/09/88	Estate Enighed #4Ea (STJ)	(test) 500	ST-224-86	commercial	Krupa
SAPPHIRE WEST CONDO. ASSOC.	10/22/80	6/22/87	Smith Bay #11-H	45,000	ST-235-80	hotel/condo	Jolander
SCHWARTZ, L & R	2/12/85	2/12/87	Belleview #14	500	ST-198-35	domestic	Krupa
SCOTT, John P.	5/08/81	5/08/88	Frydenhoj #41	500	ST-152-81	agricultural	Greblick
SEXER, Victor & Huldah	5/09/86	5/09/88	Enighed #3H (STJ)	(test) 500	ST-223-86	domestic	Krupa
SMART, Roy	1/14/81	1/14/83	#112 Estate Frydenhoj	500	ST-143-81	domestic	Jolander
SMITH BAY CENTER CORP.	6/23/87	6/23/89	#33A Frydendahl	500	ST-242-87	flushing	Krupa
SMITH, Blanca	7/26/85	7/26/87	Estate Thomas #4	3,000	ST-205-85	flushing	Goetz
SOLOMON, Raphael	4/07/86	4/07/88	Cruz Bay Town #95 & 95C (STJ)	500	ST-221-86	office bldg.	Goetz
SOOKHAN, Siewdath	6/11/80	6/11/87	Smith Bay #111	500	ST-123-80	domestic	Greblick
SOTO, Andres	11/17/80	11/17/87	Contant #8	500	ST-137-80	domestic	Greblick
SPRAUVE, Gaylord	9/07/77	9/07/97	Smith Bay #98-1	1,500	ST-003-78	domestic	Clarke

JUT 001 1679

WELL APPROPRIATION PERMITS ISSUED
ST. THOMAS/ST. JOHN
(as of July 31, 1987)

INDEMNITY OWNER	TERM OF PERMIT		LOCATION OF WELL	GPD	PERMIT NO.	PURPOSE	WELL DRILLER
STEVENS, Marjorie	2/27/81	2/27/88	#5-66 Estate Bovoni	500	ST-148-81	domestic	Greblick
SUGAR ESTATE ASSOCIATES	2/27/77	7/27/97	Estate Thomas #6L	15,000	ST-002-78	shopping center	Greblick
SUPERCAT, INC.	[redacted]	6/22/83	Contant #9A	13,000	ST-158-81	laundry	Jolander
THE PLAZA ASSOCIATES	[redacted]	3/04/88	Anna's Retreat #392	500	ST-149-81	shopping center	Greblick
THOMASVILLE CO-OP	3/20/85	3/20/87	Bovoni #9	30,000	ST-200-85	domestic	Goetz
TOTAL VISION	1/10/85	1/10/87	Anna's Retreat #128	50,000	ST-196-85	commercial	(unknown)
TRIPLE F DEVELOPMENT	11/21/85	11/21/87	Estate Mariendahl #7-6 & 7-7	(test) 500	ST-210-85	commercial	Krupa
TURNBULL, Randolph	2/14/78	2/14/90	Estate Thomas #6E-14QL	500	ST-017-78	domestic	Greblick
TURNBULL, Wallace	3/10/78	3/10/87	Contant #79a	500	ST-021-78	domestic	Jolander
TURNBULL, Wallace	8/20/78	8/20/90	Contant #46	450	ST-042-78	domestic	Clarke
TURNBULL, Wallace	5/30/80	5/30/87	Estate Thomas #8C	500	ST-119-80	domestic	Jolander
TURNBULL, Wallace	8/10/84	8/10/89	Estate Thomas #5A & B	500	ST-191-84	domestic	Goetz
TURNBULL, Wallace & L.	3/14/80	3/14/87	Prindsens Gade #10B	400	ST-096-80	domestic	Jolander
VANJACK Rodney	8/14/86	8/14/88	Enighed #3E (STJ)	(test) 500	ST-232-86	domestic	Krupa
VILLANUEVA, Julian	6/15/79	6/15/86	Bovoni #19	500	ST-071-79	domestic	Greblick
V.I. BAPTIST MISSION	12/07/77	12/07/79	Bovoni #5A	500	ST-005-78	church	Clarke
V.I. DEVELOPMENT CORP.	5/30/80	5/30/87	Estate Contant #707Ba	13,000	ST-116-80	garage	Jolander
V.I. HOUSING AUTHORITY Project No. VI-1-16	12/06/77	12/06/87	Anna's Retreat	40,000	ST-004-78	domestic	Greblick

FILE 001 1680

WELL APPROPRIATION PERMITS ISSUED
ST. THOMAS/ST. JOHN
(as of July 31, 1987)

PROPERTY OWNER	TERM OF PERMIT		LOCATION OF WELL	GPD	PERMIT NO.	PURPOSE	WELL DRILLER
V.I. HOUSING AUTHORITY Project No. VI-1-19	8/10/78	8/10/88	Bovoni	40,000	ST-057-78	domestic	(unknown)
V.I. HOUSING AUTHORITY Project No. VI-1-1	3/14/80	3/14/82	Paul M. Pearson Gardens (sea water)	100,000	ST-097-80	domestic	Jolander
V.I. HOUSING AUTHORITY Project No. VI-1-5	[illegible]	8/07/82	Oswald Harris Court (sea water)	45,000	ST-106-80	domestic	Greblick
V.I. HOUSING AUTHORITY Project No. VI-1-7	6/22/81	6/22/83	Michael H. Kirwan Terrace	10,000	ST-160-81	domestic	Greblick
V.I. HOUSING AUTHORITY Project No. VI-1-8	1/02/80	1/02/88	John F. Kennedy Terrace (STX)	27,000	SC-084-84	domestic	(unknown)
V.I. HOUSING AUTHORITY Project No. VI-1-12	1/02/80	1/02/88	Aureo Diaz Heights (STX)	17,500	SC-085-80	domestic	(unknown)
V.I. HOUSING AUTHORITY Project No. VI-1-22	1/02/80	1/02/88	Estate Mount Pleasant (STX)	6,500	SC-086-80	domestic	(unknown)
V.I. HOUSING AUTHORITY Projects Nos. VI-1-18 & VI-1-23	1/02/80	1/02/88	Estate Paradise (STX)	70,000	SC-087-80	domestic	(unknown)
V.I. HOUSING AUTHORITY Project No. VI-1-24	1/02/80	1/02/88	Estate Slob (STX)	22,500	SC-088-80	domestic	(unknown)
V.I. MEDICAL FOUNDATION	2/13/86	2/13/88	Estate Thomas #50	500	ST-214-86	flushing	Goetz
V.I. NATIONAL PARK	6/22/82	6/22/87	Trunk Bay Park Site (STJ)	500	ST-167-82	recreational	owner
V.I. REALTY CORP.	1/31/83	1/31/85	#7 Lower John Dunkoe	500	ST-174-83	domestic	Krupa
VAUGHAN, Guy W.	8/14/86	8/14/88	St. Quaco & Zimmerman #3B-12 (STJ)	500	ST-233-86	agricultural	Krupa
WAECHTER, Klaus	2/13/86	2/13/88	Nazareth #6A	(test) 500	ST-215-86	domestic	Krupa

TUT 001 1681

WELL APPROPRIATION PERMITS ISSUED
ST.THOMAS/ST. JOHN
(as of July 31, 1987)

PROPERTY OWNER	TERM OF PERMIT		LOCATION OF WELL	GPD	PERMIT NO.	PURPOSE	WELL DRILLER
WALLACE, Viggo	10/22/85	10/22/87	Estate Mandahl #28CA	500	ST-207-85	domestic	Goetz
WATERGATE VILLAS ASSOC.	11/30/84	11/30/86	#59 Estate Bolongo	80,000	ST-193-84	hotel/condo	owner
WENNER, Altagracia	[illegible]	8/22/87	#50 Estate Frydenhoj	500	ST-170-82	agricultural	(unknown)
WHITE, P. Watson	[illegible]	6/22/85	Contant #11-3-B	5,000	ST-136-80	domestic	Greblick
WILLIAMS, Cecile	5/30/80	5/30/82	Contant #k5	599	ST-117-80	domestic	Jolander
YACHT HAVEN HOTEL & MARINA	3/2/79	3/2/90	#4 Estate Thomas	500	ST-69-79	flushing	Greblick

OUT 001 1682

REFERENCE NO. 41

LOCATE STATEMENT:
LOCATE (0) C100 NH C2 EQ VI AND C182 EQ N AND C194 EQ A:

PROGRAM REPORTING DATA SYSTEM
PUBLIC WATER SYSTEM - COMPREHENSIVE REPORT
PADS01 PAGE 295

SORTED BY PWS ID

EPA REGION: 02 SURVEILLANCE STATE: VI PRIMACY: Y PWS ID: VI0000504

OWNER NAME : BRYAN WELL SERVICE T160 PHONE: INDIAN RESERVATION CODE:
OWNER ADDRESS: ESTATE DONOE PLANT AREA LOCATION: COMPLIANCE CYCLE : 01
ST. THOMAS VI 00801 CITY : POSTAL CODE : VI
MAILING NAME : BRYAN WELL SERVICE T160 COUNTY : PLANT TYPE : N
MAILING ADDRESS: ESTATE DONOE ADMIN REGION : OWNER TYPE : O
ST. THOMAS VI 00801 ADMIN DISTRICT: FRDS COUNTY CODE :

PLANT SERVICE AREA:
RESIDENTIAL: COMPANY TOWN: RECREATION : MOBILE HOMES : INSTITUTION : SCHOOL : OTHER AREA:
MOTEL : RESTAURANT : SERV STATION: CAMPGROUND : PICNIC AREA : LODGE :
MARINA : SKI RESORT : BATHING : VISITOR CENTER: HWY REST AREA: AIRPORT:

ACTIVE INDICATOR : A INITIAL DATE : 07/12/83 BEGIN DATE : 06/01/77 CONSECUTIVE INDICATOR: 0
POPULATION SERVED : 50 NUMBER OF SERVICES: 0 NUMBER OF METERS: 0 # OF CONSECUTIVE PWS :
DESIGN CAPACITY : OK EMERGENCY POWER : OK STORAGE CAPACITY: OK MAXIMUM PRODUCTION : OK
INTERSTATE CARRIER : N AVERAGE PRODUCTION: OK LAST SURVEY DATE: LAST UPDATE DATE : 00/00/00
DEACTIVATION REASON: DEACTIVATION DATE : MANUAL FILE, : REGULATE BY : B
FACILITY LATITUDE : 01820 FACILITY LONGITUDE: 00455 SMSA CODE : HYDROLOGICAL ID : 21020001

STATE DISCRETIONARY DATA:
BACTERIOLOGICAL FLG: L MINIMUM NUMBER DAILY CHECKS: NON-COMMUNITY SAMPLING FREQ: SEASON:
MONTHLY MONITORING : SAMPLES PER QUARTER : MCL HALT CHECK SAMPLE : START: 00/00
% CHLORINE SUBSTITU: TURBIDITY FLAG : L TURBIDITY LIMIT : 5.0 END : 00/00

CHEMICAL:
ORGANIC BEGIN PERIOD: ORGANIC END PERIOD: # OF TTHM SAMPLES: LABORATORY DATA:
AIR TEMPERATURE : NITRATE FREQUENCY : # OF PLANTS : TYPE : BACT PHYS INORG ORG RAD
TTHM SAMPLE FREQ : CONTROL: N N N N N

RADIOACTIVE:
MONITORING FLAG : 3 BETA FREQUENCY MONTHS: MONITOR GROSS ALPHA: MONITOR RADIUM MONTHS : RADIOACTIVE FLAG: 4
GROUND WATER MONITOR: # OF SAMPLES PER YEAR: NUCLEAR FACILITY : N NUCLEAR FACILITY TYPES:
FACILITY CONTAMINANT ID:
SAMPLING FREQUENCY :

SOURCE AND/OR ENTRY POINT INFORMATION:

(SRC) TYPE	(EPT) NAME	CODE	LATITUDE	LONGITUDE	# OF WELLS	AVAIL	BASIN #	SELLER ID	ENTRY POINT ID	TURB FLAG	TURB UNITS	TREATMENTS A E R A C	P R E A T	C O A I T	S S F R T	F F C R N	S T S T U	T I O U D	A K M A I	F M L S R	D I T h I	O T E S N	R E E S 1	R E S S 2	R E S S 3
SRC	ON SITE WELLS	6	01820333	0645350	3	P																		Y	

LOCATE STATEMENT:
LOCATE (0) C100 NH C2 EQ VI AND C182 EQ N AND C194 EQ A:

TUT 001 1683A

TUT 001 1683B

EPA REGION: 02 SURVEILLANCE STATE: VI PRIMACY: Y PWS ID: VI0000509

OWNER NAME : GERRITTS 4 WINDS PLAZA T164 PHONE: INDIAN RESERVATION CODE:
OWNER ADDRESS: ESTATE TUTU PLANT AREA LOCATION: COMPLIANCE CYCLE : 01
ST. THOMAS VI 00801 CITY : POSTAL CODE : VI
MAILING NAME : GERRITTS 4 WINDS PLAZA T164 COUNTY : PLANT TYPE : N
MAILING ADDRESS: ESTATE TUTU ADMIN REGION : OWNER TYPE : O
ST. THOMAS VI 00801 ADMIN DISTRICT: FRDS COUNTY CODE :

PLANT SERVICE AREA:
RESIDENTIAL: COMPANY TOWN: RECREATION : MOBILE HOMES : INSTITUTION : SCHOOL : OTHER AREA:
MOTEL : RESTAURANT : SERV STATION: CAMPGROUND : PICNIC AREA : LODGE :
MARINA : SKI RESORT : BATHING : VISITOR CENTER: HWY REST AREA: AIRPORT:

ACTIVE INDICATOR : A INITIAL DATE : 07/12/83 BEGIN DATE : 06/01/77 CONSECUTIVE INDICATOR: 0
POPULATION SERVED : 100 NUMBER OF SERVICES: 0 NUMBER OF METERS: 0 # OF CONSECUTIVE PWS :
DESIGN CAPACITY : OK EMERGENCY POWER : OK STORAGE CAPACITY: OK MAXIMUM PRODUCTION : OK
INTERSTATE CARRIER : N AVERAGE PRODUCTION: OK LAST SURVEY DATE: LAST UPDATE DATE : 08/22/88
DEACTIVATION REASON: DEACTIVATION DATE : MANUAL FILE : REGULATE BY : B
FACILITY LATITUDE : 01820 FACILITY LONGITUDE: 06455 SMSA CODE : HYDROLOGICAL ID : 21020001

STATE DISCRETIONARY DATA:
BACTERIOLOGICAL FLG: L MINIMUM NUMBER DAILY CHECKS: NON-COMMUNITY SAMPLING FREQ: SEASON:
MONTHLY MONITORING : SAMPLES PER QUARTER : MCL HALT CHECK SAMPLE : START: 00/00
4 CHLORINE SUBSTITU: TURBIDITY FLAG : L TURBIDITY LIMIT : 5.0 END : 00/00

CHEMICAL:
ORGANIC BEGIN PERIOD: ORGANIC END PERIOD: # OF TTHM SAMPLES: LABORATORY DATA:
AIR TEMPERATURE : NITRATE FREQUENCY : # OF PLANTS : TYPE : BACT PHYS INORG ORG RAD
TTHM SAMPLE FREQ : CONTROL: N N N N N

RADIOACTIVE:
MONITORING FLAG : 3 BETA FREQUENCY MONTHS: MONITOR GROSS ALPHA: MONITOR RADIUM MONTHS : RADIOACTIVE FLAG: 4
GROUND WATER MONITOR: # OF SAMPLES PER YEAR: NUCLEAR FACILITY : N NUCLEAR FACILITY TYPES:
FACILITY CONTAMINANT ID:
SAMPLING FREQUENCY :

SOURCE AND/OR ENTRY POINT INFORMATION:

(SRC) TYPE	NAME	CODE	LATITUDE	LONGITUDE	# OF WELLS	AVAIL	BASIN #	SELLER ID	(EPT) ENTRY POINT ID	TURB FLAG	TURB UNITS	TREATMENTS A C G I T R T T N U D I R 1 2 3	A E A C E R O E I O O A R M L I T E E E R E A D L R F S O M A S H S S S
SRC	CISTERN	S	0182030	0645326		P							Y
SRC	ON SITE WELL	G	0182030	0645326		P							Y

LOCATE STATEMENT:
LOCATE (O) C100 WH C2 EQ VI AND C182 EQ N AND C194 EQ A:

TYPE NAME CODE LATITUDE LONGITUDE WELLS AVAIL A P T S P C S T I A P L U K R R

SRC WELL 6 0182017 0649327 P

LOCATE STATEMENT:
LOCATE (D) C100 WH C2 EQ VI AND C102 EQ N AND C199 EQ A:

03/03/89 FEDERAL REPORTING DATA SYSTEM FY 1988
FRDS01 PUBLIC WATER SYSTEM - COMPREHENSIVE REPORT PAGE 5
SORTED BY PWS ID

EPA REGION: 02 SURVEILLANCE STATE: VI PRIMACY: Y PWS ID: VI0000092

OWNER NAME : GENE EGLIN WATER DELIVERY TOZA PHONE: (809) 775-1864 INDIAN RESERVATION CODE:
OWNER ADDRESS: ANNAS RETREAT #2 PLANT AREA LOCATION: COMPLIANCE CYCLE : 01
ST. THOMAS VI 00801 CITY : POSTAL CODE : VI
MAILING NAME : GENE EGLIN WATER DELIVERY TO COUNTY : PLANT TYPE : N
MAILING ADDRESS: ANNAS RETREAT #2 ADMIN REGION : OWNER TYPE : I
VI 00801 ADMIN DISTRICT: FRDS COUNTY CODE :

PLANT SERVICE AREA:
RESIDENTIAL: COMPANY TOWN: RECREATION : MOBILE HOMES : INSTITUTION : SCHOOL : OTHER AREA:
MOTEL : RESTAURANT : GAS STATION: CAMPGROUND : PICNIC AREA : CHURCH :
MARINA : SKI RESORT : BATHING : VISITOR CENTER: HWY REST AREA: AIRPORT:

ACTIVE INDICATOR : A INITIAL DATE : 07/12/83 BEGIN DATE : 06/01/77 CONSECUTIVE INDICATOR: 0
POPULATION SERVED : 0 NUMBER OF SERVICES: 0 NUMBER OF METERS: 0 # OF CONSECUTIVE PWS :
DESIGN CAPACITY : OK EMERGENCY POWER : OK STORAGE CAPACITY: OK MAXIMUM PRODUCTION : 0A
INTERSTATE CARRIER : N AVERAGE PRODUCTION: OK LAST SURVEY DATE: LAST UPDATE DATE : 11/05/85
DEACTIVATION REASON: DEACTIVATION DATE : MANUAL FILE : REGULATE BY : B
FACILITY LATITUDE : 0182U FACILITY LONGITUDE: 0649S SMSA CODE : HYDROLOGICAL ID : 0182U001

STATE DISCRETIONARY DATA:
BACTERIOLOGICAL FLG: L MINIMUM NUMBER DAILY CHECKS: NON-COMMUNITY SAMPLING FREQ: SEASON:
MONTHLY MONITORING : SAMPLES PER QUARTER : 0 ROU HALT CHECK SAMPLE : START: 01/01
% CHLORINE SUBSTITU: TURBIDITY FLAG : L TURBIDITY LIMIT : 5.0 END : 12/31

CHEMICAL: LABORATORY DATA:
ORGANIC BEGIN PERIOD: ORGANIC END PERIOD: # OF ITHM SAMPLES: TYPE : DALI PHYS INORG ORG RAD
AIR TEMPERATURE : NITRATE FREQUENCY : # OF PLANTS : CONTROL: N N N N N
ITHM SAMPLE FREQ :

RADIOACTIVE:
MONITORING FLAG : S BETA FREQUENCY MONTHS: MONITOR GROSS ALPHA: MONITOR RADIUM MONTHS : RADIOACTIVE PERIOD: 0
GROUND WATER MONITOR: # OF SAMPLES PER YEAR: NUCLEAR FACILITY : N NUCLEAR FACILITY TYPES:
FACILITY CONTAMINANT ID:
SAMPLING FREQUENCY :

SOURCE AND/OR ENTRY POINT INFORMATION: TREATMENTS

(SRC) TYPE	(EPT) NAME	CODE	LATITUDE	LONGITUDE	# OF WELLS	AVAIL	BASIN #	SELLER ID	ENTRY POINT ID	TURB FLAG	TURB UNITS	A E R A	P N E D	C T C A	S R L M	P E A N	C N S D	T T S I	I R O U	A A L R	P T S I	L E S N	U D S G	K P S	R T S	R T S
SRC WELL		6	0182021	0649316		P																				
SRC CISTERN		S	0182021	0649316		P																				

LOCATE STATEMENT:
LOCATE (D) C100 WH C2 EQ VI AND C102 EQ N AND C199 EQ A:

TUT 001 1684

FEDERAL REPORTING DATA SYSTEM
03/03/89 PUBLIC WATER SYSTEM - COMPREHENSIVE REPORT FY 1988
PRUS01 PAGE 6

SORTED BY PWS ID

EPA REGION: 02 SURVEILLANCE STATE: VI PRIMARY: Y PWS ID: VI0000093

OWNER NAME : JIM TILLET WATER DELIVERY TIOS PHONE: (809) 775-1405 INDIAN RESERVATION CODE:
OWNER ADDRESS: ANNA RETREAT 126 PLANT AREA LOCATION: COMPLIANCE CYCLE : 01
ST. THOMAS VI 00801 CITY : POSTAL CODE : VI
MAILING NAME : JIM TILLET WATER DELIVERY TI COUNTY : PLANT TYPE : N
MAILING ADDRESS: ANNA RETREAT 126 ADMIN REGION : OWNER TYPE : I
VI 00801 ADMIN DISTRICT: PWS COUNTY CODE :

PLANT SERVED AREA:
RESIDENTIAL: COMPANY TOWN: RECREATION : MOBILE HOMES : INSTITUTION : SCHOOL : OTHER AREA:
MOTEL : RESTAURANT : SERV STATION: CAMPGROUND : PICNIC AREA : LODGE :
MARINA : SKI RESORT : BATHING : VISITOR CENTER: HWY REST AREA: AIRPORT:

ACTIVE INDICATOR : A INITIAL DATE : 07/12/83 BEGIN DATE : 06/01/77 CONSECUTIVE INDICATOR: 0
POPULATION SERVED : 0 NUMBER OF SERVICES: 0 NUMBER OF METERS: 0 # OF CONSECUTIVE PWS :
DESIGN CAPACITY : 0K EMERGENCY POWER : OK STORAGE CAPACITY: OK MAXIMUM PRODUCTION : 0K
INTERSTATE CARRIER : N AVERAGE PRODUCTION: 0K LAST SURVEY DATE: LAST UPDATE DATE : 08/10/88
DEACTIVATION REASON: DEACTIVATION DATE : MANUAL FILL : REGULATE BY : B
FACILITY LATITUDE : 01820 FACILITY LONGITUDE: 06455 SMSA CODE : HYDROLOGICAL ID : 21C4C001

STATE DISCRETIONARY DATA:
BACTERIOLOGICAL FLG: L MINIMUM NUMBER DAILY CHECKS: NON-COMMUNITY SAMPLING FREQ: SEASON:
MONTHLY MONITORING : SAMPLES PER QUARTER : 0 ALL HALT CHECK SAMPLE : START: 01/01
% CHLORINE SUBSTITU: TURBIDITY FLAG : L TURBIDITY LIMIT : 5.0 END : 12/31

CHEMICAL:
ORGANIC BEGIN PERIOD: ORGANIC END PERIOD: # OF TTHM SAMPLES: LABORATORY DATA:
AIR TEMPERATURE : NITRATE FREQUENCY : # OF PLANTS : TTHM SAMPLE FREQ : TYPE : BACT PHYS INORG ORG RAD
CONTROL: N N N N N

RADIOACTIVE:
MONITORING FLAG : 3 BETA FREQUENCY MONTHS: MONITOR GROSS ALPHA: MONITOR RADIUM MONTHS : RADIOACTIVE FLAG: 0
GROUND WATER MONITOR: # OF SAMPLES PER YEAR: NUCLEAR FACILITY : N NUCLEAR FACILITY TYPES:
FACILITY CONTAMINANT ID:
SAMPLING FREQUENCY :

SOURCE AND/OR ENTRY POINT INFORMATION:

(SRC) TYPE	(EPT) NAME	CODE	LATITUDE	LONGITUDE	# OF WELLS	AVAIL	BASIN B	SELLER ID	ENTRY POINT ID	TUBE FLAG	TUBE UNITS	INTAKE APPROACH	INTAKE RELATIVE	INTAKE FLOW	INTAKE SCREEN	INTAKE SCREEN	INTAKE SCREEN	INTAKE SCREEN
SRC	WELL	0	01820	06455		P												
SRC	CISTERN	S	01820	06455		P												

LOCATE STATEMENT:
LOCATE AND LAND OWNED BY VI AND LIES IN N AND LIES IN

TUT 001 1685

FEDERAL REPORTING DATA SYSTEM
PUBLIC WATER SYSTEM - COMPREHENSIVE REPORT

03/03/89 FY 1988
FRDS01 PAGE 43

SORTED BY PWS ID

EPA REGION: 02 SURVEILLANCE STATE: VI PRIMACY: Y PWS ID: VI0000199

OWNER NAME : DEDE'S BAR T36 PHONE: (809) 775-2370 INDIAN RESERVATION CODE:
OWNER ADDRESS: EST TUTU I46-59 PLANT AREA LOCATION: COMPLIANCE CYCLE : 02
ST. THOMAS VI 00801 CITY : POSTAL CODE : VI
MAILING NAME : DEDE'S BAR I COUNTY : PLANT TYPE : N
MAILING ADDRESS: EST TUTU I46-59 ADMIN REGION : OWNER TYPE : I
VI 00801 ADMIN DISTRICT: FRDS COUNTY CODE :

PLANT SERVICE AREA:
RESIDENTIAL: COMPANY TOWN: RECREATION : MOBILE HOMES : INSTITUTION : SCHOOL : OTHER AREA:
MOTEL : RESTAURANT : SERV STATION: CAMPGROUND : PICNIC AREA : LODGE :
MARINA : SKI RESORT : BATHING : VISITOR CENTER: HWY REST AREA: AIRPORT:

ACTIVE INDICATOR : A INITIAL DATE : 07/12/83 BEGIN DATE : 02/01/78 CONSECUTIVE INDICATOR: 0
POPULATION SERVED : 0 NUMBER OF SERVICES: 0 NUMBER OF METERS: 0 # OF CONSECUTIVE PWS :
DESIGN CAPACITY : OK EMERGENCY POWER : OK STORAGE CAPACITY: OK MAXIMUM PRODUCTION : OK
INTERSTATE CARRIER : N AVERAGE PRODUCTION: OK LAST SURVEY DATE: LAST UPDATE DATE : 08/18/88
DEACTIVATION REASON: DEACTIVATION DATE : MANUAL FILE : REGULATE BY : N
FACILITY LATITUDE : 01820 FACILITY LONGITUDE: 06455 SMSA CODE : HYDROLOGICAL ID : 21020001

STATE DISCRETIONARY DATA:
BACTERIOLOGICAL FLG: L MINIMUM NUMBER DAILY CHECKS: NON-COMMUNITY SAMPLING FREQ: 0 SEASON:
MONTHLY MONITORING : SAMPLES PER QUARTER : 0 ALL HALT CHECK SAMPLE : START: 01/01
% CHLORINE SUBSTITU: TURBIDITY FLAG : L TURBIDITY LIMIT : 5.0 END : 12/31

CHEMICAL: LABORATORY DATA:
ORGANIC BEGIN PERIOD: ORGANIC END PERIOD: # OF ITHM SAMPLES: TYPE : BACT PHYS INORG ORG RAD
AIR TEMPERATURE : NITRATE FREQUENCY : # OF PLANTS : CONTROL: N N N N N
ITHM SAMPLE FREQ :

RADIOACTIVE:
MONITORING FLAG : 3 BETA FREQUENCY MONTHS: MONITOR GROSS ALPHA: MONITOR RADIUM MONTHS : RADIOACTIVE FLAG: 0
GROUND WATER MONITOR: # OF SAMPLES PER YEAR: NUCLEAR FACILITY : N NUCLEAR FACILITY TYPES:
FACILITY CONTAMINANT ID:
SAMPLING FREQUENCY :

SOURCE AND/OR ENTRY POINT INFORMATION:

(SRC) TYPE	(EPT) NAME	CODE	LATITUDE	LONGITUDE	# OF WELLS	AVAIL	BASIN #	SELLER ID	ENTRY POINT ID	TURB FLAG	TURB UNITS	Treatments: A ENCLOSURE, P ACTIVATED, C CORROSION, S SEQUESTERING, T TASTE, A AERATION, F FLUORIDATION, D DEMINERALIZATION, C CHLORINATION, R RADIUM REMOVAL
SRC	CISTERN	S	0181944	0645251		P						
SRC	WELL	G	0181944	0645251		P						

LOCATE STATEMENT:
LOCATE (02) CIDD NM EQ 'VI' AND CIN2 EQ 'N' AND CIYY EQ 'A'

TUT 001 1686

FEDERAL REPORTING DATA SYSTEM

01/03/89 PUBLIC WATER SYSTEM - COMPREHENSIVE REPORT FY 1988

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SORTED BY PWS ID

EPA REGION: 02 SURVEILLANCE STATE: VI PRIPACY: Y PWS ID: VI0000238

OWNER NAME : EL PAPAGAYO RESTAURANT I-67 PHONE: (809) 775-1550 INDIAN RESERVATION CODE:
OWNER ADDRESS: ANNA'S RETREAT #126 PLANT AREA LOCATION: COMPLIANCE CYCLE : 01
ST. THOMAS VI 00801 CITY : POSTAL CODE : VI
MAILING NAME : EL PAPAGAYO RESTAURANT I COUNTY : PLANT TYPE : N
MAILING ADDRESS: ANNA'S RETREAT #126 ADMIN REGION : OWNER TYPE : I
CHARLOTTE AMALIE VI 00801 ADMIN DISTRICT: FRDS COUNTY CODE :

PLANT SERVICE AREA:
RESIDENTIAL: COMPANY TOWN: RECREATION : MOBILE HOMES : INSTITUTION : SCHOOL : OTHER AREA:
MOTEL : RESTAURANT : SERV STATION: CAMPGROUND : PICNIC AREA : LODGE :
MARINA : SKI RESORT : BATHING : VISITOR CENTER: HWY REST AREA: AIRPORT:

ACTIVE INDICATOR : A INITIAL DATE : 07/12/83 BEGIN DATE : 02/01/78 CONSECUTIVE INDICATOR: 0
POPULATION SERVED : 25 NUMBER OF SERVICES: 0 NUMBER OF METERS: 0 # OF CONSECUTIVE PWS :
DESIGN CAPACITY : OR EMERGENCY POWER : OR STORAGE CAPACITY: OR MAXIMUM PRODUCTION : OR
INTERSTATE CARRIER : N AVERAGE PRODUCTION: OR LAST SURVEY DATE: LAST UPDATE DATE : 01/31/89
DEACTIVATION REASON: DEACTIVATION DATE : MANUAL FILE : REGULATE BY : B
FACILITY LATITUDE : 01820 FACILITY LONGITUDE: 06455 SMSA CODE : HYDROLOGICAL ID : 21020001

STATE DISCRETIONARY DATA:
BACTERIOLOGICAL FLG: L MINIMUM NUMBER DAILY CHECKS: NON-COMMUNITY SAMPLING FREQ: 0 SEASON:
MONTHLY MONITORING : SAMPLES PER QUARTER : 0 ALL HALT CHECK SAMPLE : START: 01/01
* CHLORINE SUBSTITU: TURBIDITY FLAG : L TURBIDITY LIMIT : 5.0 END : 12/31

CHEMICAL:
ORGANIC BEGIN PERIOD: ORGANIC END PERIOD: # OF ITHM SAMPLES:
AIR TEMPERATURE : NITRATE FREQUENCY : # OF PLANTS :
ITHM SAMPLE FREQ :

LABORATORY DATA:
TYPE : BACT PHYS INORG ORG RAD
CONTROL: N N R N N

RADIOACTIVE:
MONITORING FLAG : I BETA FREQUENCY MONTHS: MONITOR GROSS ALPHA: MONITOR RADIUM MONTHS : RADIOACTIVE FLAG: 0
GROUND WATER MONITOR: # OF SAMPLES PER YEAR: NUCLEAR FACILITY : N NUCLEAR FACILITY TYPES:
FACILITY CONTAMINANT ID:
SAMPLING FREQUENCY :

SOURCE AND/OR ENTRY POINT INFORMATION:

(SRC) TYPE	NAME	(EPT) CODE	LATITUDE	LONGITUDE	# OF WELLS	AVAIL	BASIN #	SELLER ID	ENTRY POINT ID	TURB FLAG	TURB UNITS	TREATMENTS A E R A	P E A D	C E C L	S R F I	F A S T	C C A I	S T I N	I M L U	A E A I	F F S R	U I H I	O L S K	R E S 1	R E S 2	S E S 3
SRC	HOLDING TANK	5	0182029	0645309		P																				
SRC	WELL	6	0182028	0645315		P																				

LOCATE STATEMENT:
LOCATE (0) C100 WH C2 EQ VI AND C182 EQ N AND C194 EQ A:

OCT 001 1687

REFERENCE NO. 42

FEDERAL REPORTING DATA SYSTEM
PUBLIC WATER SYSTEM - COMPREHENSIVE REPORT

SORTED BY PWS ID

EPA REGION: 02 SURVEILLANCE STATE: VI PRIMACY: Y PWS ID: VI0000487

OWNER NAME	HARTMAN WELL SERVICE T131A		PHONE:	INDIAN RESERVATION CODE:	
OWNER ADDRESS:	EST TUTO		PLANT AREA LOCATION:	COMPLIANCE CYCLE	VI
	ST. THOMAS	VI 00801	CITY	POSTAL CODE	VI
MAILING NAME	HARTMAN WELL SERVICE T131A		COUNTY	PLANT TYPE	N
MAILING ADDRESS:	EST TUTO		ADMIN REGION	OWNER TYPE	O
	ST. THOMAS	VI 00801	ADMIN DISTRICT:	FRDS COUNTY CODE	

PLANT SERVICE AREA:

RESIDENTIAL:	COMPANY TOWN:	RECREATION	MOBILE HOMES	INSTITUTION	SCHOOL	OTHER AREA:
MOTEL	RESTAURANT	SERV STATION:	CAMPGROUND	PICNIC AREA	LODGE	
MARINA	SKI RESORT	BATHING	VISITOR CENTER:	HWY REST AREA:	AIRPORT:	

ACTIVE INDICATOR	A	INITIAL DATE	07/12/83	BEGIN DATE	06/01/77	CONSECUTIVE INDICATOR:	U
POPULATION SERVED	200	NUMBER OF SERVICES:	0	NUMBER OF METERS:	0	# OF CONSECUTIVE PWS	
DESIGN CAPACITY	OK	EMERGENCY POWER	OK	STORAGE CAPACITY:	OK	MAXIMUM PRODUCTION	OK
INTERSTATE CARRIER	N	AVERAGE PRODUCTION:	OK	LAST SURVEY DATE:		LAST UPDATE DATE	08/22/88
DEACTIVATION REASON:		DEACTIVATION DATE		MANUAL FILE		REGULATE BY	B
FACILITY LATITUDE	01820	FACILITY LONGITUDE:	06455	SMSA CODE		HYDROLOGICAL ID	21020001

STATE DISCRETIONARY DATA:

BACTERIOLOGICAL FLG:	L	MINIMUM NUMBER DAILY CHECKS:		NON-COMMUNITY SAMPLING FREQ:		SEASON:	
MONTHLY MONITORING		SAMPLES PER QUARTER		MCL HALT CHECK SAMPLE		START: 00/00	
% CHLORINE SUBSTITU:		TURBIDITY FLAG	L	TURBIDITY LIMIT	5.0	END: 00/00	

CHEMICAL:

ORGANIC BEGIN PERIOD:	ORGANIC END PERIOD:	# OF TTHM SAMPLES:		LABORATORY DATA:	
AIR TEMPERATURE	NITRATE FREQUENCY	# OF PLANTS		TYPE: BACT PHYS INORG ORG RAD	
		TTHM SAMPLE FREQ:		CONTROL: N N N N N	

RADIOACTIVE:

MONITORING FLAG	3	BETA FREQUENCY MONTHS:		MONITOR GROSS ALPHA:		MONITOR RADION MONTHS	RADIOACTIVE FLAG: Y
GROUND WATER MONITOR:		# OF SAMPLES PER YEAR:		NUCLEAR FACILITY	N	NUCLEAR FACILITY TYPES:	
FACILITY CONTAMINANT ID:							
SAMPLING FREQUENCY							

SOURCE AND/OR ENTRY POINT INFORMATION:

(SRC) TYPE	(EPT) NAME	CODE	LATITUDE	LONGITUDE	# OF WELLS	AVAIL	BASIN #	SELLER ID	ENTRY POINT ID	TURB FLAG	TURB UNITS	TREATMENTS A C G I T M T T N U U I N I 1 2 3	A E R E I O U A M M L I T L L L R E R O L R P S O N R S M S S S
SRC	WELL	6	0182020	0645320		P							Y

LOCATE STATEMENT:
LOCATE (0) C100 BH C2 EQ VI AND C102 EQ N AND C194 EQ A:

TUT 001 1689

EPA REGION: 02 SURVEILLANCE STATE: VI PRIMACY: Y PWS ID: VI0000259

OWNER NAME : THE LANTEIN BAR & REST. INC PHONE: (809) 775-3395 INDIAN RESERVATION CODE:
OWNER ADDRESS: MARIENDAHL 2-AB PLANT AREA LOCATION: COMPLIANCE CYCLE : 01
ST. THOMAS VI 00801 CITY : POSTAL CODE : VI
MAILING NAME : THE LANTEIN BAR & REST I COUNTY : PLANT TYPE : N
MAILING ADDRESS: MARIENDAHL 2-AB ADMIN REGION : OWNER TYPE : I
VI 00801 ADMIN DISTRICT: FRDS COUNTY CODE :

PLANT SERVICE AREA:
RESIDENTIAL: COMPANY TOWN: RECREATION : MOBILE HOMES : INSTITUTION : SCHOOL : OTHER AREA:
MOTEL : RESTAURANT : SERV STATION: CAMPGROUND : PICNIC AREA : LODGE :
MARINA : SKI RESORT : BATHING : VISITOR CENTER: HWY REST AREA: AIRPORT:

ACTIVE INDICATOR : A INITIAL DATE : 07/12/83 BEGIN DATE : 02/01/78 CONSECUTIVE INDICATOR: 0
POPULATION SERVED : 25 NUMBER OF SERVICES: 0 NUMBER OF METERS: 0 # OF CONSECUTIVE PWS :
DESIGN CAPACITY : OK EMERGENCY POWER : OK STORAGE CAPACITY: OK MAXIMUM PRODUCTION : OK
INTERSTATE CARRIER : N AVERAGE PRODUCTION: OK LAST SURVEY DATE: LAST UPDATE DATE : 11/05/85
DEACTIVATION REASON: DEACTIVATION DATE : MANUAL FILE : REGULATE BY : B
FACILITY LATITUDE : 01820 FACILITY LONGITUDE: 06455 SMSA CODE : HYDROLOGICAL ID : 21020001

STATE DISCRETIONARY DATA:
BACTERIOLOGICAL FLG: L MINIMUM NUMBER DAILY CHECKS: NON-COMMUNITY SAMPLING FREQ: 0 SEASON:
MONTHLY MONITORING : SAMPLES PER QUARTER : 0 MCL HALT CHECK SAMPLE : START: 01/01
& CHLORINE SUBSTITUT TURBIDITY FLAG : L TURBIDITY LIMIT : 5.0 END : 12/31

CHEMICAL:
ORGANIC BEGIN PERIOD: ORGANIC END PERIOD: # OF TTHM SAMPLES: LABORATORY DATA:
AIR TEMPERATURE : NITRATE FREQUENCY : # OF PLANTS : TYPE : BACT PHYS INORG ORG RAD
TTHM SAMPLE FREQ : CONTROL: N N N N N

RADIOACTIVE:
MONITORING FLAG : 5 BETA FREQUENCY MONTHS: MONITOR GROSS ALPHA: MONITOR RADIUM MONTHS : RADIOACTIVE FLAG: 0
GROUND WATER MONITOR: # OF SAMPLES PER YEAR: NUCLEAR FACILITY : N NUCLEAR FACILITY TYPES:
FACILITY CONTAMINANT ID:
SAMPLING FREQUENCY :

SOURCE AND/OR ENTRY POINT INFORMATION:

(SRC) (EPT) TYPE	NAME	CODE	LATITUDE	LONGITUDE	# OF WELLS	AVAIL	BASIN #	SELLER ID	ENTRY POINT ID	TURB FLAG	TURB UNITS	TREATMENTS A C G I T R T T N O U I R I 2 3 : A E R O E I O O A R M L I T E E E P A U L M F S U M A S M S S S
SRC	CISTERN	S	0181930	0645239		P						
SRC	WELL	G	0181936	0645239		P						

LOCATE STATEMENT:
LOCATE (D) C100 EQ C2 EQ VI AND C182 EQ N AND C154 EQ A:

TUI 001 1690

LOCATE (0) C100 WH C2 EQ VI AND C182 EQ N AND C194 EQ A;

FEDERAL REPORTING DATA SYSTEM
PUBLIC WATER SYSTEM - COMPREHENSIVE REPORT
FRDS01 SORTED BY PWS ID

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EPA REGION: 02 SURVEILLANCE STATE: VI PRIMACY: Y PWS ID: VI0000521

OWNER NAME	LOCKHART WELL 1298	PHONE		INDIAN RESERVATION CODE	
OWNER ADDRESS	ESTATE THOMAS	PLANT AREA LOCATION		COMPLIANCE CYCLE	VI
	ST. THOMAS VI 00801	CITY		POSTAL CODE	VI
MAILING NAME	LOCKHART WELL 1298	COUNTY		PLANT TYPE	N
MAILING ADDRESS	ESTATE THOMAS	ADMIN REGION		OWNER TYPE	O
	ST. THOMAS VI 00801	ADMIN DISTRICT		FRDS COUNTY CODE	

PLANT SERVICE AREA:

RESIDENTIAL	COMPANY TOWN	RECREATION	MOBILE HOMES	INSTITUTION	SCHOOL	OTHER AREA	
MOTEL	RESTAURANT	SERV STATION	CAMPGROUND	PICNIC AREA	LODGE		
MARINA	SKI RESORT	BATHING	VISITOR CENTER	HWY REST AREA	AIRPORT		

ACTIVE INDICATOR	A	INITIAL DATE	07/12/83	BEGIN DATE	06/01/77
POPULATION SERVED	100	NUMBER OF SERVICES	0	NUMBER OF METERS	0
DESIGN CAPACITY	OK	EMERGENCY POWER	OK	STORAGE CAPACITY	OK
INTERSTATE CARRIER	N	AVERAGE PRODUCTION	OK	LAST SURVEY DATE	
DEACTIVATION REASON		DEACTIVATION DATE		MANUAL FILE	
FACILITY LATITUDE	01820	FACILITY LONGITUDE	06455	SMSA CODE	
CONSECUTIVE INDICATOR		0			
# OF CONSECUTIVE PWS		0			
MAXIMUM PRODUCTION		OK			
LAST UPDATE DATE		08/22/88			
REGULATE BY		B			
HYDROLOGICAL ID		21020001			

STATE DISCRETIONARY DATA:

BACTERIOLOGICAL FLG	L	MINIMUM NUMBER DAILY CHECKS		NON-COMMUNITY SAMPLING FREQ	
MONTHLY MONITORING		SAMPLES PER QUARTER		MCL HALT CHECK SAMPLE	
% CHLORINE SUBSTITU		TURBIDITY FLAG	L	TURBIDITY LIMIT	5.0
SEASON					
START	00/00				
END	00/00				

CHEMICAL:

ORGANIC BEGIN PERIOD		ORGANIC END PERIOD		# OF TTHM SAMPLES	
AIR TEMPERATURE		NITRATE FREQUENCY		# OF PLANTS	
				TTHM SAMPLE FREQ	

LABORATORY DATA:

TYPE	HALT	PHYS	INORG	VOC	RAD
CONTROL	N	N	N	N	N

RADIOACTIVE:

MONITORING FLAG	3	BETA FREQUENCY MONTHS		MONITOR GROSS ALPHA		MONITOR RADIUM MONTHS	
GROUND WATER MONITOR		# OF SAMPLES PER YEAR		NUCLEAR FACILITY	N	NUCLEAR FACILITY TYPES	
FACILITY CONTAMINANT ID						RADIOACTIVE FLAG	Y
SAMPLING FREQUENCY							

SOURCE AND/OR ENTRY POINT INFORMATION:

(SRC) TYPE	(EPT) NAME	LOWE	LATITUDE	LONGITUDE	# OF WELLS	AVAIL	BASIN #	SELLER ID	ENTRY POINT ID	TURB FLAG	TURB UNITS	TREATMENTS A E R A L I T R A T T N U U I K 1 2 3	A P L S F L S I I A P D U K R R E K U E I O U A R N L I T E E E
SRC	ON SITE WELLS	6	01820439	0645500	6	P						Y	

LOCATE STATEMENT:
LOCATE (0) C100 WH C2 EQ VI AND C182 EQ N AND C194 EQ A;

TUT 001 1691

SORTED BY PWS ID

LPA REGION: 02 SURVEILLANCE STATE: VI PRIMACY: Y PWS ID: VI0000520

OWNER NAME	DONOE WATER SERVICE T29A	PHONE:		INDIAN RESERVATION CODE:	
OWNER ADDRESS:	ESTATE DONOE	PLANT AREA LOCATION:		COMPLIANCE CYCLE	01
	ST. THOMAS VI 00801	CITY		POSTAL CODE	VI
MAILING NAME	DONOE WATER SERVICE T29A	COUNTY		PLANT TYPE	N
MAILING ADDRESS:	ESTATE DONOE	ADMIN REGION		OWNER TYPE	O
	ST. THOMAS VI 00801	ADMIN DISTRICT:		FRDS COUNTY CODE	

PLANT SERVICE AREA:

RESIDENTIAL:	COMPANY TOWN:	RECREATION	MOBILE HOMES	INSTITUTION	SCHOOL	OTHER AREA:	
MOTEL	RESTAURANT	SERV STATION:	CAMPGROUND	PICNIC AREA	LODGE		
MARINA	SKI RESORT	BATHING	VISITOR CENTER:	HWY REST AREA:	AIRPORT:		

ACTIVE INDICATOR	A	INITIAL DATE	07/12/83	BEGIN DATE	06/01/77	CONSECUTIVE INDICATOR:	0
POPULATION SERVED	100	NUMBER OF SERVICES:	0	NUMBER OF METERS:	0	# OF CONSECUTIVE PWS	
DESIGN CAPACITY	OK	EMERGENCY POWER	OK	STORAGE CAPACITY:	OK	MAXIMUM PRODUCTION	OK
INTERSTATE CARRIER	N	AVERAGE PRODUCTION:	OK	LAST SURVEY DATE:		LAST UPDATE DATE	08/22/88
DEACTIVATION REASON:		DEACTIVATION DATE		MANUAL FILE		REGULATE BY	B
FACILITY LATITUDE	01820	FACILITY LONGITUDE:	00655	SMSA CODE		HYDROLOGICAL ID	21020001

STATE DISCRETIONARY DATA:

BACTERIOLOGICAL FLG:	L	MINIMUM NUMBER DAILY CHECKS:	NON-COMMUNITY SAMPLING FREQ:	SEASON	
MONTHLY MONITORING		SAMPLES PER QUARTER	MCL HALT CHECK SAMPLE	START:	00/00
% CHLORINE SUBSTITU:		TURBIDITY FLAG	L TURBIDITY LIMIT: 5.0	END	00/00

CHEMICAL:

ORGANIC BEGIN PERIOD:		ORGANIC END PERIOD:	# OF TTHM SAMPLES:	LABORATORY DATA:						
AIR TEMPERATURE		NITRATE FREQUENCY	# OF PLANTS	TYPE	BACT	PHYS	INORG	ORG	RAD	
			TTHM SAMPLE FREQ	CONTROL:	N	N	N	N	N	

RADIOACTIVE:

MONITORING FLAG	3	BETA FREQUENCY MONTHS:	MONITOR GROSS ALPHA:	MONITOR RADIUM MONTHS		RADIOACTIVE FLAG	4
GROUND WATER MONITOR:		# OF SAMPLES PER YEAR:	NUCLEAR FACILITY	N	NUCLEAR FACILITY TYPES:		
FACILITY CONTAMINANT ID:							
SAMPLING FREQUENCY							

SOURCE AND/OR ENTRY POINT INFORMATION:

(SRC) TYPE	NAME	(EPT) CODE	LATITUDE	LONGITUDE	# OF WELLS	AVAIL	BASIN #	SELLER ID	ENTRY POINT ID	TURB FLAG	TURB UNITS	TREATMENTS A E R A C	P R E G	C O A I	S D R T	F E M R	C A N T	I E E R	A R A E	P L S A	U I N T	R T E R	R E E S 1	R E E S 2	R E E S 3
SRC	ON SITE WELLS	6	018203	0645350	4	P																	Y		

LOCATE STATEMENT:
LOCATE (0) C100 EQ C2 AND C102 EQ N AND C194 EQ A:

TUT 001 1692

SORTED BY PWS ID

EPA REGION: 02 SURVEILLANCE STATE: VI PRIMACY: Y PWS ID: VI0000509

OWNER NAME : GERRITTS & WINDS PLAZA T164		PHONE:		INDIAN RESERVATION CODE:	
OWNER ADDRESS: ESTATE TUTU		PLANT AREA LOCATION:		COMPLIANCE CYCLE :	01
ST. THOMAS	VI 00801	CITY :		POSTAL CODE :	VI
MAILING NAME : GERRITTS & WINDS PLAZA T164		COUNTY :		PLANT TYPE :	N
MAILING ADDRESS: ESTATE TUTU		ADMIN REGION :		OWNER TYPE :	O
ST. THOMAS	VI 00801	ADMIN DISTRICT:		FRDS COUNTY CODE :	

PLANT SERVICE AREA:

RESIDENTIAL:	COMPANY TOWN:	RECREATION :	MOBILE HOMES :	INSTITUTION :	SCHOOL :	OTHER AREA:	
MOTEL :	RESTAURANT :	SERV STATION:	CAMPGROUND :	PICNIC AREA :	LODGE :		
MARINA :	SKI RESORT :	BATHING :	VISITOR CENTER:	HWY REST AREA:	AIRPORT:		

ACTIVE INDICATOR :	A	INITIAL DATE :	07/12/83	BEGIN DATE :	06/01/77	CONSECUTIVE INDICATOR:	O
POPULATION SERVED :	100	NUMBER OF SERVICES:	0	NUMBER OF METERS:	0	# OF CONSECUTIVE PWS :	
DESIGN CAPACITY :	OK	EMERGENCY POWER :	OK	STORAGE CAPACITY:	OK	MAXIMUM PRODUCTION :	OK
INTERSTATE CARRIER :	N	AVERAGE PRODUCTION:	OK	LAST SURVEY DATE:		LAST UPDATE DATE :	08/22/88
DEACTIVATION REASON:		DEACTIVATION DATE :		MANUAL FILE :		REGULATE BY :	S
FACILITY LATITUDE :	01820	FACILITY LONGITUDE:	06455	SMSA CODE :		HYDROLOGICAL ID :	21020001

STATE DISCRETIONARY DATA:

BACTERIOLOGICAL FLG:	L	MINIMUM NUMBER DAILY CHECKS:		NON-COMMUNITY SAMPLING FREQ:		SEASON:	
MONTHLY MONITORING :		SAMPLES PER QUARTER :		ALL HALT CHECK SAMPLE :		START:	00/00
& CHLORINE SUBSTITU:		TURBIDITY FLAG :	L	TURBIDITY LIMIT :	5.0	END :	00/00

CHEMICAL:

ORGANIC BEGIN PERIOD:	ORGANIC END PERIOD:	# OF TTHM SAMPLES:		LABORATORY DATA:	
AIR TEMPERATURE :	NITRATE FREQUENCY :	# OF PLANTS :		TYPE : BACT PHYS INORG ORG RAD	
		TTHM SAMPLE FREQ :		CONTROL: N N N N N	

RADIOACTIVE:

MONITORING FLAG :	J	BETA FREQUENCY MONTHS:		MONITOR GROSS ALPHA:		MONITOR RADIUM MONTHS :	RADIOACTIVE FLAG: A
GROUND WATER MONITOR:		# OF SAMPLES PER YEAR:		NUCLEAR FACILITY :	N	NUCLEAR FACILITY TYPES:	
FACILITY CONTAMINANT ID:							
SAMPLING FREQUENCY :							

SOURCE AND/OR ENTRY POINT INFORMATION:

(SRC) (EPT)											TREATMENTS											
TYPE	NAME	CODE	LATITUDE	LONGITUDE	# OF WELLS	AVAIL	BASIN #	SELLER ID	ENTRY POINT ID	TURB FLAG	TURB UNITS	A E R A	P R E C	C O A D	S I R F	F O L R	C O R T	I L T N	A R M U	F U L D	U R E I	R R E A	R E E S	S S S S
												A	C	G	I	T	R	T	N	U	D	I	R	1	2	3
SRC	CISTERN	S	0182030	0645326		P																Y				
SRC	ON SITE WELL	G	0182030	0645326		P																Y				

LOCATE STATEMENT:
LOCATE (O) C100 EQ C2 EQ VI AND C102 EQ N AND C194 EQ A:

SORTED BY PWS ID

TUT 001 1693

LOCATE STATEMENT:
LOCATE (0) C100 WH C2 EQ VI AND C102 EQ N AND C194 EQ A:

NATIONAL REPORTING DATA SYSTEM
PUBLIC WATER SYSTEM - COMPREHENSIVE REPORT
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PRDS01
SORTED BY PWS ID

EPA REGION: 02 SURVEILLANCE STATE: VI PRIMACY: Y PWS ID: VI0000504

OWNER NAME : BRYAN WELL SERVICE TIOO
OWNER ADDRESS: ESTATE DONOE
ST. THOMAS VI 00801
MAILING NAME : BRYAN WELL SERVICE TIOO
MAILING ADDRESS: ESTATE DONOE
ST. THOMAS VI 00801
PHONE:
PLANT AREA LOCATION:
CITY :
COUNTY :
ADMIN REGION :
ADMIN DISTRICT:
INDIAN RESERVATION CODE:
COMPLIANCE CYCLE : 01
POSTAL CODE : VI
PLANT TYPE : N
OWNER TYPE : O
PRDS COUNTY CODE :

PLANT SERVICE AREA:
RESIDENTIAL: COM: CITY TOWN: RECREATION : MOBILE HOMES : INSTITUTION : SEASONAL : OTHER AREA:
MOTEL : RESTAURANT : SERV STATION: CAMPGROUND : PICNIC AREA : LODGE :
MARINA : SKI RESORT : BATHING : VISITOR CENTER: REST REST AREA: AIRPORT:

ACTIVE INDICATOR : A INITIAL DATE : 07/12/83 BEGIN DATE : 08/01/77 CONSECUTIVE INDICATOR: 0
PUPULATION SERVED : 50 NUMBER OF SERVICES: 0 NUMBER OF METERS: 0 # OF CONSECUTIVE PWS :
DESIGN CAPACITY : 0K EMERGENCY POWER : 0K STORAGE CAPACITY: 0K MAXIMUM PRODUCTION : 0K
INTERSTATE CARRIER : N AVERAGE PRODUCTION: 0K LAST SURVEY DATE: LAST UPDATE DATE : 08/22/88
DEACTIVATION REASON: DEACTIVATION DATE : MANUAL FLG: REGULATE BY : B
FACILITY LATITUDE : 01820 FACILITY LONGITUDE: 06455 SMSA CODE : HYDROLOGICAL ID : 21020001

STATE DISCRETIONARY DATA:
BACTERIOLOGICAL FLG: L MINIMUM NUMBER DAILY CHECKS: NON-COMMUNITY SAMPLING FREQ: SEASON:
MONTHLY MONITORING : SAMPLES PER QUARTER : ALL HALT CHECK SAMPLE : START: 00/00
% CHLORINE SUBSTITU: TURBIDITY FLAG : L TURBIDITY LIMIT : 5.0 END : 00/00

CHEMICAL:
ORGANIC BEGIN PERIOD: ORGANIC END PERIOD: # OF TTHM SAMPLES:
AIR TEMPERATURE : NITRATE FREQUENCY : # OF PLANTS :
TTHM SAMPLE FREQ :

LABORATORY DATA:

TYPE	BACT	PHYS	INORG	ORG	RAD
CONTROLT	N	N	N	N	N

RADIOACTIVE:
MONITORING FLAG : 3 BETA FREQUENCY MONTHS: MONITOR GROSS ALPHA: MONITOR RADIUM MONTHS : RADIOACTIVE FLAG: 4
GROUND WATER MONITOR: # OF SAMPLES PER YEAR: NUCLEAR FACILITY : N NUCLEAR FACILITY TYPES:
FACILITY CONTAMINANT ID:
SAMPLING FREQUENCY :

SOURCE AND/OR ENTRY POINT INFORMATION:

(SRC) TYPE	NAME	CODE	LATITUDE	LONGITUDE	# OF WELLS	AVAIL	BASIN #	SELLER ID	(EPT) ENTRY POINT ID	TURB FLAG	TURB UNITS	TREATMENTS A E M G E I O U A M M L I T E E T R E A D C R F S O M A S M S S S A C G I T M T T N U D I R I 2 3
SRC	ON SITE WELLS	6	0182033	0649550	3	P						Y

LOCATE STATEMENT:
LOCATE (0) C100 WH C2 EQ VI AND C102 EQ N AND C194 EQ A:

TUT 001 1694

SORTED BY PWS ID

EPA REGION: 02 SURVEILLANCE STATE: VI PRIMACY: Y PWS ID: VI00001

OWNER NAME : TUTU HR VIHA BLDG 14 T1&1R — PHONE: (809) 775-2761 — INDIAN RESERVATION CODE:
OWNER ADDRESS: ESTATE TUTU CHARLOTTE AMALIE — PLANT AREA LOCATION: — COMPLIANCE CYCLE : 01
ST. THOMAS — VI 00801 — CITY : — TUTU — POSTAL CODE : VI
MAILING NAME : TUTU HR VIHA BLDG 14 T1&1R — COUNTY : — PLANT TYPE : L
MAILING ADDRESS: ESTATE TUTU CHARLOTTE AMALIE — ADMIN REGION : — OWNER TYPE : S
ST. THOMAS — VI 00801 — ADMIN DISTRICT: — FRDS COUNTY CODE :

PLANT SERVICE AREA:
RESIDENTIAL: COMPANY TOWN: RECREATION : MOBILE HOMES : INSTITUTION : SCHOOL : OTHER AREA:
MOTEL : RESTAURANT : SERV STATION: CAMPGROUND : PICNIC AREA : LODGE :
MARINA : SKI RESORT : BATHING : VISITOR CENTER: HWY REST AREA: AIRPORT:

ACTIVE INDICATOR : A INITIAL DATE : 07/12/83 BEGIN DATE : 08/01/77 CONSECUTIVE INDICATOR: 0
POPULATION SERVED : 778 NUMBER OF SERVICES: 0 NUMBER OF METERS: 0 # OF CONSECUTIVE PWS :
DESIGN CAPACITY : OK EMERGENCY POWER : OK STORAGE CAPACITY: OK MAXIMUM PRODUCTION : OK
INTERSTATE CARRIER : N AVERAGE PRODUCTION: OK LAST SURVEY DATE: 04/19/88 LAST UPDATE DATE : 12/19/88
DEACTIVATION REASON: DEACTIVATION DATE : MANUAL FILE : REGULATE BY : B
FACILITY LATITUDE : 01820 FACILITY LONGITUDE: 06455 SMSA CODE : HYDROLOGICAL ID : 21020001

STATE DISCRETIONARY DATA:
BACTERIOLOGICAL FLG: L MINIMUM NUMBER DAILY CHECKS: NON-COMMUNITY SAMPLING FREQ: SEASON:
MONTHLY MONITORING : SAMPLES PER QUARTER : 0 MCL HALT CHECK SAMPLE : START: 00/00
CHLORINE SUBSTITU: TURBIDITY FLAG : L TURBIDITY LIMIT : 5.0 END : 00/00

CHEMICAL:
ORGANIC BEGIN PERIOD: ORGANIC END PERIOD: # OF TTHM SAMPLES: LABORATORY DATA:
AIR TEMPERATURE : NITRATE FREQUENCY : # OF PLANTS : TYPE : BACT PHYS INORG ORG RAD
TTHM SAMPLE FREQ : CONTROL: N N N N N

RADIOACTIVE:
MONITORING FLAG : 3 BETA FREQUENCY MONTHS: MONITOR GROSS ALPHA: MONITOR RADIUM MONTHS : RADIOACTIVE FLAG: Y
GROUND WATER MUNITION: # OF SAMPLES PER YEAR: NUCLEAR FACILITY : N NUCLEAR FACILITY TYPES:
FACILITY CONTAMINANT ID:
SAMPLING FREQUENCY :

SOURCE AND/OR ENTRY POINT INFORMATION:

(SRC) TYPE	NAME	(EPT) CODE	LATITUDE	LONGITUDE	# OF WELLS	AVAIL	BASIN #	SELLER ID	ENTRY POINT ID	TURB FLAG	TURB UNITS	TREATMENTS: AERATION	CHLORINATION	SEQUESTERING	FLUORIDATION	CORROSION CONTROL	TASTE & ODOR	IRON & MANGANESE	ASBESTOS FIBER	DISINFECTION BYPRODUCTS	ORGANIC REMOVAL	RADIUM REMOVAL	SOFTENING	SYNTHETIC ORGANIC REMOVAL	VOLATILE ORGANIC REMOVAL
SRC	CISTERNS	S	0182034	0645253		P						Y	Y					Y	Y						
SRC	TRUCKED WATER	P				P		0000000																	
SRC	WAPA	P				P		0000993				Y	Y					Y							
SRC	VIHA WELLFIELD	G			4	E						Y	Y					Y	Y						

LOCATE STATEMENT:
LOCATE (U) C100 EQ 02 AND C102 EQ VI AND C104 EQ L AND C199 EQ A;

EPA REGION: 02 SURVEILLANCE STATE: VI PRIMACY: Y PWS ID: VI3000140

OWNER NAME	TUTU HR VIHA DECD 7 71416		PHONE: (809) 775-2761		INDIAN RESERVATION CODE:		
OWNER ADDRESS:	ESTATE TUTU CHARLOTTE AMALIE		PLANT AREA LOCATION:		COMPLIANCE CYCLE	:	01
	St. THOMAS	VI 00801	CITY :	TUTU	POSTAL CODE	:	VI
MAILING NAME	TUTU HR VIHA DECD 7 71416		COUNTY :		PLANT TYPE	:	C
MAILING ADDRESS:	ESTATE TUTU CHARLOTTE AMALIE		ADMIN REGION :		OWNER TYPE	:	S
	St. THOMAS	VI 00801	ADMIN DISTRICT:		FRDS COUNTY CODE	:	

PLANT SERVICE AREA:

RESIDENTIAL:	COMPANY TOWN:	RECREATION :	MOBILE HOMES :	INSTITUTION :	SCHOOL :	OTHER AREA:	
MOTEL :	RESTAURANT :	SERV STATION:	CAMPGROUND :	PICNIC AREA :	LODGE :		
MARINA :	SKI RESORT :	BATHING :	VISITOR CENTER:	HWY REST AREA:	AIRPORT:		

ACTIVE INDICATOR :	A	INITIAL DATE :	07/12/83	BEGIN DATE :	06/01/77	CONSECUTIVE INDICATOR:	0
POPULATION SERVED :	750	NUMBER OF SERVICES:	0	NUMBER OF METERS:	0	# OF CONSECUTIVE PWS :	
DESIGN CAPACITY :	0K	EMERGENCY POWER :	0K	STORAGE CAPACITY:	0K	MAXIMUM PRODUCTION :	0K
INTERSTATE CARRIER :	N	AVERAGE PRODUCTION:	0K	LAST SURVEY DATE:	04/19/88	LAST UPDATE DATE :	12/19/88
DEACTIVATION REASON:		DEACTIVATION DATE :		MANUAL FILE :		REGULATE BY :	B
FACILITY LATITUDE :	01020	FACILITY LONGITUDE:	06455	SMSA CODE :		HYDROLOGICAL ID :	21020001

STATE DISCRETIONARY DATA:

BACTERIOLOGICAL PLG:	L	MINIMUM NUMBER DAILY CHECKS:		NON-COMMUNITY SAMPLING FREQ:		SEASON:	
MONTHLY MONITORING :		SAMPLES PER QUARTER :	0	ALL HALT CHECK SAMPLE :		START: 00/00	
% CHLORINE SUBSTITU:		TURBIDITY FLAG :	L	TURBIDITY LIMIT :	5.0	END : 00/00	

CHEMICAL:

ORGANIC BEGIN PERIOD:	ORGANIC END PERIOD:	# OF TTHM SAMPLES:	LABORATORY DATA:		
AIR TEMPERATURE :	NITRATE FREQUENCY :	# OF PLANTS :	TYPE : BACT	PHYS	INORG	ORG	RAD
		TTHM SAMPLE FREQ :	CONTROL: R	N	R	N	R

RADIOACTIVE:

MONITORING FLAG :	J	BETA FREQUENCY MONTHS:	MONITOR GROSS ALPHA:		MONITOR RADIUM MONTHS :	RADIOACTIVE FLAG:	4
GROUND WATER MONITOR:		# OF SAMPLES PER YEAR:	NUCLEAR FACILITY :	N	NUCLEAR FACILITY TYPES:		
FACILITY CONTAMINANT ID:							
SAMPLING FREQUENCY :							

SOURCE AND/OR ENTRY POINT INFORMATION:

(SRC) TYPE	(EPT) NAME	CODE	LATITUDE	LONGITUDE	# OF WELLS	AVAIL	BASIN #	SELLER ID	ENTRY POINT ID	TURB FLAG	TURB UNITS	TREATMENTS A E R U E I G U A K M L I T E E E R E R D L R P S O M R S W S S S A C G I I R T I N O U I N 1 2 3
SRC	CISTERNS	S	0102034	0645253		P						Y Y Y Y
SRC	TRUCKED WATER	P				P		0000000				
SRC	WAPA	P				P		0000493				Y Y Y
SRC	VIHA WELLFIELD	G			6	E						Y Y Y Y

LOCATE STATEMENT:
LOCATE (01) C100 AN C2 EQ VI AND C102 EQ C AND C194 EQ A:

TUIT 001 1496

REFERENCE NO. 43

NUS CORPORATION AND SUBSIDIARIES			STANDARD CALCULATION SHEET
CLIENT:	FILE NO.:	BY:	PAGE 2 OF 2
SUBJECT:		CHECKED BY:	DATE:

L Nos.	Ref No. 3	Ref. No. 8	Ref. No. 17	Ref. No. 18	Ref. No. 20
			61	15-45	
			62	15-44	
			63	15-42	
			64	15-41	
			65	15-40	
			66	15-39	
			67	10-8	
	19*		68	9-95	M*
		-	69	10-29	-
		-	70	10-36	-
		-	71	10-33	-
	9	32	?	?	K
	23	-	?	?	-

* Owner of this well owns several wells listed under the same name. However, these wells cannot be distinguished from each other in references 3 and 20; and matched up to wells in references 17 and 18 because there is not a unique I.D. number presented in references 3 and 20.

TUT 001 1697

NUS CORPORATION AND SUBSIDIARIES			STANDARD CALCULATION SHEET
CLIENT: USEPA	FILE NO.: C 2-9102-11/VI2C1K	BY: R. FEINBERG	PAGE · OF
SUBJECT: WELL INVENTORY CROSS REFERENCE		CHECKED BY:	DATE: 4/26/91

THE FOLLOWING IS A WELL INVENTORY CROSS REFERENCE FOR THE TUTU WELLFIELD FHRS DOCUMENTATION PACKAGE. A MATRIX CROSS REFERENCING WELL INVENTORIES AND LISTINGS FOUND IN REFERENCE NOS. 3, 6, 17, 18, + 20 IS FOUND BELOW.

	Ref. No. 3 (Figure 2-2)	Ref. No. 6	Ref. No. 17	Ref. No. 18	Ref. No. 20 (Figure 1)
WELL NOS.	-	-	1	-	-
	-	-	2	9-94	-
	-	-	3	9-95	-
	19*	6	4	9-99	M*
	19*	8	5	9-97	M*
	19*	7	6	9-98	M*
	-	-	7	9-96	-
	1*	2	8	10-10	A*
	1*	3	9	10-11	A*
	1*	1	10	10-12	A*
	19*	4	11	10-13	M*
	19*	5	12	10-14	M*
	-	-	13	10-15	-
	-	-	14	10-16	-
	-	-	15	10-17	-
	-	-	16	10-18	-
	-	-	17	10-19	-
	-	-	18	10-20	-
	-	-	19	10-21	-
	-	26	20	10-22	-
	-	24	21	10-23	I1*
	2*	29	22	10-25	P*
	-	25	23	10-24	I1*
	2*	30	24	10-26	P*
	2*	31	25	10-27	P*
	-	-	26	10-28	-

* Owner of this well owns several wells listed under the same name. However these wells cannot be distinguished from each other in refern 3 and 20; and match up to wells in refernce 17 and 18 because there is not a unique I.D Number presented in references 3 and 20.

NUS CORPORATION AND SUBSIDIARIES			STANDARD CALCULATION SHEET
CLIENT:	FILE NO.:	BY:	PAGE : OF
SUBJECT:		CHECKED BY:	DATE:

Ref. No. 3	Ref. No. E	Ref. No. 17	Ref. No. 1F	Ref. No. 2C
-	22	27	10-37	I2
5	21	28	10-35	J
6	20	29	10-34	-
-	32	30	10-33	-
8	33	31	10-32	Q
7	34	32	10-31	N
-	-	33	10-30	-
-	-	34	10-44	I3
-	-	35	10-42	-
-	-	36	10-41	-
4.2	18	37	10-40	F2
4.3	19	38	10-39	F3
4.1	17	39	10-38	F1
15	9	40	10-6	C
14	-	41	10-7	L
12.2	16	42	10-45	H
12.1	15	43	10-46	G
10	14	44	10-47	S
11	-	45	10-48	O
13.2	11	46	10-50	T2
13.1	10	47	10-49	T1
13.3	12	48	10-51	T3
13.4	13	49	10-52	T4
16	-	50	15-28	D
17.1	36	51	15-29	E1
17.2	37	52	15-30	E2
17.3	38	53	15-31	E3
-	39	54	15-32	-
18	40	55	15-34	B
-	-	56	15-35	-
-	-	57	15-36	-
-	-	58	-	-
-	-	59	15-37	-
-	41	6C	15-38	-

TU7 001 1699

REFERENCE NO. 44

TUT 001 1700

WELL APPROPRIATION PERMITS ISSUED
ST. THOMAS/ST. JOHN

(as of July 31, 1987)

PROPERTY OWNER	TERM OF PERMIT		LOCATION OF WELL	GPD	PERMIT NO.	PURPOSE	WELL DRILLER
AASA Water Supply	2/14/78	2/14/87	#3 Estate Charlotte Amalie	75,000	ST-020-78	commercial	Jolander
ADKINS, Courtland	3/10/78	3/10/90	#7 Estate Charlotte Amalie	500	ST-022-78	domestic	St. Thos.Dairies
ALLISON ENTERPRISES	4/14/[illegible]	4/14/87	Lindberg Bay #70T	6,000	ST-101-80	hotel/condo	Goetz
AMERICAN YACHT CHARTER	[illegible]/02/83	1/02/88	Smith Bay #18A (sea water)	50,000	ST-079-79	marina	Greblick
ANCHORAGE CONDO ASSOC.	[illegible]	5/13/86	#8-57-4 Estate Nazareth	50,000	ST-154-81	hotel/condo	Goetz
ANDRES SUTO, INC.	2/14/78	2/14/90	Contant #17C	500	ST-018-81	domestic	Jolander
ATLAS MOTOR INN	12/31/80	6/22/87	Estate Bakkeroe #5	100,000	ST-076-79	hotel/condo	Greblick
ATLAS MOTOR INN	6/08/84	6/08/86	Estate Bakkeroe - East Point	43,000	ST-181-83	hotel/condo	Krupa
ATLAS MOTOR INN	7/24/82	7/24/86	Estate Bakkeroe #2K (sea water)	500	ST-168-82	hotel/condo	Krupa
BALFOUR, Alan	3/21/86	3/21/88	#10E Lerkenlund	500	ST-216-86	domestic	Krupa
BALL, Vernon	6/22/81	6/22/87	Frydendal #11-4	10,000	ST-122-80	commercial	Greblick
BARBEL, Leo	3/22/78	3/22/86	Estate Raphune #1	10,000	ST-023-78	domestic	Buderas
BENJAMIN, Luther and COFFELT, Gordon	7/23/87	7/23/89	#17A Smith Bay	500	ST-247-87	gas sta/store	Krupa
BERRY, Dante	1/13/84	1/13/91	Lerkenlund #3FA & 3HI	500	ST-183-84	domestic/agr.	Goetz
BERRY, Joseph	11/30/84	11/30/86	Est. St. Peter #6E	500	ST-194-84	agricultural	Goetz
BETTERROADS ASPHALT CORP.	8/18/82	8/18/87	Haypiece Hill, Sub Base	500	ST-169-82	asphalt plant	Krupa
BIBLE BOOK NOOK	5/23/85	5/23/87	Frenchman's Bay #15-12	500	ST-203-85	domestic	Goetz
BLANTON, Henry	7/27/81	7/27/88	Estate Nazareth #9-2	500	ST-162-81	domestic	Greblick

WELL APPROPRIATION PERMITS I ED
ST. THOMAS/ST. JOHN
(as of July 31, 1987)

PROPERTY OWNER	TERM OF PERMIT		LOCATION OF WELL	GPD	PERMIT NO.	PURPOSE	WELL DRILLER
BIGGET, Randolph	6/20/80	6/20/87	Estate Nazareth #12F	450	ST-125-80	, domestic	Jolander
BLUEBEARD'S CASTLE	10/22/85	10/22/87	Taarnebjerge #1	7,500	ST-209-85	flushing	Krupa
BLUEBEARD'S CASTLE	[redacted]	11/5/88	Taarnebjerge #2	500	ST-236-86	agricultural	Goetz
BLYDEN, John		8/21/87	#35 First Ave., Estate Thomas	500	ST-130-80	domestic	Greblick
BOLONGO BAY HOTEL CORP.		3/21/88	Bolongo Lot #105	500	ST-128-86	agricultural	Krupa
BOSCHULTE, Louis	7/27/81	7/27/88	#77 Estate Solberg	500	ST-161-81	domestic	Greblick
BOYLAN, Jeffrey	4/07/86	4/07/88	Dorothea #16H	500	ST-219-86	domestic	Krupa
BRUN, Henri	5/20/80	5/20/87	Hull Bay #2D	500	ST-110-80	agricultural	Jolander
BRUH, John	6/14/78	6/14/90	Frydenhoj #33	400	ST-038-78	domestic	Jolander
BRYAN, Carl J.	7/27/77	7/27/97	Estate Dorothea #2Ca	1,000	ST-001-78	agricultural	Greblick
BRYAN, Edwin	7/02/80	7/02/82	Estate St. Peter #6G2	500	ST-128-80	domestic	Jolander
BRYAN, John F.	1/02/80	1/02/87	Estate Dorothea #3K	8,000	ST-081-80	agr/commercial	Goetz
BRYAN, Leopold	10/22/80	10/22/82	Estate Hull #4	500	ST-134-80	agricultural	Greblick
BRYAN, Mario	2/07/78	2/07/80	Donoe Lot C (3 wells)	80,000	ST-016/78 ST-027-78 ST-028-78	commercial	Greblick
CALVARY BAPTIST CHURCH	11/21/79	11/21/85	Altona & Welgunst #200	500	ST-075-79	church	Jolander
CARIBE BAY PLANTATION	10/12/82	10/12/87	Estate Cnaeel Bay #8	5,000	ST-171-82	hotel/condo	Krupa
CARIBBEAN HOTEL CORP.	11/30/84	11/30/86	#14 Lower John Dunkoe	56,000	ST-192-84	hotel/condo	Krupa
CARTY, Marmion	1/31/83	1/31/90	Scott Free #58A	500	ST-173-83	domestic	Krupa

TUT 001 1702

WELL APPROPRIATION PERMITS ISSUED
ST. THOMAS/ST. JOHN
(as of July 31, 1987)

PROPERTY OWNER	TERM OF PERMIT		LOCATION OF WELL	GPD	PERMIT NO.	PURPOSE	WELL DRILLER
CARTY, Marmion	10/01/79	10/01/91	#3 Second Street, Est. Thomas	400	ST-072-79	domestic	Greblick
CARTY, Maxwell	5/13/86	5/13/88	#10 Tenth Street, Est. Thomas	(test)500	ST-227-86	domestic	Krupa
CHARLES, Reynald	[redacted]	2/28/83	#17 Estate Bovoni	500	ST-146-81	domestic	Greblick
CHARLES, Reynald		2/12/87	Estate Dorothea #22B	500	ST-197-85	agricultural	Goetz
CHARLEY'S TRUCKING	[redacted]	6/23/89	Bolongo #106	(test) 500	ST-241-87	commercial	Krupa
CHRISTOPHER, Claudius	5/17/87	5/17/90	Anna's Fancy #16B	500	ST-029-78	domestic	Clarke
CHURCH OF GOD OF HOLINESS	4/02/81	4/02/83	Anna's Retreat #212	500	ST-151-81	church	Jolander
COLLEGE OF THE V.I.	5/13/82	5/13/88	#1John Brewers Bay	50,000	ST-055-82(2)	college	Greblick
COLLEGE OF THE V.I.	8/10/78	5/13/88	#66 John Brewers Bay	20,000	ST-055-78(1)	college	Greblick
COMPASS POINT DEV. CORP.	2/13/86	2/13/88	Frydenhoj #41-6-1	(test) 500	ST-213-86	domestic	Goetz
CONTANT INVESTORS	8/21/81	8/21/87	Contant #111	500	ST-132-80	domestic	Jolander
CONTROLLED CONCRETE	6/28/79	6/28/85	Estate Mariendahl #11	40,000	ST-066-79	commercial	Greblick
COWPET BAY EAST	4/15/80	4/15/87	Estate Nazareth #8-1-7	35,000	ST-103-80	hotel/condo	Jolander
COWPET BAY WEST	6/01/78	8/04/88	Estate Nazareth #8-1-7	150,000	ST-034-78	hotel/condo	Greblick
D & C DEVELOPMENT	1/29/86	1/29/88	Dorothea #17, 18 and 19	35,000	ST-211-86	hotel/condo	Buderas
DEMCO HOUSING CORP.	6/22/81	6/22/83	Anna's Retreat #215	(test) 500	ST-155-81	commercial	Jolander
DERCH, Eustace	2/16/79	2/16/81	Mariendahl #10	15,000	ST-06-79	commercial	Greblick
DEPT. OF EDUCATION Bertha Boschulte School	5/30/82	5/30/84	Bovoni	15,000	ST-118-80	school	Jolander

TLT 001 1705

WELL APPROPRIATION PERMITS ISSUED
ST. THOMAS/ST. JOHN
(as of July 31, 1987)

PROPERTY OWNER	TERM OF PERMIT		LOCATION OF WELL	GPD	PERMIT NO.	PURPOSE	WELL DRILLER
DEPT. OF EDUCATION Edith Williams School	5/20/80	5/20/84	Charlotte Amalie #1	500	ST-115-80	school	Jolander
DEPT. OF EDUCATION Joseph Gomez School	[redacted]	5/20/87	Ann's Retreat #142	500	ST-114-80	school	Jolander
DEPT. OF EDUCATION Kiwan Terrace School		5/13/84	#68A Lindberg Bay	7,000	ST-016-82	school	Greblick
DEPT. OF HEALTH	11/20/80	11/20.86	Estate Thomas #45	45,000	ST-139-80	hospital	Jolander
DEPT. OF HEALTH	2/04/80	2/04/90	Hospital Ground	500	ST-090-80	hospital	Jolander
DEPT. OF HOUSING AND COMMUNITY RENEWAL	2/04/80	2/04/88	Estate Altona	500	ST-091-80	domestic	Greblick
DEPT. OF PUBLIC WORKS	1/02/80	1/02/87	Bovoni Sanitary Landfill	144,000	ST-083-80	firefighting	Jolander
DEPT. OF PUBLIC WORKS	2/25/80	2/25/82	Estate Thomas Race Track	(test) 500	ST-100-80	municipal	Greblick/Jolander
DEPT. OF PUBLIC WORKS	8/22/79	8/22/89	Estate Concordia Well Field	58,000		municipal	
DEPT. OF PUBLIC WORKS	8/22/79	8/22/89	Fair Plain Well Field	750,000		municipal	
DEPT. OF PUBLIC WORKS	8/22/79	8/22/89	La Vallee Well Field	30,000		municipal	
DEPT. OF PUBLIC WORKS	8/22/79	8/22/89	La Grange Well Field	72,000		municipal	
DEPT. OF PUBLIC WORKS	8/22/79	8/22/89	Barren Spot Well Field	100,000		municipal	
DEPT. OF PUBLIC WORKS	8/22/79	8/22/89	Adventure Well Field	85,000		municipal	
DONOVAN, Roy & Doreen	5/13/86	5/13/88	John Dunkoe #79-13	500	ST-226-86	domestic	Krupa
DORSETT, Theodore & Lorna	4/07/83	4/07/85	Estate Fortuna 4-4-8	500	ST-176-83	domestic	Krupa
DROBE, INC.	1/25/83	1/25/85	Estate Ross #8AD	10,000	ST-172-83	domestic	Krupa

001 1704 TUE

WELL APPROPRIATION PERMITS ISSUED
ST. THOMAS/ST. JOHN
(as of July 31, 1987)

PROPERTY OWNER	TERM OF PERMIT		LOCATION OF WELL	GPD	PERMIT NO.	PURPOSE	WELL DRILLER
EGLIN, Gene	8/21/78	4/19/87	Anna's Retreat #2	25,000	ST-043-78	commercial	Greblick
FAHED EL-HAJ	6/23/87	6/23/89	#11C Estate Lindberg Bay	500	ST-246-87	domestic	Goetz
FARRELL, Winston	[redacted]	7/27/83	#57-15 Smith Bay	500	ST-163-81	domestic	owner
FELIX, Otis	1/13/86	1/13/86	Estate Contant #12	500	ST-184-84	domestic	Goetz
FLAG HILL PROPERTIES	1/19.81	1/19/88	Estate Bakkeroe #3A of 3	500	ST-144-81	domestic	Jolander
FRETT, Thomas	12/15/80	12/15/87	#14PE Estate Thomas	500	ST-142-80	domestic	Greblick
GEORGE, Beatrice	3/14/80	3/14/87	#27A Hospital Ground	400	ST-098-80	domestic	Jolander
GIFT HILL GARDENS	10/04/78	10/04/85	#3 Beverhoudtsberg (STJ)	500	ST-058-78	agricultural	Greblick
GIRARD, Pamela	5/17/78	5/17/80	Estate Adrian #6A & 5B (STJ)	250	ST-033-78	domestic	St.Thos.Dairies
GIRARD, Victor	11/5/86	11/5/88	4-5-5 Estate Rosendahl	500	ST-238-86	agricultural	Goetz
GREAT CRUZ BAY DEVELOPMENT	5/23/85	5/23/87	#300A Chocolate Hole (STJ)	(test) 500	ST-204-85	hotel/condo	Goetz
HALPERN, Arthur	11/28/83	11/28/85	Frenchman's Bay #15-66	2,000	ST-182-83	agricultural	Krupa
HARVEY, Osborne	8/02/78	8/02/85	Anna's Retreat #5	500	ST-051-78	domestic	Jolander
HAYNES, Earle Sr.	4/27/78	4/27/90	Estate Frydenhoj #94	100	ST-046-78	domestic	Clarke
HEATHINGTON, Clarence	12/15/80	12/15/82	#330 Hospital Ground	500	ST-141-80	domestic	Greblick
HODGE, George & Maria	1/31/78	1/31/90	#20 Eight Street, Est. Thomas	500	ST-014-78	domestic	Greblick
HUGHES, Maria	6/23/78	6/23/90	Contant #15C	500	ST-041-78	animal clinic	Jolander
HUSBAND, Cynthia	5/22/85	5/22/87	#3A Estate Frydendahl	500	ST-202-85	restaurant	Goetz

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WELL APPROPRIATION PERMITS ISSUED
ST. THOMAS/ST. JOHN
(as of July 31, 1987)

PROPERTY OWNER	TERM OF PERMIT		LOCATION OF WELL	GPD	PERMIT NO.	PURPOSE	WELL DRILLED
HYMAN, Elliot	8/21/80	8/21/87	Frenchman's Bay #15-65	500	ST-131-80	domestic	Jolander
ISAAC, Fernando	11/30/79	11/30/81	Upper John Dunkow #2-2	350	ST-077-79	domestic	Greblick
JEPPESEN, Arthur	4/15/80	4/15/87	#20 Tenth Street, Est. Thomas	500	ST-102-80	domestic	Jolander
JOHNSON, Aubrey	[redacted]	4/05/85	Smith Bay #5	500	ST-024-78	domestic	Clarke
JOSEPH, Albert & Enid	[redacted]	6/23/89	#4 Estate Bolongo	500	ST-244-87	domestic	Krupa
JOSEPH, J & C	8/27/80	3/12/87	Lindberg Bay #11A	15,000	ST-013-80	commercial	Greblick
KAUFMAN, Henry	8/14/86	8/14/88	St. Quaco #6B-15 (STJ)	500	ST-234-86	agricultural	Krupa
KING, Avon D. C.	7/26/85	7/26/87	Contant #33B	500	ST-206-85	domestic	(unknown)
LAMBROS, Henry	4/05/78	4/05/90	#29 Anna's Fancy	420	ST-026-78	domestic	Clarke
LANTERN LAUNDRY	6/22/81	6/22/83	Estate Mariendahl #2BA	20,000	ST-015-81	laundry	Jolander
LIDDLE, Joseph	12/04/78	12/04/85	St. Joseph & Rosendahl #6D	500	ST-061-78	agricultural	Jolander
LILLARD ISLANDS CORP.	4/22/85	4/22/87	#17 Crown Bay Fill (sea water)	(test) 500	ST-201-85	domestic	Goetz
LILLARD, Alpha	6/02/78	6/02/90	Anna's Retreat #129-45	500	ST-035-78	domestic	Greblick
LE LODGE OF CALL LTD.	7/10.86	7/10/88	Lot #3 St. Peter #12	500	ST-230-86	domestic	Goetz
LETTSOME, Victor	6/20/80	6/20/87	Gylling Street #8	500	ST-126-80	domestic	Greblick
LIRA, Alfredo	9/23/81	9/23/85	Bovoni #2-2	35,000	ST-164-81	commercial	Goetz
LIRA, Alfredo	3/21/86	3/21/88	Bovoni #7	500	ST-217-86	domestic	Goetz
LIRA, Mariano	2/27/87	2/27/89	Bovoni #4BA	(test) 500	ST-239-87	laundromat	Goetz
LIME TREE BEACH HOTEL	5/08/81	5/08/86	Frenchman's Bay #100	75,000	ST-153-81	hotel/condo	Goetz

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WELL APPROPRIATION PERMITS ISSUED
ST. THOMAS/ST. JOHN
(as of July 31, 1987)

PROPERTY OWNER	TERM OF PERMIT		LOCATION OF WELL	GPD	PERMIT NO.	PURPOSE	WELL DRILLER
LINDER CORP.	5/13/86	5/13/88	#210-3A Altona & Welgunst	(test) 500	ST-228-86	laundromat	Krupa
LOCKHART, Herbert et al	12/07/77	1/02/90	Donoe #1	125,000	ST-009-78	commercial	Buderas
LOCKHART, Herbert et al	[redacted]	1/02/90	Estate Thomas #6A	100,000	ST-011-78	commercial	Buderas
LOCKHART, H. E.	[redacted]	5/13/88	Estate Thomas #46B	(test) 500	ST-225-86	laundry	Krupa
MACHOVER, Frank	4/07/83	4/07/85	#1 Havensight	500	ST-178-83	agricultural	Krupa
MACK, Arnold	12/07/77	12/07/89	Scott Free #17	500	ST-007-78	domestic	Clarke
MAGENS BAY AUTHORITY	3/30/83	3/30/85	Magens Bay Beach	500	ST-185-84	recreational	Goetz
MAGENS POINT HOTEL	6/23/87	6/23/89	#7 St. Joseph & Rosendahl	500	ST-245-87	swimming pool	Goetz
MAGENS POINT, INC.	10/04/78	5/13/86	#7 St. Joseph & Rosendahl	15,000	ST-059-78	hotel/condo	Goetz
MAHO BAY CAMPS, INC.	6/23/87	6/23/89	#3D Maho Bay	(test) 500	ST-249-78	campsite	Goetz
MAHOGANY RUN CO.	2/14/79	6/22/85	Estate Lovenlund #C1 & 2	100,000	ST-065-79	hotel/condo	Jolander
MAHOGANY RUN CO.	2/14/79	6/22/85	Estate Lovenlund #A1 & 2	100,000	ST-064-79	hotel/condo	Jolander
MAJESTIC CONSTRUCTION	7/09/84	7/09/86	#10 Susannaberg (STJ)	500	ST-190-84	domestic	Goetz
MANDAHL BAY REALTY	12/28/79	12/28/86	#34 Estate Mandahl	500	ST-080-79	hotel/condo	Jolander
MARINA, Joseph	2/14/78	2/14/87	#68A Lindberg Bay	500	ST-019-78	domestic	Greblick
MARSH, Eudora	6/23/87	6/23/89	#3 Estate Emmaus (STJ)	(test) 500	ST-248-87	laundry	Conklin/Johansson
MILLER, Leslie	5/17/78	5/17/80	#56 Smith Bay	350	ST-031-78	domestic	St.Thos.Dairies
MOOTH DAY CONSTRUCTION	6/23/87	6/23/89	Estate Thomas #54	(test) 500	ST-243-87	commercial	Krupa
MOJICA, Emilio Tapia	5/17/78	5/17/85	Estate Contant #31	500	ST-30-78	domestic	Jolander

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WELL APPROPRIATION PERMITS I[illegible]IED
ST. THOMAS/ST. JOHN
(as of July 31, 1987)

PROPERTY OWNER	TERM OF PERMIT		LOCATION OF WELL	GPD	PERMIT NO.	PURPOSE	WELL DRILLER
MORRISON, Grace	3/04/81	3/04/88	#11 Bolongo Bay	500	ST-150-81	domestic	Greblick
MORSEN/MORSEN/HASSAN	7/09/84	7/09/86	#9CA & 20 Estate Contant	(test) 500	ST-189-84	domestic	Goetz
MEYERS, Donald	[illegible]	5/12/87	#13 First Avenue, Est. Thomas	500	ST-108-80	domestic	owner
NEETHROP, Brumney	[illegible]	4/07/90	Lindberg Bay #53	500	ST-180-83	domestic	Krupa
NEUMANN, Alfred	[illegible]	4/07/90	Estate St. Peter #18-3-B	500	ST-179-83	domestic	Krupa
O'BRIEN, Edward	7/09/84	7/09/86	#24C Mafolie	500	ST-187-84	domestic	Goetz
OLIVE, Lionel	8/23/78	8/23/90	Contant #3A	250	ST-048-79	domestic	Buderas
OLIVE, L & R	2/04/80	2/04/87	Estate Nazareth #2V7	500	ST-094-80	domestic	Jolander
PETERSEN, Marvin	6/08/84	6/08/86	#4B-1 Estate Fortuna	500	ST-186-84	domestic	Goetz
POINT PLEASANT	12/07/77	5/13/88	Estate Smith Bay #4C	6,000	ST-006-78	hotel/condo	Clarke
POTTERS CONSTRUCTION CO.	2/27/87	2/27/89	#18-7 Estate Smith Bay	(test) 500	ST-240-87	laundromat	Goetz
PUBLIC WORKS ACCELERATION AUTH.	5/12/80	5/12/87	1st Ave. & 1st St., Est. Thomas	500	ST-109-80	domestic	Buderas
QUESTEL, E & B	7/09/84	7/09/86	#2 Misgunst	1,440	ST-188-84	hotel/condo	Krupa
RAASCH, Gerald	10/30/81	10/30/88	#9-7 Vessup Bay	500	ST-165-81	domestic	Greblick
RAMAHAN, Ramsaran	2/16/79	2/16/86	#5A-31 Estate Fortuna	2,000	ST-067-79	agricultural	Greblick
RAMSAY, R & R	8/09/78	8/09/85	Anna's Retreat #405	500	ST-054-78	garage	Jolander
RICHARDS, Alice	6/07/78	6/07/90	Frydenhoj #61	300	ST-037-78	domestic	Clarke
RIVERA, Antonio	8/02/78	8/02/80	Contant #54	500	ST-053-78	domestic	Jolander
ROLLER, Hugo A.	4/07/86	4/07/88	Carolina, Parcel #8-4-1 STJ	500	SJ-220-86	domestic	Goetz

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WELL APPROPRIATION PERMITS ISSUED
ST. THOMAS/ST. JOHN
(as of July 31, 1987)

PROPERTY OWNER	TERM OF PERMIT		LOCATION OF WELL	GPD	PERMIT NO.	PURPOSE	WELL DRILLER
ROSEN, Jerome	7/10/86	4/07/88	Wintberg #1B1-A	500	ST-229-86	domestic	Krupa
ST. JOHN HOMES, INC.	4/07/86	4/07/88	Parcel #18, Est. Enighed, STJ	500	ST-222-86	domestic	Goetz
ST. THOMAS BEACH RESORT	[redacted]	3/30/87	Bolongo Bay #53-58	(test) 500	ST-199-85	domestic	Goetz
ST. THOMAS DAIRIES	[redacted]	3/14/87	Lovenlund #2	500	ST-095-80	dairy farm	Jolander
ST. THOMAS DAIRIES	2/10/88	2/10/88	Lovenlund #4	(test) 500	ST-212-86	agricultural	Goetz
ST. THOMAS PARTNERSHIP	1/08/86	1/08/87	Frydendahl #49	320,000	ST-195-85	hotel/condo	Goetz
SALEM, Rifat	2/24/81	2/24/83	Estate Thomas #9-E	500	ST-145-81	domestic	Jolander
SAMUEL, Rosa S.	5/09/86	5/09/88	Estate Enighed #4Ea (STJ)	(test) 500	ST-224-86	commercial	Krupa
SAPPHIRE WEST CONDO. ASSOC.	10/22/80	6/22/87	Smith Bay #11-H	45,000	ST-235-80	hotel/condo	Jolander
SCHWARTZ, L & R	2/12/85	2/12/87	Belleview #14	500	ST-198-35	domestic	Krupa
SCOTT, John P.	5/08/81	5/08/88	Frydenhoj #41	500	ST-152-81	agricultural	Greblick
SEWER, Victor & Huldah	5/09/86	5/09/88	Enighed #3H (STJ)	(test) 500	ST-223-86	domestic	Krupa
SMART, Roy	1/14/81	1/14/83	#112 Estate Frydenhoj	500	ST-143-81	domestic	Jolander
SMITH BAY CENTER CORP.	6/23/87	6/23/89	#33A Frydendahl	500	ST-242-87	flushing	Krupa
SMITH, Blanca	7/26/85	7/26/87	Estate Thomas #4	3,000	ST-205-85	flushing	Goetz
SOLOMON, Raphael	4/07/86	4/07/88	Cruz Bay Town #95 & 95C (STJ)	500	ST-221-86	office bldg.	Goetz
SOOKHAN, Siewdath	6/11/80	6/11/87	Smith Bay #111	500	ST-123-80	domestic	Greblick
SOTO, Andres	11/17/80	11/17/87	Contant #8	500	ST-137-80	domestic	Greblick
SPRAUVE, Gaylord	9/07/77	9/07/97	Smith Bay #98-1	1,500	ST-003-78	domestic	Clarke

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WELL APPROPRIATION PERMITS ISSUED
ST. THOMAS/ST. JOHN
(as of July 31, 1987)

PROPERTY OWNER	TERM OF PERMIT		LOCATION OF WELL	GPD	PERMIT NO.	PURPOSE	WELL DRILLER
STEVENS, Marjorie	2/27/81	2/27/88	#5-66 Estate Bovoni	500	ST-148-81	domestic	Greblick
SUGAR ESTATE ASSOCIATES	2/27/77	7/27/97	Estate Thomas #6L	15,000	ST-002-78	shopping center	Greblick
SUPERCAT, INC.	[redacted]	6/22/83	Contant #9A	13,000	ST-158-81	laundry	Jolander
THE PLAZA ASSOCIATES	[redacted]	3/04/88	Anna's Retreat #392	500	ST-149-81	shopping center	Greblick
THOMASVILLE CO-OP	3/20/85	3/20/87	Bovoni #9	30,000	ST-200-85	domestic	Goetz
TOTAL VISION	1/10/85	1/10/87	Anna's Retreat #126	50,000	ST-196-85	commercial	(unknown)
TRIPLE F DEVELOPMENT	11/21/85	11/21/87	Estate Mariendahl #7-6 & 7-7	(test) 500	ST-210-85	commercial	Krupa
TURNBULL, Randolph	2/14/78	2/14/90	Estate Thomas #6E-14QL	500	ST-017-78	domestic	Greblick
TURNBULL, Wallace	3/10/78	3/10/87	Contant #7Ba	500	ST-021-78	domestic	Jolander
TURNBULL, Wallace	8/20/78	8/20/90	Contant #46	450	ST-042-78	domestic	Clarke
TURNBULL, Wallace	5/30/80	5/30/87	Estate Thomas #8C	500	ST-119-80	domestic	Jolander
TURNBULL, Wallace	8/10/84	8/10/89	Estate Thomas #5A & B	500	ST-191-84	domestic	Goetz
TURNBULL, Wallace & L.	3/14/80	3/14/87	Prindsens Gade #10B	400	ST-096-80	domestic	Jolander
VANJACK Rodney	8/14/86	8/14/88	Enighed #3E (STJ)	(test) 500	ST-232-86	domestic	Krupa
VILLANUEVA, Julian	6/15/79	6/15/86	Bovoni #19	500	ST-071-79	domestic	Greblick
V.I. BAPTIST MISSION	12/07/77	12/07/79	Bovoni #5A	500	ST-005-78	church	Clarke
V.I. DEVELOPMENT CORP.	5/30/80	5/30/87	Estate Contant #707Ba	13,000	ST-116-80	garage	Jolander
V.I. HOUSING AUTHORITY Project No. VI-1-16	12/06/77	12/06/87	Anna's Retreat	40,000	ST-004-78	domestic	Greblick

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WELL APPROPRIATION PERMITS ISSUED
ST. THOMAS/ST. JOHN
(as of July 31, 1987)

PROPERTY OWNER	TERM OF PERMIT		LOCATION OF WELL	GPD	PERMIT NO.	PURPOSE	WELL DRILLER
V.I. HOUSING AUTHORITY Project No. VI-1-19	8/10/78	8/10/88	Bovoni	40,000	ST-057-78	domestic	(unknown)
V.I. HOUSING AUTHORITY Project No. VI-1-1	3/14/80	3/14/82	Paul M. Pearson Gardens (sea water)	100,000	ST-097-80	domestic	Jolander
V.I. HOUSING AUTHORITY Project No. VI-1-5	[redacted]	8/07/82	Oswald Harris Court (sea water)	45,000	ST-106-80	domestic	Greblick
V.I. HOUSING AUTHORITY Project No. VI-1-7	6/22/81	6/22/83	Michael H. Kirwan Terrace	10,000	ST-160-81	domestic	Greblick
V.I. HOUSING AUTHORITY Project No. VI-1-8	1/02/80	1/02/88	John F. Kennedy Terrace (STX)	27,000	SC-084-84	domestic	(unknown)
V.I. HOUSING AUTHORITY Project No. VI-1-12	1/02/80	1/02/88	Aureo Diaz Heights (STX)	17,500	SC-085-80	domestic	(unknown)
V.I. HOUSING AUTHORITY Project No. VI-1-22	1/02/80	1/02/88	Estate Mount Pleasant (STX)	6,500	SC-086-80	domestic	(unknown)
V.I. HOUSING AUTHORITY Projects Nos. VI-1-18 & VI-1-23	1/02/80	1/02/88	Estate Paradise (STX)	70,000	SC-087-80	domestic	(unknown)
V.I. HOUSING AUTHORITY Project No. VI-1-24	1/02/80	1/02/88	Estate Slob (STX)	22,500	SC-088-80	domestic	(unknown)
V.I. MEDICAL FOUNDATION	2/13/86	2/13/88	Estate Thomas #50	500	ST-214-86	flushing	Goetz
V.I. NATIONAL PARK	6/22/82	6/22/87	Trunk Bay Park Site (STJ)	500	ST-167-82	recreational	owner
V.I. REALTY CORP.	1/31/83	1/31/85	#7 Lower John Dunkoe	500	ST-174-83	domestic	Krupa
VAUGHAN, Guy W.	8/14/86	8/14/88	St. Quaco & Zimmerman #38-12 (STJ)	500	ST-233-86	agricultural	Krupa
WAECHTER, Klaus	2/13/86	2/13/88	Nazareth #6A	(test) 500	ST-215-86	domestic	Krupa

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WELL APPROPRIATION PERMITS ISSUED
ST.THOMAS/ST. JOHN
(as of July 31, 1987)

PROPERTY OWNER	TERM OF PERMIT		LOCATION OF WELL	GPD	PERMIT NO.	PURPOSE	WELL DRILLER
WALLACE, Viggo	10/22/85	10/22/87	Estate Mandahl #26CA	500	ST-207-85	domestic	Goetz
WATERGATE VILLAS ASSOC.	11/30/84	11/30/86	#59 Estate Bolongo	80,000	ST-193-84	hotel/condo	owner
WENNER, Altagracia	[illegible]	8/22/87	#50 Estate Frydenhoj	500	ST-170-82	agricultural	(unknown)
WHITE, P. Watson	[illegible]	6/22/85	Contant #11-3-B	5,000	ST-136-80	domestic	Greblick
WILLIAMS, Cecile	5/30/80	5/30/82	Contant #k5	599	ST-117-80	domestic	Jolander
YACHT HAVEN HOTEL & MARINA	3/2/79	3/2/90	#4 Estate Thomas	500	ST-69-79	flushing	Greblick

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METHOD 524.2. MEASUREMENT OF PURGEABLE ORGANIC COMPOUNDS IN WATER BY CAPILLARY COLUMN GAS CHROMATOGRAPHY/MASS SPECTROMETRY

Revision 3.0

A. Alford-Stevens, J. W. Eichelberger, W. L. Budde - Method 524, Revision 1.0 (1983)

R. W. Slater, Jr. - Method 524.2, Revision 2.0 (1986)

J. W. Eichelberger, W. L. Budde - Method 524.2, Revision 3.0 (1989)

ENVIRONMENTAL MONITORING SYSTEMS LABORATORY
OFFICE OF RESEARCH AND DEVELOPMENT
U.S. ENVIRONMENTAL PROTECTION AGENCY
CINCINNATI, OHIO 45268

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2,2-Dichloropropane	590-20-7
1,1-Dichloropropene	563-58-6
cis-1,3-Dichloropropene	10061-01-5
trans-1,3-Dichloropropene	10061-02-6
Ethylbenzene	100-41-4
Hexachlorobutadiene	87-68-3
Isopropylbenzene	98-82-8
4-Isopropyltoluene	99-87-6
Methylene chloride	75-09-2
Naphthalene	91-20-3
n-Propylbenzene	103-65-1
Styrene	100-42-5
1,1,1,2-Tetrachloroethane	630-20-6
1,1,2,2-Tetrachloroethane	79-34-5
Tetrachloroethene	127-18-4
Toluene	108-88-3
1,2,3-Trichlorobenzene	87-61-6
1,2,4-Trichlorobenzene	120-82-1
1,1,1-Trichloroethane	71-55-6
1,1,2-Trichloroethane	79-00-5
Trichloroethene	79-01-6
Trichlorofluoromethane	75-69-4
1,2,3-Trichloropropane	96-18-4
1,2,4-Trimethylbenzene	95-63-6
1,3,5-Trimethylbenzene	108-67-8
Vinyl chloride	75-01-4
o-Xylene	95-47-6
m-Xylene	108-38-3
p-Xylene	106-42-3

1.2 Method detection limits (MDLs) (3) are compound and instrument dependent and vary from approximately 0.02-0.35 µg/L. The applicable concentration range of this method is primarily column dependent and is approximately 0.02 to 200 µg/L for the wide-bore thick-film columns. Narrow-bore thin-film columns may have a capacity which limits the range to about 0.02 to 20 µg/L. Analytes that are inefficiently purged from water will not be detected when present at low concentrations, but they can be measured with acceptable accuracy and precision when present in sufficient amounts.

1.3 Analytes that are not separated chromatographically, but which have different mass spectra and non-interfering quantitation ions, can be identified and measured in the same calibration mixture or water sample (Sect 11.6.2). Analytes which have very similar mass spectra cannot be individually identified and measured in the same calibration mixture or water sample unless they have different retention times (Sect.11.6.3). Coeluting compounds with very similar mass spectra, typically many structural isomers, must be reported as an isomeric group or pair. Two of the three isomeric xylenes and two of the three dichlorobenzenes are examples of structural isomers that may not be resolved on the capillary column, and if not, must be reported as isomeric pairs.

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analytes or other interferences are present in the laboratory environment, the reagents, or the apparatus.

3.6 Field reagent blank (FRB) -- Reagent water placed in a sample container in the laboratory and treated as a sample in all respects, including exposure to sampling site conditions, storage, preservation and all analytical procedures. The purpose of the FRB is to determine if method analytes or other interferences are present in the field environment.

3.7 Laboratory performance check solution (LPC) -- A solution of one or more compounds (analytes, surrogates, internal standard, or other test compounds) used to evaluate the performance of the instrument system with respect to a defined set of method criteria.

3.8 Laboratory fortified blank (LFB) -- An aliquot of reagent water to which known quantities of the method analytes are added in the laboratory. The LFB is analyzed exactly like a sample, and its purpose is to determine whether the methodology is in control, and whether the laboratory is capable of making accurate and precise measurements at the required method detection limit.

3.9 Laboratory fortified sample matrix (LFM) -- An aliquot of an environmental sample to which known quantities of the method analytes are added in the laboratory. The LFM is analyzed exactly like a sample, and its purpose is to determine whether the sample matrix contributes bias to the analytical results. The background concentrations of the analytes in the sample matrix must be determined in a separate aliquot and the measured values in the LFM corrected for background concentrations.

3.10 Stock standard solution -- A concentrated solution containing a single certified standard that is a method analyte, or a concentrated solution of a single analyte prepared in the laboratory with an assayed reference compound. Stock standard solutions are used to prepare primary dilution standards.

3.11 Primary dilution standard solution -- A solution of several analytes prepared in the laboratory from stock standard solutions and diluted as needed to prepare calibration solutions and other needed analyte solutions.

3.12 Calibration standard (CAL) -- a solution prepared from the primary dilution standard solution and stock standard solutions of the internal standards and surrogate analytes. The CAL solutions are used to calibrate the instrument response with respect to analyte concentration.

3.13 Quality control sample (QCS) -- a sample matrix containing method analytes or a solution of method analytes in a water miscible solvent which is used to fortify reagent water or environmental samples. The QCS is obtained from a source external to the laboratory, and is used

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form, 1,2-dibromoethane,tetrachloroethene, trichloroethene, and vinyl chloride. Pure standard materials and stock standard solutions of these compounds should be handled in a hood. A NIOSH/MESA approved toxic gas respirator should be worn when the analyst handles high concentrations of these toxic compounds.

6. APPARATUS AND EQUIPMENT

6.1 SAMPLE CONTAINERS -- 60-mL to 120-mL screw cap vials (Pierce #19832 or equivalent) each equipped with a PTFE-faced silicone septum (Pierce #12718 or equivalent). Prior to use, wash vials and septa with detergent and rinse with tap and distilled water. Allow the vials and septa to air dry at room temperature, place in a 105°C oven for 1 hr, then remove and allow to cool in an area known to be free of organics.

6.2 PURGE AND TRAP SYSTEM -- The purge and trap system consists of three separate pieces of equipment: purging device, trap, and desorber. Systems are commercially available from several sources that meet all of the following specifications.

6.2.1 The all glass purging device (Figure 1) should be designed to accept 25-mL samples with a water column at least 5 cm deep. A smaller (5-mL) purging device is recommended if the GC/MS system has adequate sensitivity to obtain the method detection limits required. Gaseous volumes above the sample must be kept to a minimum (< 15 mL) to eliminate dead volume effects. A glass frit should be installed at the base of the sample chamber so the purge gas passes through the water column as finely divided bubbles with a diameter of < 3 mm at the origin. Needle spargers may be used, however, the purge gas must be introduced at a point about 5 mm from the base of the water column.

6.2.2 The trap (Figure 2) must be at least 25 cm long and have an inside diameter of at least 0.105 in. Starting from the inlet, the trap should contain 1.0 cm of methyl silicone coated packing and the following amounts of adsorbents: 1/3 of 2,6-diphenylene oxide polymer, 1/3 of silica gel, and 1/3 of coconut charcoal. If it is not necessary to determine dichlorodifluoromethane, the charcoal can be eliminated and the polymer increased to fill 2/3 of the trap. Before initial use, the trap should be conditioned overnight at 180°C by backflushing with an inert gas flow of at least 20 mL/min. Vent the trap effluent to the room, not to the analytical column. Prior to daily use, the trap should be conditioned for 10 min at 180°C with backflushing. The trap may be vented to the analytical column during daily conditioning; however, the column must be run through the temperature program prior to analysis of samples.

6.2.3 The use of the methyl silicone coated packing is recommended, but not mandatory. The packing serves a dual purpose of protecting the Tenax adsorbant from aerosols, and also of

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are acceptable interfaces. Any interface can be used if the performance specifications described in this method can be achieved. The end of the transfer line after the interface, or the end of the analytical column if no interface is used, should be placed within a few mm of the MS ion source.

6.3.3.2 The narrow bore column 3 cannot accept the thermal desorption gas flow, and a cryogenic interface is required. This interface (Tekmar Model 1000 or equivalent) condenses the desorbed sample components at liquid nitrogen temperature, and allows the helium gas to pass through to an exit. The condensed components are frozen in a narrow band on an uncoated fused silica precolumn. When all components have been desorbed from the trap, the interface is rapidly heated under a stream of carrier gas to transfer the analytes to the analytical column. The end of the analytical column should be placed with a few mm of the MS ion source. A potential problem with this interface is blockage of the interface by frozen water from the trap. This condition will result in a major loss in sensitivity and chromatographic resolution.

6.3.4 The mass spectrometer must be capable of electron ionization at a nominal electron energy of 70 eV. The spectrometer must be capable of scanning from 35 to 260 amu with a complete scan cycle time (including scan overhead) of 2 sec or less. (Scan cycle time = Total MS data acquisition time in seconds divided by number of scans in the chromatogram). The spectrometer must produce a mass spectrum that meets all criteria in Table 3 when 25 ng or less of 4-bromofluorobenzene (BFB) is introduced into the GC. An average spectrum across the BFB GC peak may be used to test instrument performance.

6.3.5 An interfaced data system is required to acquire, store, reduce, and output mass spectral data. The computer software should have the capability of processing stored GC/MS data by recognizing a GC peak within any given retention time window, comparing the mass spectra from the GC peak with spectral data in a user-created data base, and generating a list of tentatively identified compounds with their retention times and scan numbers. The software must allow integration of the ion abundance of any specific ion between specified time or scan number limits. The software should also allow calculation of response factors as defined in Sect. 9.2.6 (or construction of a second or third order regression calibration curve), calculation of response factor statistics (mean and standard deviation), and calculation of concentrations of analytes using either the calibration curve or the equation in Sect. 12.

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sources (for example, Matheson, Ideal Gas Products, and Scott Gases).

7.2.5 Ascorbic acid -- ACS reagent grade, granular.

7.3 STOCK STANDARD SOLUTIONS -- These solutions may be purchased as certified solutions or prepared from pure standard materials using the following procedures. One of these solutions is required for every analyte of concern, every surrogate, and the internal standard. A useful working concentration is about 1-5 mg/mL.

7.3.1 Place about 9.8 mL of methanol into a 10-mL ground-glass stoppered volumetric flask. Allow the flask to stand, unstoppered, for about 10 min or until all alcohol-wetted surfaces have dried and weigh to the nearest 0.1 mg.

7.3.2 If the analyte is a liquid at room temperature, use a 100-µL syringe and immediately add two or more drops of reference standard to the flask. Be sure that the reference standard falls directly into the alcohol without contacting the neck of the flask. If the analyte is a gas at room temperature, fill a 5-mL valved gas-tight syringe with the standard to the 5.0-mL mark, lower the needle to 5 mm above the methanol meniscus, and slowly inject the standard into the neck area of the flask. The gas will rapidly dissolve in the methanol.

7.3.3 Reweigh, dilute to volume, stopper, then mix by inverting the flask several times. Calculate the concentration in µg/µL from the net gain in weight. When compound purity is certified at 96% or greater, the weight can be used without correction to calculate the concentration of the stock standard.

7.3.4 Store stock standard solutions in 15-mL bottles equipped with PTFE-lined screw caps. Methanol solutions prepared from liquid analytes are stable for at least 4 weeks when stored at 4°C. Methanol solutions prepared from gaseous analytes are not stable for more than 1 week when stored at <0°C; at room temperature, they must be discarded after 1 day.

7.4 PRIMARY DILUTION STANDARDS -- Use stock standard solutions to prepare primary dilution standard solutions that contain all the analytes of concern and the surrogates (but not the internal standard!) in methanol. The primary dilution standards should be prepared at concentrations that can be easily diluted to prepare aqueous calibration solutions that will bracket the working concentration range. Store the primary dilution standard solutions with minimal headspace and check frequently for signs of deterioration or evaporation, especially just before preparing calibration solutions. Storage times described for stock standard solutions in Sect. 7.4.4 also apply to primary dilution standard solutions.

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flask three times only. Discard the contents contained in the neck of the flask. Aqueous standards are not stable in a volumetric flask and should be discarded after 1 hr unless transferred to a sample bottle and sealed immediately.

8. SAMPLE COLLECTION, PRESERVATION, AND STORAGE

8.1 SAMPLE COLLECTION, DECHLORINATION, AND PRESERVATION

8.1.1 Collect all samples in duplicate. If samples contain residual chlorine, and measurements of the concentrations of disinfection by-products (trihalomethanes, etc.) at the time of sample collection are desired, add about 25 mg of ascorbic acid to the sample bottle before filling. Fill sample bottles to overflowing, but take care not to flush out the rapidly dissolving ascorbic acid. No air bubbles should pass through the sample as the bottle is filled, or be trapped in the sample when the bottle is sealed. Adjust the pH of the duplicate samples to <2 by carefully adding one drop of 1:1 HCl for each 20 mL of sample volume. Seal the sample bottles, PFTE-face down, and shake vigorously for 1 min.

8.1.2 When sampling from a water tap, open the tap and allow the system to flush until the water temperature has stabilized (usually about 10 min). Adjust the flow to about 500 mL/min and collect duplicate samples from the flowing stream.

8.1.3 When sampling from an open body of water, fill a 1-quart wide-mouth bottle or 1-liter beaker with sample from a representative area, and carefully fill duplicate sample bottles from the 1-quart container.

8.1.4 The samples must be chilled to 4°C on the day of collection and maintained at that temperature until analysis. Field samples that will not be received at the laboratory on the day of collection must be packaged for shipment with sufficient ice to ensure that they will be at 4°C on arrival at the laboratory.

8.2 SAMPLE STORAGE

8.2.1 Store samples at 4°C until analysis. The sample storage area must be free of organic solvent vapors.

8.2.2 Analyze all samples within 14 days of collection. Samples not analyzed within this period must be discarded and replaced.

8.3 FIELD REAGENT BLANKS

8.3.1 Duplicate field reagent blanks must be handled along with each sample set, which is composed of the samples collected from the same general sample site at approximately the same time. At the laboratory, fill field blank sample bottles with reagent

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compounds are recognized, system maintenance is required. See Sect. 9.3.6.

9.2.5 If all performance criteria are met, purge an aliquot of each of the other CAL solutions using the same GC/MS conditions.

9.2.6 Calculate a response factor (RF) for each analyte, surrogate, and isomer pair for each CAL solution using the internal standard fluorobenzene. Table 1 contains suggested quantitation ions for all compounds. This calculation is supported in acceptable GC/MS data system software (Sect. 6.3.4), and many other software programs. RF is a unitless number, but units used to express quantities of analyte and internal standard must be equivalent.

$$RF = \frac{(A_x)(Q_{is})}{(A_{is})(Q_x)}$$

where: A_x = integrated abundance of the quantitation ion of the analyte.
A_{is} = integrated abundance of the quantitation ion of the internal standard.
Q_x = quantity of analyte purged in ng or concentration units.
Q_{is} = quantity of internal standard purged in ng or concentration units.

9.2.6.1 For each analyte and surrogate, calculate the mean RF from the analyses of the CAL solutions. Calculate the standard deviation (SD) and the relative standard deviation (RSD) from each mean: RSD = 100 (SD/M). If the RSD of any analyte or surrogate mean RF exceeds 20%, either analyze additional aliquots of appropriate CAL solutions to obtain an acceptable RSD of RFs over the entire concentration range, or take action to improve GC/MS performance. See Sect. 9.2.7.

9.2.7 As an alternative to calculating mean response factors and applying the RSD test, use the GC/MS data system software or other available software to generate a second or third order regression calibration curve.

9.3 Continuing calibration check. Verify the MS tune and initial calibration at the beginning of each 8-hr work shift during which analyses are performed using the following procedure.

9.3.1 Introduce into the GC (either by purging a laboratory reagent blank or making a syringe injection) 25 ng of BFB and acquire a mass spectrum that includes data for m/z 35-260. If the spectrum does not meet all criteria (Table 2), the MS must be

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9.3.6.7 Replace any components that allow analytes to come into contact with hot metal surfaces.

9.3.6.8 Replace the MS electron multiplier, or any other faulty components.

9.4 Optional calibration for vinyl chloride using a certified gaseous mixture of vinyl chloride in nitrogen can be accomplished by the following steps.

9.4.1 Fill the purging device with 25.0 mL (or 5-mL) of reagent water or aqueous calibration standard.

9.4.2 Start to purge the aqueous mixture. Inject a known volume (between 100 and 2000 µL) of the calibration gas (at room temperature) directly into the purging device with a gas tight syringe. Slowly inject the gaseous sample through a septum seal at the top of the purging device at 2000 µL/min. If the injection of the standard is made through the aqueous sample inlet port, flush the dead volume with several mL of room air or carrier gas. Inject the gaseous standard before 5 min of the 11-min purge time have elapsed.

9.4.3 Determine the aqueous equivalent concentration of vinyl chloride standard, in µg/L, injected with the equation:

$$S = 0.102\ (C)(V)$$

where S = Aqueous equivalent concentration of vinyl chloride standard in µg/L;
C = Concentration of gaseous standard in ppm (v/v);
V = Volume of standard injected in milliliters.

10. QUALITY CONTROL

10.1 Quality control (QC) requirements are the initial demonstration of laboratory capability followed by regular analyses of laboratory reagent blanks, field reagent blanks, and laboratory fortified blanks. The laboratory must maintain records to document the quality of the data generated. Additional quality control practices are recommended.

10.2 Initial demonstration of low system background. Before any samples are analyzed, it must be demonstrated that a laboratory reagent blank (LRB) is reasonably free of contamination that would prevent the determination of any analyte of concern. Sources of background contamination are glassware, purge gas, sorbants, and equipment. Background contamination must be reduced to an acceptable level before proceeding with the next section. In general, background from method analytes should be below the method detection limit.

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10.5 Laboratory reagent blanks. With each batch of samples processed as a group within a work shift, analyze a laboratory reagent blank to determine the background system contamination. A FRB (Sect. 10.7) may be used in place of a LRB.

10.6 With each batch of samples processed as a group within a work shift, analyze a single laboratory fortified blank (LFB) containing each analyte of concern at a concentration as determined in 10.3. If more than 20 samples are included in a batch, analyze one LFB for every 20 samples. Use the procedures described in 10.3.3 to evaluate the accuracy of the measurements, and to estimate whether the method detection limits can be obtained. If acceptable accuracy and method detection limits cannot be achieved, the problem must be located and corrected before further samples are analyzed. Add these results to the on-going control charts to document data quality.

10.7 With each set of field samples a field reagent blank (FRB) should be analyzed. The results of these analyses will help define contamination resulting from field sampling and transportation activities. If the FRB shows unacceptable contamination, a LRB must be measured to define the source of the impurities.

10.8 At least quarterly, replicates of laboratory fortified blanks should be analyzed to determine the precision of the laboratory measurements. Add these results to the on-going control charts to document data quality.

10.9 At least quarterly, analyze a quality control sample (QCS) from an external source. If measured analyte concentrations are not of acceptable accuracy, check the entire analytical procedure to locate and correct the problem source.

10.10 Sample matrix effects have not been observed when this method is used with distilled water, reagent water, drinking water, and ground water. Therefore, analysis of a laboratory fortified sample matrix (LFM) is not required. It is recommended that sample matrix effects be evaluated at least quarterly using the QCS described in 10.9.

10.11 Numerous other quality control measures are incorporated into other parts of this procedure, and serve to alert the analyst to potential problems.

11. PROCEDURE

11.1 SAMPLE INTRODUCTION AND PURGING

11.1.1 This method is designed for a 25-mL sample volume, but a smaller (5 mL) sample volume is recommended if the GC/MS system has adequate sensitivity to achieve the required method detection limits. Adjust the purge gas (nitrogen or helium) flow rate to 40 mL/min. Attach the trap inlet to the

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11.3 GAS CHROMATOGRAPHY/MASS SPECTROMETRY -- Acquire and store data over the mass range 35-260 with a total cycle time (including scan overhead time) of 2 sec or less. Cycle time must be adjusted to measure five or more spectra during the elution of each GC peak. Several alternative temperature programs can be used.

11.3.1 Single ramp linear temperature program for wide bore columns 1 and 2 with a jet separator. Adjust the helium carrier gas flow rate to about 15 mL/min. The column temperature is reduced 10°C and held for 5 min from the beginning of desorption, then programmed to 160°C at 6°C/min, and held until all components have eluted.

11.3.2 Multi-ramp linear temperature program for wide bore column 2 with the open split interface. Adjust the helium carrier gas flow rate to about 4.6 mL/min. The column temperature is reduced 10°C and held for 6 min from the beginning of desorption, then heated to 70°C at 10°/min, heated to 120°C at 5°/min, heated to 180° at 8°/min, and held at 180° until all compounds have eluted.

11.3.3 Single ramp linear temperature program for narrow bore column 3 with a cryogenic interface. Adjust the helium carrier gas flow rate to about 4 mL/min. The column temperature is reduced 10°C and held for 5 min from the beginning of vaporization from the cryogenic trap, programmed at 6°C/min for 10 min, then 15°C/min for 5 min to 145°C, and held until all components have eluted.

11.4 TRAP RECONDITIONING -- After desorbing the sample for 4 min, recondition the trap by returning the purge and trap system to the purge mode. Wait 15 sec, then close the syringe valve on the purging device to begin gas flow through the trap. Maintain the trap temperature at 180°C. After approximately 7 min, turn off the trap heater and open the syringe valve to stop the gas flow through the trap. When the trap is cool, the next sample can be analyzed.

11.5 TERMINATION OF DATA ACQUISITION -- When all the sample components have eluted from the GC, terminate MS data acquisition. Use appropriate data output software to display full range mass spectra and appropriate plots of ion abundance as a function of time. If any ion abundance exceeds the system working range, dilute the sample aliquot in the second syringe with reagent water and analyze the diluted aliquot.

11.6 IDENTIFICATION OF ANALYTES -- Identify a sample component by comparison of its mass spectrum (after background subtraction) to a reference spectrum in the user-created data base. The GC retention time of the sample component should be within three standard deviations of the mean retention time of the compound in the calibration mixture.

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12.1.1 Calculate analyte and surrogate concentrations.

$$C_x = \frac{(A_x)(Q_{is})\ 1000}{(A_{is})\ RF\ V}$$

where: C_x = concentration of analyte or surrogate in µg/L in the water sample.
A_x = integrated abundance of the quantitation ion of the analyte in the sample.
A_{is} = integrated abundance of the quantitation ion of the internal standard in the sample.
Q_{is} = total quantity (in micrograms) of internal standard added to the water sample.
V = original water sample volume in mL.
RF = mean response factor of analyte from the initial calibration.

12.1.2 Alternatively, use the GC/MS system software or other available proven software to compute the concentrations of the analytes and surrogates from the second or third order regression curves.

12.1.3 Calculations should utilize all available digits of precision, but final reported concentrations should be rounded to an appropriate number of significant figures (one digit of uncertainty). Experience indicates that three significant figures may be used for concentrations above 99 µg/L, two significant figures for concentrations between 1- 99 µg/L, and one significant figure for lower concentrations.

12.1.4 Calculate the total trihalomethane concentration by summing the four individual trihalomethane concentrations in µg/L.

13. ACCURACY AND PRECISION

13.1 Single laboratory accuracy and precision data were obtained for the method analytes using laboratory fortified blanks with analytes at concentrations between 1 and 5 µg/L. Four sets of results were obtained using the three columns specified (Sect. 6.3.2) and the open split, cryogenic, and jet separator interfaces (Sect. 6.3.3). These data are shown in Tables 4-6.

13.2 With these data, method detection limits were calculated using the formula (2):

$$MDL = S\ t_{(n-1,1\text{-alpha} = 0.99)}$$

where:

$t_{(n-1,1\text{-alpha} = 0.99)}$ = Student's t value for the 99% confidence level with n-1 degrees of freedom,

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TABLE 1. MOLECULAR WEIGHTS AND QUANTITATION IONS FOR METHOD ANALYTES

Compound	MW[a]	Primary Quantitation Ion	Secondary Quantitation Ions
Internal standard			
Fluorobenzene	96	96	77
Surrogates			
4-Bromofluorobenzene	174	95	174,176
1,2-Dichlorobenzene-d4	150	152	115,150
Target Analytes			
Benzene	78	78	77
Bromobenzene	156	156	77,158
Bromochloromethane	128	128	49,130
Bromodichloromethane	162	83	85,127
Bromoform	250	173	175,252
Bromomethane	94	94	96
n-Butylbenzene	134	91	134
sec-Butylbenzene	134	105	134
tert-Butylbenzene	134	119	91
Carbon tetrachloride	152	117	119
Chlorobenzene	112	112	77,114
Chloroethane	64	64	66
Chloroform	118	83	85
Chloromethane	50	50	52
2-Chlorotoluene	126	91	126
4-Chlorotoluene	126	91	126
Dibromochloromethane	206	129	127
1,2-Dibromo-3-Chloropropane	234	75	155,157
1,2-Dibromoethane	186	107	109,188
Dibromomethane	172	93	95,174
1,2-Dichlorobenzene	146	146	111,148
1,3-Dichlorobenzene	146	146	111,148
1,4-Dichlorobenzene	146	146	111,148
Dichlorodifluoromethane	120	85	87
1,1-Dichloroethane	98	63	65,83
1,2-Dichloroethane	98	62	98
1,1-Dichloroethene	96	96	61,63
cis-1,2-Dichloroethene	96	96	61,98
trans-1,2-Dichloroethene	96	96	61,98
1,2-Dichloropropane	112	63	112
1,3-Dichloropropane	112	76	78
2,2-Dichloropropane	112	77	97
1,1-Dichloropropene	110	75	110,77

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TABLE 2. CHROMATOGRAPHIC RETENTION TIMES FOR METHOD ANALYTES ON THREE COLUMNS WITH FOUR SETS OF CONDITIONS[a]

Compound	Retention Time (min:sec) Column 1[b]	Column 2[b]	Column 2[c]	Column 3[d]
Internal standard				
Fluorobenzene	8:49	6:27	14:06	8:03
Surrogates				
4-Bromofluorobenzene	18:38	15:43	23:38	
1,2-Dichlorobenzene-d4	22:16	19:08	27:25	
Target Analytes				
Benzene	8:14	5:40	13:30	7:25
Bromobenzene	18:57	15:52	24:00	16:25
Bromochloromethane	6:44	4:23	12:22	5:38
Bromodichloromethane	10:35	8:29	15:48	9:20
Bromoform	17:56	14:53	22:46	15:42
Bromomethane	2:01	0:58	4:48	1:17
n-Butylbenzene	22:13	19:29	27:32	17:57
sec-Butylbenzene	20:47	18:05	26:08	17:28
tert-Butylbenzene	20:17	17:34	25:36	17:19
Carbon Tetrachloride	7:37	5:16	13:10	7:25
Chlorobenzene	15:46	13:01	20:40	14:20
Chloroethane	2:05	1:01		1:27
Chloroform	6:24	4:48	12:36	5:33
Chloromethane	1:38	0:44	3:24	0:58
2-Chlorotoluene	19:20	16:25	24:32	16:44
4-Chlorotoluene	19:30	16:43	24:46	16:49
Cyanogen chloride				1:03
Dibromochloromethane	14:23	11:51	19:12	12:48
1,2-Dibromo-3-Chloropropane	24:32	21:05		18:02
1,2-Dibromoethane	14:44	11:50	19:24	13:36
Dibromomethane	10:39	7:56	15:26	9:05
1,2-Dichlorobenzene	22:31	19:10	27:26	17:47
1,3-Dichlorobenzene	21:13	18:08	26:22	17:28
1,4-Dichlorobenzene	21:33	18:23	26:36	17:38
Dichlorodifluoromethane	1:33	0:42	3:08	0:53
1,1-Dichloroethane	4:51	2:56	10:48	4:02
1,2-Dichloroethane	8:24	5:50	13:38	7:00
1,1-Dichloroethene	2:53	1:34	7:50	2:20
cis-1,2-Dichloroethene	6:11	3:54	11:56	5:04
trans-1,2-Dichloroethene	3:59	2:22	9:54	3:32
1,2-Dichloropropane	10:05	7:40	15:12	8:56
1,3-Dichloropropane	14:02	11:19	18:42	12:29
2,2-Dichloropropane	6:01	3:48	11:52	5:19
1,1-Dichloropropene	7:49	5:17	13:06	7:10

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TABLE 3. ION ABUNDANCE CRITERIA FOR 4-BROMOFLUOROBENZENE (BFB)

Mass (M/z)	Relative Abundance Criteria
50	15 to 40% of mass 95
75	30 to 80% of mass 95
95	Base Peak, 100% Relative Abundance
96	5 to 9% of mass 95
173	< 2% of mass 174
174	> 50% of mass 95
175	5 to 9% of mass 174
176	> 95% but < 101% of mass 174
177	5 to 9% of mass 176

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TABLE 4. (Continued)

Compound	True Conc. Range (µg/L)	Mean Accuracy (% of True Value)	Rel. Std. Dev. (%)	Method Det. Limit (µg/L)
1,1,1,2-Tetrachloroethane	0.5-10	90	6.8	0.05
1,1,2,2-Tetrachloroethane	0.1-10	91	6.3	0.04
Tetrachloroethene	0.5-10	89	6.8	0.14
Toluene	0.5-10	102	8.0	0.11
1,2,3-Trichlorobenzene	0.5-10	109	8.6	0.03
1,2,4-Trichlorobenzene	0.5-10	108	8.3	0.04
1,1,1-Trichloroethane	0.5-10	98	8.1	0.08
1,1,2-Trichloroethane	0.5-10	104	7.3	0.10
Trichloroethene	0.5-10	90	7.3	0.19
Trichlorofluoromethane	0.5-10	89	8.1	0.08
1,2,3-Trichloropropane	0.5-10	108	14.4	0.32
1,2,4-Trimethylbenzene	0.5-10	99	8.1	0.13
1,3,5-Trimethylbenzene	0.5-10	92	7.4	0.05
Vinyl chloride	0.5-10	98	6.7	0.17
o-Xylene	0.1-31	103	7.2	0.11
m-Xylene	0.1-10	97	6.5	0.05
p-Xylene	0.5-10	104	7.7	0.13

[a]Data obtained by Robert W. Slater using column 1 with a jet separator interface and a quadrupole mass spectrometer (Sect. 11.3.1) with analytes divided among three solutions.

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TABLE 5. (Continued)

Compound	True Conc. (µg/L)	Mean Accuracy (% of True Value)	Rel. Std. Dev. (%)	Method Dect. Limit (µg/L)
n-Propylbenzene	0.1	99	6.6	0.06
Styrene	0.1	96	19.0	0.06
1,1,1,2-Tetrachloroethane	0.1	100	4.7	0.04
1,1,2,2-Tetrachloroethane	0.5	100	12.0	0.20
Tetrachloroethene	0.1	96	5.0	0.05
Toluene	0.1	100	5.9	0.08
1,2,3-Trichlorobenzene	0.1	98	8.9	0.04
1,2,4-Trichlorobenzene	0.1	91	16.0	0.20
1,1,1-Trichloroethane	0.1	100	4.0	0.04
1,1,2-Trichloroethane	0.1	98	4.9	0.03
Trichloroethene	0.1	96	2.0	0.02
Trichlorofluoromethane	0.1	97	4.6	0.07
1,2,3-Trichloropropane	0.1	96	6.5	0.03
1,2,4-Trimethylbenzene	0.1	96	6.5	0.04
1,3,5-Trimethylbenzene	0.1	99	4.2	0.02
Vinyl chloride	0.1	96	0.2	0.04
o-Xylene	0.1	94	7.5	0.06
m-Xylene	0.1	94	4.6	0.03
p-Xylene	0.1	97	6.1	0.06

[a]Data obtained by Caroline A. Madding using column 3 with a cryogenic interface and a quadrupole mass spectrometer (Sect 11.3.3).
[b]Reference 8.

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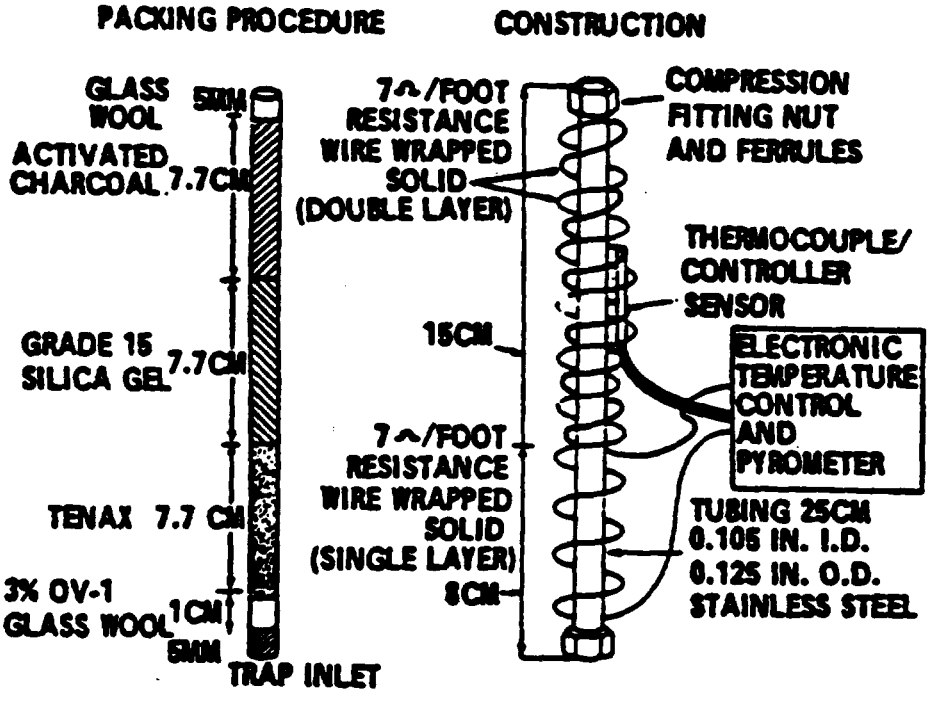

FIGURE 2. TRAP PACKINGS AND CONSTRUCTION TO INCLUDE DESORB CAPABILITY

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TABLE 6. (Continued)

Compound	No.[b]	Mean Accuracy (% of True Value, 2 µg/L Conc.)	RSD (%)	Mean Accuracy (% of True Value, 0.2 µg/L Conc.)	RSD (%)
1,2-Dichloropropane	20	102	2.2	103	2.9
1,3-Dichloropropane	21	92	3.7	93	3.2
2,2-Dichloropropane[c]					
1,1-Dichloropropene[c]					
cis-1,3-Dichloropropene[c]					
trans-1,3-Dichloropropene	25	96	1.7	99	2.1
Ethylbenzene	48	96	9.1	100	4.0
Hexachlorobutadiene	26	91	5.3	88	2.4
Isopropylbenzene	49	103	3.2	101	2.1
4-Isopropyltoluene	50	95	3.6	95	3.1
Methylene chloride	27	e		e	
Naphthalene	51	93	7.6	78	8.3
n-Propylbenzene	52	102	4.9	97	2.1
Styrene	53	95	4.4	104	3.1
1,1,1,2-Tetrachloroethane	28	99	2.7	95	3.8
1,1,2,2-Tetrachloroethane	29	101	4.6	84	3.6
Tetrachloroethene	30	97	4.5	92	3.3
Toluene	54	105	2.8	126	1.7
1,2,3-Trichlorobenzene	55	90	5.7	78	2.9
1,2,4-Trichlorobenzene	56	92	5.2	83	5.9
1,1,1-Trichloroethane	31	94	3.9	94	2.5
1,1,2-Trichloroethane	32	107	3.4	109	2.8
Trichloroethene	33	99	2.9	106	2.5
Trichlorofluoromethane	34	81	4.6	48	13.
1,2,3-Trichloropropane	35	97	3.9	91	2.8
1,2,4-Trimethylbenzene	57	93	3.1	106	2.2
1,3,5-Trimethylbenzene	58	88	2.4	97	3.2
Vinyl chloride	36	104	3.5	115	14.
o-Xylene	59	97	1.8	98	1.7
m-Xylene	60	f		f	
p-Xylene	61	98	2.3	103	1.4

[a]Data obtained by James W. Eichelberger using column 2 with the open split interface and an ion trap mass spectrometer (Sect. 11.3.2) with all method analytes in the same reagent water solution.
[b]Designation in Figures 1 and 2.
[c]Not measured; authentic standards were not available.
[d]Not found at 0.2 µg/L.
[e]Not measured; methylene chloride was in the laboratory reagent blank.
[f]m-xylene coelutes with and cannot be distinguished from its isomer p-xylene, No 61.

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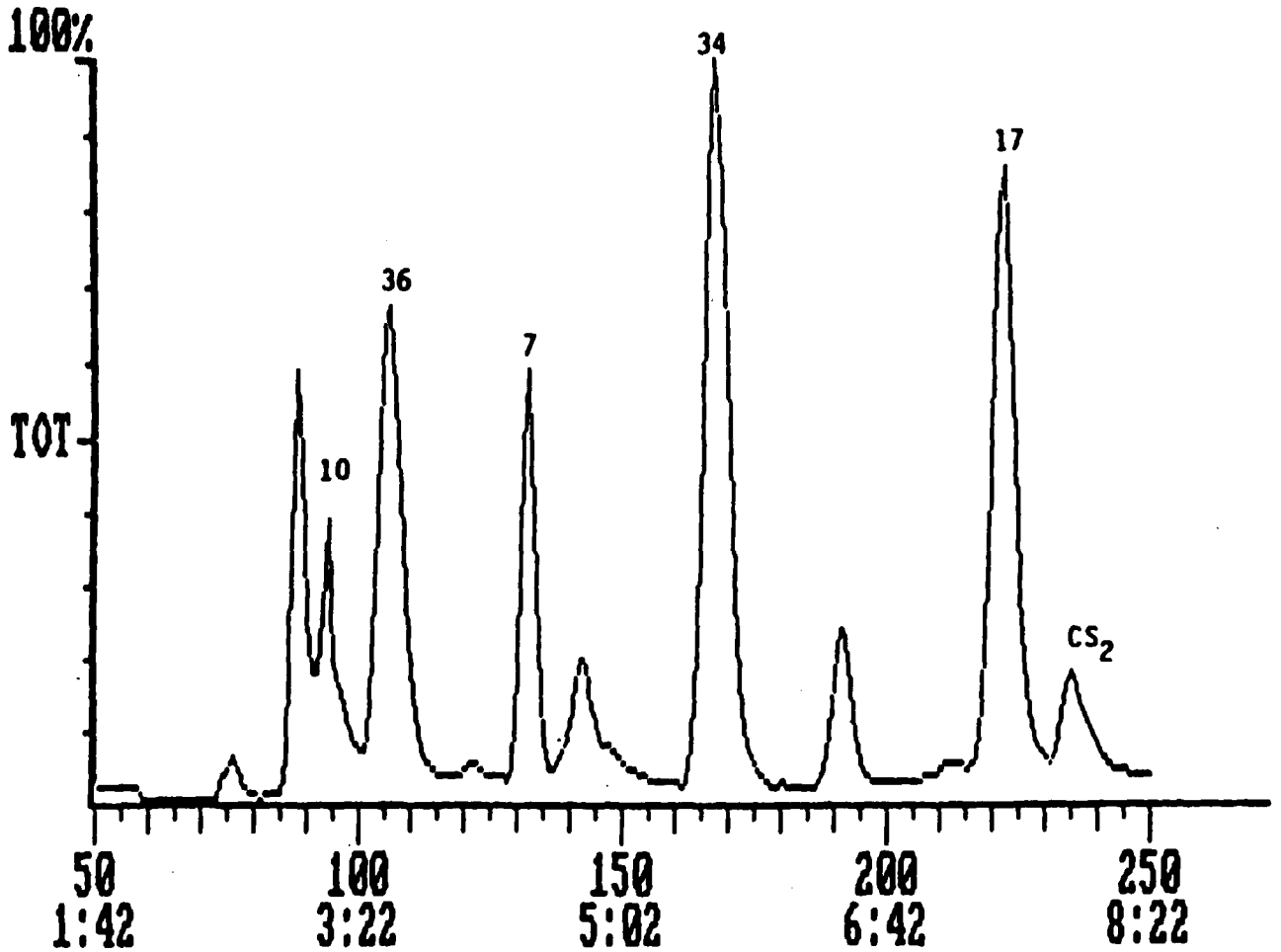
FIGURE 4. AMPLIFIED FIRST EIGHT MINUTES OF A TOTAL ION CURRENT CHROMATOGRAM FROM A VOLATILE COMPOUND CALIBRATION MIXTURE CONTAINING 25 ng (5 µg/L) OF EACH COMPONENT. THE COMPOUND IDENTIFICATION NUMBERS ARE GIVEN IN TABLE 6.



REFERENCE NO. 45

Kris Buros

FINAL REPORT-FINAL

WATER MANAGEMENT PLAN FOR THE PUBLIC WATER SYSTEM

Prepared for
THE DEPARTMENT OF CONSERVATION AND CULTURAL AFFAIRS

GOVERNMENT OF THE VIRGIN ISLANDS

Prepared by
CH2M HILL SOUTHEAST, INC.

Project No. GN14325.AO
July, 1983

TUT 001 1734

COPY NO._____

FINAL REPORT

WATER MANAGEMENT PLAN FOR THE PUBLIC WATER SYSTEM--U.S. VIRGIN ISLANDS

Prepared for

Division of Natural Resources Management
Department of Conservation and Cultural Affairs
Government of the U.S. Virgin Islands

Prepared by

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July 1983

GN14325.AO

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actions to stabilize the demand (consumption) for water at a reasonable level.

Specifically, it is assumed that the government will:

1. Decrease the subsidy now given the public water system by passing on the majority of the costs of purchasing, producing, storing, and distributing water directly to the actual consumers in the form of charges for water.

2. Efficiently meter, invoice, and promptly collect monies owed for water utilized.

3. Mandate the installation of appropriate water-efficient fixtures in new construction.

4. Increase the public's awareness of the need to conserve water.

5. Require that significant water-intensive industries be responsible for their own water supply areas.

If these actions are undertaken and largely instituted by 1990, it can be anticipated that the average demand for water will be stabilized within the predicted level.

Objectives

The demand data was developed for the water management plan with three basic objectives in mind:

1. That the data produced reflect the future water needs of the islands in accordancs with a moderate approach to growth (as discussed below) rather than emphasizing extremes.

2. That the data reflect the demand in small areas (districts) on each island instead of for the island as a whole.

3. That the data be in a form which would allow it to be readily updated or revised.

Moderate Approach--The basis for determining future demand in the Territory was a description of the islands' characteristics, in terms of population, industry, tourism, schools, etc., in 1990 and the year 2000. To generate such a description, we detailed a scenario describing possible future economic and population growth. This scenario, along with the projected unit water demands by various consumer

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types, was presented at a day-long public workshop on St. Thomas in 1982.

The concensus of the attendees was that both the scenario and the unit demands were reasonable. On the basis of some of the discussions and comments at this meeting, the scenario was slightly modified before being utilized in the study.

It is assumed that the projections will be updated and corrected in the future as additional data become available and trends become apparent.

District Planning--The demand data was assembled on a district basis. Each island was divided into a number of districts: St. Croix--20 districts, St. John--5, and St. Thomas--19. The boundaries of the districts were based on the boundaries of the larger districts used for the federal census with consideration also given to topographic and demographic features which might contribute to the district being treated as a logical entity in the water system. Thus many of the districts have boundaries dependent on the potential water pressure to be provided in the future system.

This is one of the first, if not the first, demand study for the Territory that has been developed on a district basis rather than calculated on an island-wide basis.

One of the important reasons for separating data by district is that it is very unlikely that the distribution system will be extended to the entire island during the period of this study (through the year 2000) and thus the direct demand on the distribution system will only be made up of those districts where service will be supplied. The remaining districts (Level II Service Areas), which will have no house-to-house distribution system can also exert some demand (external non-piped demand) on the system as water can be trucked to these areas from time to time. However, the demand of these districts should be reduced due to the higher cost of the water caused by the trucking charges (see Figures 3-1 and 3-2).

This Level II Service Area demand will mainly have an impact on the amount of water needed and will primarily be exerted at the locations where trucks are currently filled, such as at Subbase on St. Thomas or at the Cruz Bay Tank on St. John.

Data Update--The water management plan must be a dynamic document that can and should be updated to reflect changes in growth, development, economics, and desires. The demand data has been devised in a way which will permit checking,

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modification, and recomputation as new data becomes available or if someone wishes to try a new "what-if" scenario to see its effect on the projected demand. To this end, the data has been entered on a district-by-district basis in great detail. Individual large consumption units such as specific hotels, large restaurants, schools, housing projects, etc., with the basis for consumption (e.g., gpd per pupil in a school or gpd per room in a hotel). In addition, the factors that would contribute to a reduction in the demand of each of these units on the external system are identified. These reductions could be due to cistern supplies (calculated on the basis of the roof area available) or other localized sources such as wells, desalination facilities, etc.

Table 3-1 shows the typical input data used in the study. This data is for several districts on St. Thomas. It illustrates the level of detail with which the demand data was assembled.

The initial input to determine an estimated potential demand for 1980 involved inputing about 510 separate entries. As conditions change, any of these entries can be modified. To perform all of the necessary calculations, a special computer program was written so that the data could be calculated on the IBM System 34 located at the College of the Virgin Islands. This program is available for use by agencies interested in planning for the Territory's future growth.

ELEMENTS OF DEMAND

As previously discussed, the demand study allocated potential demand among the various districts. The life style of most Virgin Island families is such that in the course of a day the family members utilize water in several districts, as they often sleep, work, go to school, etc., in different locations around the island. By dividing the demand by function, i.e., residential, work place, school, medical, etc., these potential usages can be identified, quantified, and located in the appropriate district.

Types

Three primary types of water users were identified:

1. Residential
2. Tourist
3. Industrial

They are listed in the order of their significance.

Residential--The potential demand by residents of the Territory is divided mainly into the following categories:

Category	Description
Residential	Homes/apartments, housing projects, dormitories
School	Schools, colleges, day care
Medical	Doctors/dentists, clinics, hospital
Work Force	Government/private workers
Other	Laundromats, etc.
Tourist	Tourist-type restaurants (shared with tourists)

Residents spread their water usage between these categories so that the total per capita resident usage is actually the sum of these parts. As an individual moves about during the day, he or she creates a demand that can move from district-to-district. This method of calculation accounts for this distribution of consumption.

Tourist--The potential demand by tourists is somewhat limited to those facilities which they utilize. The demand is divided mainly into the following categories:

Category	Description
Tourist	Hotels, restaurants, marinas
Other	Airport

While shopping is a major activity of tourists, they do not in fact directly utilize water in this activity. This water use, in this study, is shown as water usage of people who work in shops, i.e., part of the work force (residents) water usage. The tourists' main use of water associated with shopping involves eating at tourist-type restaurants. Naturally hotels are a big user of water. Condominiums where greater than half of the rooms were under a hotel plan were counted as hotels; otherwise, they were considered as residential apartments.

Industrial--This area picks up potential water usage which is not directly tied to the number of residents or tourists. This demand is divided mainly as follows:

Category	Description
Other	Abbatoirs, bakeries, markets, asphalt and concrete plants, rum factories, ice plants, fish markets, pharmaceuticals, oil and bauxite refineries.

Unit Demand Estimates

For each consumption category, a unit demand was developed by DCCA. A summary of the unit demands of eight of the major potable water consumer categories in the Territory is shown in Table 3-2 along with a comparison of the unit demand figures used in three other recent reports on water resources for the islands. Except for the residential category, the figures are comparable.

For each of the consumption categories the projected demand and its manner of assignment to a district are discussed below:

Residential (Homes and Apartments)--This represents water used in a single or multifamily home or apartment.

i) Demand. The DCCA figure of 50 gpcd is compatible with the 50 gpcd used by the Caribbean Research Institute (CRI) and in the U.S. Army Corps of Engineers (COE) study. However, the CRI study includes outside domestic uses such as restaurants, laundries, etc., which are listed separately in the DCCA method. The DCCA predicted demand is lower than the 80 gpcd reported by the Virgin Islands Housing Authority (VIHA) in 1982 as actual usage in their Bovoni Housing Project, although VIHA does use 50 gpcd for planning purposes.

The figure of 50 gpcd for total residential consumption is not an impossible level to achieve. The actual usage of many islanders who rely solely on a cistern supply is often less than this quantity.

As emphasized in the beginning of this section, the perceived cost of the water to the residential user will have a significant effect on consumption. For the 50-gpcd figure to be valid, it is important that the governmental actions described in the "Key Assumptions" section of this chapter be carried out.

If, on the other hand, a higher residential consumption occurs, it would have a significant impact on the overall potential water consumption in the Territory. The effect of

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an additional daily increment of 10 gallons of usage (i.e., increasing consumption from 50 gpcd to 60 gpcd) by each person on the total supply is shown below:

TOTAL EXTERNAL DEMAND (IN MGD) USING RESIDENTIAL CONSUMPTIONS OF 50 OR 60 GALLONS PER CAPITA PER DAY (GPCD)

	St. Croix		St. John		St. Thomas	
	50 gpcd	60 gpcd	50 gpcd	60 gpcd	50 gpcd	60 gpcd
1980	3.3	3.7	0.13	0.15	3.2	3.6
1990	4.1	4.7	0.17	0.20	3.7	4.2
2000	4.6	5.4	0.20	0.24	4.0	4.6

Thus for 1990, on an annual Territory-wide basis the effect of keeping domestic consumption at 50 gpcd versus 60 gpcd would be a potential savings of about 400 million gallons, which is equivalent to 40 of the large tanks on Sara Hill or Kings Hill.

The basic demographic data for the two major residential categories, which are homes or apartments and housing projects, were obtained using census and VIHA data.

Enumeration for the 1980 census was accomplished by census districts, which were significant factors in determining the boundaries of the service districts used in this study. In general, there are two to four service districts within each of the census districts.

ii) Assignment to Service District. In order to locate the potential demand for each service district, the population was assigned to service districts within each census district by using (1) data reflecting on large concentrated communities such as the VIHA projects, (2) aerial photographs, and (3) field observations. By necessity, these assignments were approximations although the results are certainly acceptable.

Residential (Housing Projects)--This represents water used in low-cost housing run by the VIHA and other agencies.

i) Demand. Previous reports estimate the demand at 50 to 75 gpcd, whereas DCCA estimates 50 gpcd. Since consumption is often reported as being as much as twice this amount, efforts to reduce consumption will be needed. Since consumption by individual residential unit is not measured (by water meters) nor are residents presently billed for water usage, it is much more difficult to determine the effects of price/consumption elasticity as illustrated on Figure 3-1. It is our assumption that by 1990 some type of metering and/or equitable cost sharing system will be instituted by

VIHA along with the appropriate hardware, etc., necessary to reduce demand.

Efforts to reduce the amount of water usage in any of the housing projects must be undertaken with considerable sensitivity and understanding for the residents of the projects. Since any move to reduce usage will probably be viewed as a reduction in services (without a reduction in rent), any unilateral activities in this area could create considerable problems. It is recommended that a Task Force composed of representatives of the residents, Housing Authority, and the Legislature be formed with the charge to devise a method of equitably stabilizing water consumption at a reasonable level.

ii) Assignment to Service District. As each housing project is a large discrete high density unit, they are easily placed in the appropriate service district and listed by name.

The housing projects are individually named and listed within each district. Data on each of the housing projects is readily available from VIHA.

Schools--This represents water used by students, faculty, and staff for all purposes in the schools.

i) Demand. The same figure (15 gpcd) was used by the other three reports.

Demographic data for school enrollment is readily obtainable from the Department of Education. All of the schools are named in the program, so their inclusion and data can be readily checked.

ii) Assignment to Service District. Each school is a discrete unit and is easily assigned to the appropriate service district and listed by name.

Hotels--This represents water used in hotels and guest houses.

i) Demand: All three reports used rooms as a unit to estimate demand, but the figures varied widely, with DCCA using 150 gpd per room and others 260 and 120 gpd per room. The CRI figure of 260 gpd per room includes restaurants, which are listed separately in the DCCA report.

Data on hotel accommodations is readily obtainable from Department of Commerce literature such as the hotel rates sheets which are published twice yearly. Each of the hotels has been named in the program so that their inclusion and

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data can be readily checked. Condominiums with more than half their rooms on the hotel plan are counted as hotels.

ii) Assignment to Service District. Since each hotel is a discrete unit identifiable by name, it is easily placed in the proper service district.

Restaurants--This represents the water used by customers and staff in the operation of a restaurant.

i) Demand. In the DCCA report the restaurants were separated into two major divisions--tourist restaurants, which were defined as those with 10 or more tables, and local restaurants, which were considered to be small restaurants with less than 10 tables.

The water usage for the local (small) restaurants was included as part of the work force water usage, on the assumption that these restaurants are, by and large, patronized by workers employed in the immediate neighborhood.

Restaurants with 10 or more tables were classified as tourist restaurants, although it is recognized that they are heavily patronized, especially at lunch, by workers and other residents of the island. This potential water demand was listed separately under the category Tourist-Restaurant. These tourist restaurants were, in turn, classified as medium or large; those with more than 20 tables were classified as large. To reduce complexity, all medium restaurants were assigned a value of 10 tables and all large restaurants received a value of 25 tables, regardless of the actual number.

The category "day visitor" used by both the CRI and COE reports was not used in this study. Although this data is generally collected and thus available, it is extremely difficult to separate tourist from resident or to use the information to distribute the demand to the appropriate districts. We believe that the number of day visitors and overnight tourists directly affects the number of gift shops and restaurants which can be maintained on the islands. As tourism rises, one would expect the number of restaurants and shops (work force) to increase to accommodate it. Thus in this report these more site-specific indicators of tourism were used with the understanding that they also, in part, cover some of the lunch time consumption.

Where possible, almost every restaurant reflected in the data was identified by name, which means that their inclusion can be readily checked and updated. Updating can be performed using general knowledge, business licenses, the yellow pages, and tourist information.

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ii) Assignment by Service Area. The restaurants listed in the study are identifiable by name and hence easily placed in the proper service district.

Work Force--This covers the demand created by the resident work force.

i) Demand. The demand includes sanitary, dining, cleaning, and other service activities associated with these consumers.

ii) Assignment to Service District. In order to distribute this demand, the DCCA obtained raw employment data (an alphabetical list of employers) for the Territory and then painstakingly sorted the data by island and district. This was done by categorizing each type of employment because, unfortunately, this information was not organized by the collecting agency in a fashion which would make it readily usable for purposes of this type. This makes it difficult to check and update the agency data. It is hoped that the coding and organizing of this data will be revised by the collection agency for easier usage by all parties concerned.

DEVELOPMENT OF DEMAND DATA

General

The current (1980) and future (1990 and 2000) external demand was developed in a joint effort by DCCA and CH2M HILL. The detailed results of this effort were published in the demand report (CH2M HILL, 1982) which was based on a Present Water Use Report by DCCA (1982). In the CH2M HILL report, a scenario of future growth and development of the U.S. Virgin Islands was presented and reviewed by public agencies and other interested organizations or individuals. Based on this review and comments DCCA suggested some minor modifications and approved the scenario.

Scenario--Background

The purpose of producing a scenario of future growth and development for the Virgin Islands is for estimating the requirements for the public water system through the year 2000. The future growth of the Territory has been, and is a subject of speculation, study and thought by numbers of people, agencies, and businesses. Our version of this scenario is not intended to be the master plan for territorial development nor the ultimate in predictions on the islands' future. It is however, a reasonable outline of how the Territory could develop and it is in sufficient detail so the water use estimates can be made and possible public water distribution patterns established.

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It is not expected that this scenario will be fulfilled but review of the Territory's development at periodic intervals will enable one to determine where deviations have occurred and based on these make the appropriate changes in the water related estimates.

The major component of the scenario will be the expected change in population and its distribution within the Territory. There are three major factors which impact population. These are related to the political, economic, and social structures of the society (VI Planning Office, 1977). It is our belief that economic condition is the key factor that will be the controlling influence on the population growth as well as affect the political and social structures of the islands.

Present Economic Conditions--With an area of only 132 square miles in the three major islands, and most of that in steep rocky hillsides, the existence of a self sustaining economy vanished years ago. The population exceeds the capacity of the land and sea to support it through agriculture, fisheries, and development of local resources. St. John with a population density of 118 people/square mile might have a chance (if the National Park did not hold most of the land) but for St. Croix and St. Thomas (583 and 2,579 person/ square miles, respectively) it is not longer possible. This means that the economy must depend on external sources to maintain its strength and development in the future. Typical of these are the service and processing industries which have developed around tourism, petroleum, bauxite, rum, and watch manufacturing. The revenues brought in by these industries help support the network of smaller service industries and businesses like contractors, material suppliers, hardware stores, supermarkets, laundries, theaters, clothing stores, and eventually the government itself.

These industries are, for the most part, controlled by ownership, regulations, and/or market conditions which are beyond the ready control of the Government of the Virgin Islands. When these key industries are healthy and profitable the economy is strong and can support the population. If, in the future, these key industries (or those that may take their place) continue to be healthy and expand then it is logical to expect the population to continue to increase. However, if these industries suffer financial problems then the economic ability to support an expanded population will not be there. This would result in either a reduced overall standard of living or a reduction in population growth (or even a net population loss) until a relative balance between economic potential and population is achieved.

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In the case of an economic downturn it is assumed that out-migration would occur to stabilize the standard of living. Since people born outside the Virgin Islands make up about half of the population (VI Planning Office, 1977) out-migration is a reasonable possibility.

For purposes of this scenario it is being assumed that the economic conditions will continue to be reasonably favorable although not a repeat of the boom which occurred in the 1960-75 period.

Migration--Historically the Virgin Islands has experienced considerable in- and out-migration with a tremendous immigration of people during the 1970's which accounted for over 60 percent of the population growth during that decade. During other times, such as early 1900's a net out-immigration occurred on some of the islands, as people moved to the mainland to better their economic conditions.

Although immigration pressures have slackened since the 1970's with natural increase being the dominant factor, it is difficult to predict what will occur in the future. One unknown will be the effect on the Territory of the new legislation on U.S. immigration policies which is being formulated in the Congress.

Again, it is believed that despite the final wording of the immigration legislation (within reason) the dominant factor affecting immigration will be economic activity. The major affect of the congressional action for the islands will probably be who, not how many, may migrate.

Historical Growth Pattern--The population growth for the Territory since 1940 is shown in the following table:

	1940	1950	1960	1970	1975	1980
St. Thomas	11,265	13,813	16,201	37,285	40,950	44,170
St. John	722	749	925	1,921	2,190	2,480
St. Croix	12,902	12,103	14,973	35,945	42,690	49,280
V.I. Total	24,889	26,665	32,099	75,151	85,830	95,930

Notes: 1. 1940-1960 U.S. Census data as published by V.I. Planning Office in United States Virgin Islands Housing Market Survey--1974.

2. 1970-1980 data as published by the V.I. Office of Policy, Planning and Research (VIOPPR) in Annual Economic Review--1980.

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The basis for the statistics is the data published by the Office of Policy, Planning and Research (V.I. Department of Commerce).

Census--An important source of data for the Territory has been the census taken as part of the U.S. Census Bureau's national count. This takes place every ten years and is coordinated by the Federal government.

i) 1970 Census. The results of the 1970 census were questioned by various Territorial agencies as showing the population to have been undercounted. The VI Bureau of Research and Statistical Services estimated the under-enumeration at approximately 12,680 people. They estimated the islands population at 75,151 (versus 62,468 for the U.S. Census) and this modified data has been generally used by planners within the Territory and is being used in this report.

ii) 1980 Census. Given the problems involved with the results of the 1970 Census some care went into planning the 1980 Census in the Territory. However, there has been considerable delay in processing and releasing data. The problem is attributed to the U.S. Census Bureau and the cuts in their staff at various centers of the mainland where they are processing the data. Data released thus far are related to the head and housing count on the islands. Additional demographic data will probably not be released until the middle of 1982.

The VIOPPR placed the population of the Territory at 95,930 based on data from the 1980 census.

Growth Statistics--In developing a scenario for growth and development in the Virgin Islands it is helpful to base this on a data base which can be referred to in the future to determine how the scenario differed so that the water demand figures can be adjusted accordingly.

The key data used for this plan include:

- Population (including general, school enrollment, and work force)
- Tourist (hotel rooms)

The data on school population, hotel rooms, and population, which was used in the demand computations was obtained from local government sources and/or publications which can be referred to in the future to adjust the predicted figures for these parameters.

Table 3-3
DEMOGRAPHIC DATA FOR THE U.S. VIRGIN ISLANDS

Island Districts Category		1980 Data					1990 Projected Data					2000 Projected Data				
		Population (persons) RES	Work Force (persons) WKF	Schools (pupils) SCH	Hotels (rooms) TUR	Restaurant (tables) TUR	Population (persons) RES	Work Force (persons) WKF	Schools (pupils) SCH	Hotels (rooms) TUR	Restaurant (tables) TUR	Population (persons) RES	Work Force (persons) WKF	Schools (pupils) SCH	Hotels (rooms) TUR	Restaurant (tables) TUR
St. John	1	1,033	470	429	41	60	1,345	510	429	84	100	1,454	554	429	96	170
	2	897	7	--	30	--	1,072	50	100	30	--	1,220	60	138	30	--
	3	351	436	--	320	25	302	450	--	358	25	390	450	--	358	25
	4	164	11	83	--	--	226	11	83	--	--	257	30	83	60	--
	5	35	--	--	--	--	40	--	--	--	--	46	--	--	--	--
STJ TOTALS		2,488	924	512	391	85	2,965	1,021	612	452	125	3,375	1,094	650	574	145
St. Thomas	1	135	--	--	--	--	162	--	--	--	--	148	--	--	--	--
	2	376	11	48	--	--	395	11	48	--	--	410	12	48	--	--
	3	555	8	--	--	--	635	8	--	--	--	735	9	--	50	25
	4	1,523	45	260	--	40	2,742	50	260	70	50	3,961	53	260	70	70
	5	2,456	30	--	82	30	2,810	33	--	82	30	3,164	35	--	82	65
	6	4,599	6,619	3,061	433	90	4,820	7,120	3,237	433	115	5,010	7,547	3,514	433	115
	7	1,348	11	334	160	25	1,887	15	334	310	45	2,350	16	334	332	65
	8	1,622	58	--	--	--	2,757	600	294	--	--	3,926	636	1,294	--	10
	9	8,785	440	2,608	--	25	9,035	453	2,608	--	25	9,292	480	2,608	--	25
	10	740	130	158	321	100	1,274	519	858	647	125	1,825	550	858	671	175
	11	544	2	--	--	--	656	2	--	--	--	962	3	--	--	--
	12	2,133	114	996	234	70	2,986	117	996	234	70	3,732	124	1,699	344	70
	13	3,753	258	1,067	661	110	4,293	266	1,067	661	110	4,834	350	1,067	785	160
	14	697	22	364	--	--	797	23	364	--	--	897	24	364	--	--
	15	3,158	400	32	267	--	3,316	422	32	267	20	3,449	469	32	267	20
	16	6,926	6,605	4,235	194	110	7,923	7,105	4,235	194	135	8,921	7,531	4,235	234	160
	17	4,649	6,077	3,565	213	155	4,881	6,259	3,575	254	190	5,076	6,735	3,575	294	215
	18	11	--	--	--	--	13	--	--	--	--	15	46	--	100	25
	19	148	75	--	117	--	160	77	--	117	--	180	120	--	117	25
STT TOTALS		44,198	20,905	14,736	2,692	755	50,526	23,108	18,408	3,237	915	56,875	24,748	19,888	3,790	1,175
St. Croix	1	375	121	23	60	30	473	390	23	160	55	565	443	723	160	55
	2	3,887	831	2,095	65	55	4,562	914	2,095	65	55	5,198	1,040	2,095	115	65
	3	11,170	739	2,812	110	10	14,425	199	2,812	110	10	17,491	957	2,812	110	10
	4	637	175	--	--	10	700	199	--	--	10	836	226	--	--	10
	5	573	25	--	--	--	630	28	--	--	--	753	32	--	--	--
	6	404	78	9	91	25	509	89	9	91	25	608	101	9	154	50
	7	4,964	1,091	1,939	--	--	6,674	1,242	2,739	--	--	7,975	1,413	3,458	--	--
	8	2,268	1,479	2,200	25	20	4,278	1,683	3,149	56	20	5,112	1,915	3,317	56	20
	9	8,012	4,013	3,369	--	10	8,960	4,093	3,369	--	10	10,663	4,658	3,369	--	10
	10	2,885	306	440	82	25	2,629	348	440	82	25	3,142	396	440	82	25
	11	2,497	596	65	100	25	3,148	607	65	200	45	3,762	691	65	200	50
	12	3,528	8,196	1,369	383	190	3,888	9,186	1,369	383	190	4,637	10,364	1,369	383	190
	13	2,551	473	--	--	--	3,430	538	800	100	--	4,099	612	800	100	--
	14	504	--	--	--	--	555	10	--	--	--	663	11	--	--	--
	15	418	252	799	162	75	527	287	799	162	75	630	327	799	162	75
	16	546	110	40	100	25	688	125	40	100	25	822	142	40	202	25
	17	303	200	--	154	85	407	374	--	154	85	486	426	--	154	85
	18	48	10	--	--	--	53	11	--	--	--	63	13	--	--	--
	19	377	--	--	--	--	415	10	--	--	--	495	11	--	--	--
	20	4,241	1,741	3,168	100	10	5,222	1,775	3,168	100	10	6,240	2,020	3,168	100	10
STX TOTALS		49,280	20,516	18,328	1,512	595	62,145	22,670	20,877	1,843	640	74,240	25,798	22,456	2,138	680
TOTALS		95,930	42,345	25,576	4,595	1,435	115,630	46,791	39,897	5,572	1,680	134,490	51,622	42,944	6,452	2,000

Note: RES = residential; WKF = work force; SCH = school; TUR = tourist oriented.

QHR05A

ISLAND OF ST THOMAS
OUTPUT DATA FOR YEAR 1980

	INTERNAL DEMAND			INTERNAL WATER SUPPLY						EXTERNAL DEMAND		
				POTABLE WATER			NON-POTABLE WATER					
	POTABLE KGAL/D	NON-POT KGAL/D	TOTAL KGAL/D	CISTERN KGAL/D	OTHER KGAL/D	TOTAL KGAL/D	SALT KGAL/D	OTHER KGAL/D	TOTAL KGAL/D	POTABLE KGAL/D	NON-POT KGAL/D	TOTAL KGAL/D
DISTRICT # 01	6.8	0.0	6.8	1.4	0.0	1.4	0.0	0.0	0.0	5.4	0.0	5.4
DISTRICT # 02	19.7	0.0	19.7	4.1	0.0	4.1	0.0	0.0	0.0	15.6	0.0	15.6
DISTRICT # 03	27.9	0.0	27.9	5.0	0.0	5.0	0.0	0.0	0.0	22.9	0.0	22.9
DISTRICT # 04	85.8	0.0	85.8	22.1	0.0	22.1	0.0	0.0	0.0	63.7	0.0	63.7
DISTRICT # 05	137.0	1.9	138.9	34.7	0.0	34.7	0.0	4.0	4.0	102.3	0.0	102.3
DISTRICT # 06	584.7	31.8	616.5	83.8	30.0	113.8	0.0	0.0	0.0	475.7	31.8	507.5
DISTRICT # 07	104.1	106.0	210.1	20.3	65.0	85.3	0.0	56.0	56.0	73.4	50.0	123.4
DISTRICT # 08	82.5	0.0	82.5	11.2	8.0	19.2	0.0	0.0	0.0	63.3	0.0	63.3
DISTRICT # 09	540.8	0.0	540.8	102.8	16.0	118.8	0.0	0.0	0.0	422.2	0.0	422.2
DISTRICT # 10	97.0	11.1	108.1	13.1	0.0	13.1	0.0	15.0	15.0	83.9	0.0	83.9
DISTRICT # 11	50.3	0.0	50.3	3.4	0.0	3.4	0.0	0.0	0.0	46.9	0.0	46.9
DISTRICT # 12	174.9	10.5	185.4	28.6	10.0	38.6	0.0	15.0	15.0	139.7	0.0	139.7
DISTRICT # 13	281.7	61.1	342.8	40.0	170.0	210.0	0.0	62.0	62.0	195.8	4.2	200.0
DISTRICT # 14	40.7	0.0	40.7	9.7	0.0	9.7	0.0	0.0	0.0	31.0	0.0	31.0
DISTRICT # 15	215.4	26.3	241.7	33.8	0.0	33.8	0.0	0.0	0.0	181.6	26.3	207.9
DISTRICT # 16	712.0	57.6	769.6	112.7	8.0	120.7	0.0	0.0	0.0	591.3	57.6	648.9
DISTRICT # 17	567.2	20.7	587.9	93.5	25.0	118.5	0.0	0.0	0.0	448.7	20.7	469.4
DISTRICT # 18	0.6	0.0	0.6	0.1	0.0	0.1	0.0	0.0	0.0	0.5	0.0	0.5
DISTRICT # 19	25.7	0.0	25.7	3.6	0.0	3.6	0.0	0.0	0.0	22.1	0.0	22.1
TOTAL ISLAND	3754.8	327.0	4081.8	623.9	332.0	955.9	0.0	152.0	152.0	2986.0	190.6	3176.6

FIGURE 3-6.
Projected demand of the service districts on St. Thomas for the year 1980.

CH2M HILL

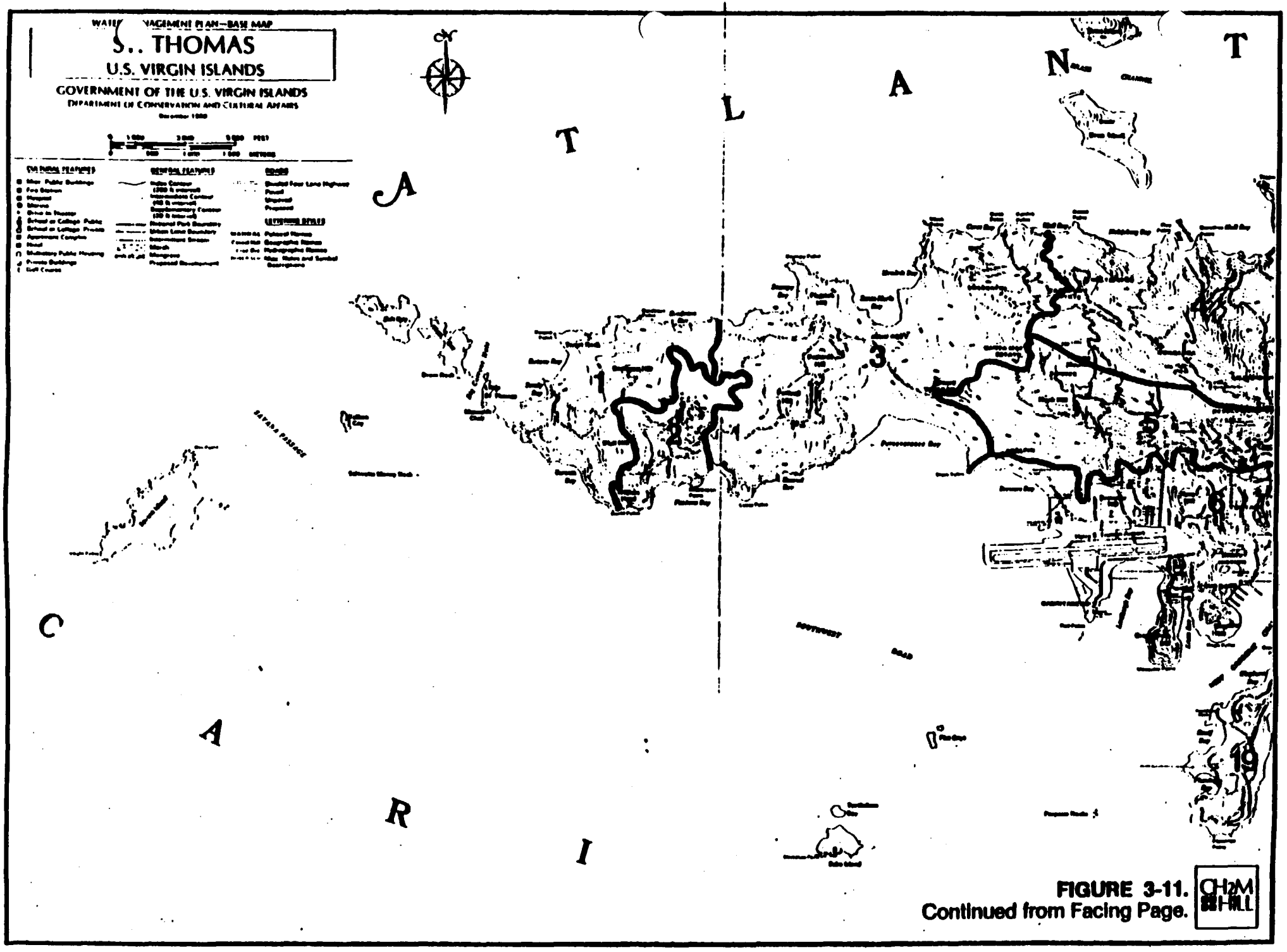

FIGURE 3-11.
Continued from Facing Page.

CH2M HILL

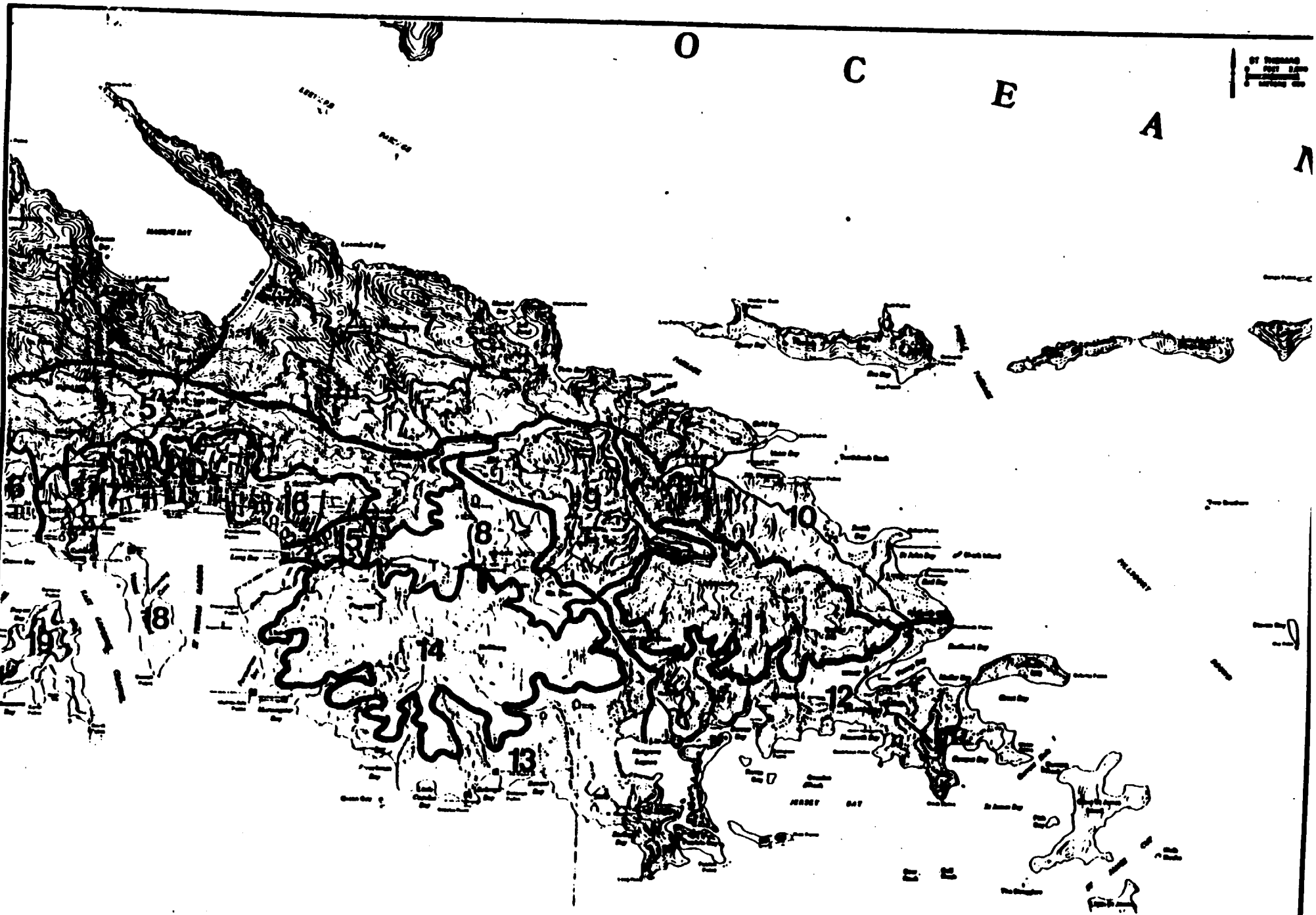

FIGURE 3-11.
Service District Boundaries on St. Thom(

Appendix A
DEMAND STUDY
COMPUTER DATA

US VIRGIN ISLANDS WATER SUPPLY INFORMATION
VI DEPT OF CONSERVATION AND CULTURAL AFFAIRS

ISLAND OF ST THOMAS
INPUT DATA FOR YEAR 1980

SEE APPENDIX I FOR AVERAGE ANNUAL RAINFALL
CATCHMENT EFFICIENCY 70 PERCENT

YR	LOC	DIST	DESC	CAT	DESCRIPTION	UNITS USED	# OF UNITS	CODE	INDIVIDUAL DEMAND: POTABLE GPD/UT	INDIVIDUAL DEMAND: NON-POT GPD/UT	CISTERNS: ROOF AREA FT2/UT	CISTERNS: % OPR	DESALINATION UNITS: DESC OF FEED WATER/MANUFACTURER	DESALINATION UNITS: TYPE/OUTPUT KGAL/D	OTHER SOURCES: DESC OF SOURCE	OTHER SOURCES: OUTPUT KGAL/D	NON-POTABLE WATER: DESC OF SOURCE/TDS	NON-POTABLE WATER: OUTPUT KGAL/D
80	1	01	000	RES	HOMES / APARTMENTS	PERSON	135		50	0	250	100	/ /	0.0		0.0	/ 0	0.0
80	1	02	000	RES	HB BLUE MTN BIBL COL	PERSON	48		50	0	250	100	/ /	0.0		0.0	/ 0	0.0
80	1	02	000	RES	HOMES / APARTMENTS	PERSON	328		50	0	250	100	/ /	0.0		0.0	/ 0	0.0
80	1	02	000	SCL	BLUE MTN BIBLE COL	PUPILS	48		15	0	75	100	/ /	0.0		0.0	/ 0	0.0
80	1	02	000	WKF	GOV PRIV WORKERS	PERSON	11		15	0	70	100	/ /	0.0		0.0	/ 0	0.0
80	1	03	000	RES	HOMES / APARTMENTS	PERSON	555		50	0	250	100	/ /	0.0		0.0	/ 0	0.0
80	1	03	000	WKF	GOV PRIV WORKERS	PERSON	8		15	0	70	100	/ /	0.0		0.0	/ 0	0.0
80	1	04	000	RES	HOMES / APARTMENTS	PERSON	1523		50	0	250	100	/ /	0.0		0.0	/ 0	0.0
80	1	04	000	SCL	J SIBILY J MONROE	PUPILS	260		15	0	75	100	/ /	0.0		0.0	/ 0	0.0
80	1	04	000	TUR	CAMPGRD LARRYS HIDW	TENTS	20		50	0	300	5	/ /	0.0		0.0	/ 0	0.0
80	1	04	000	TUR	RST SM ENTRE NOUS	TABLE	10		100	0	100	100	/ /	0.0		0.0	/ 0	0.0
80	1	04	000	TUR	RST SM LARRYS MIDWAY	TABLE	10		100	0	100	100	/ /	0.0		0.0	/ 0	0.0
80	1	04	000	TUR	RST SM MAGENS BAY	TABLE	10		100	0	100	100	/ /	0.0		0.0	/ 0	0.0
80	1	04	000	TUR	RST SM MOUNTAIN TOP	TABLE	10		100	0	100	100	/ /	0.0		0.0	/ 0	0.0
80	1	04	000	WKF	GOV PRIV WORKERS	PERSON	45		15	0	70	100	/ /	0.0		0.0	/ 0	0.0
80	1	05	000	DIH	RIV PARLOR	EACH	1		125	0	200	100	/ /	0.0		0.0	/ 0	0.0
80	1	05	000	RES	HOMES / APARTMENTS	PERSON	2456		50	0	250	100	/ /	0.0		0.0	/ 0	0.0
80	1	05	000	TUR	HTL CROWN COLONY	ROOMS	17		100	50	300	100	/ /	0.0		0.0	/ 0	0.0
80	1	05	000	TUR	HTL DANISH CHALET	ROOMS	15		150	0	300	100	/ /	0.0		0.0	FWW/ 0	2.0
80	1	05	000	TUR	HTL DOMINI HUS	ROOMS	7		150	0	300	100	/ /	0.0		0.0	/ 0	0.0
80	1	05	000	TUR	HTL MAFOLIE	ROOMS	23		150	0	300	100	/ /	0.0		0.0	/ 0	0.0
80	1	05	000	TUR	HTL SHIBUI	ROOMS	20		100	50	300	100	/ /	0.0		0.0	/ 0	0.0
80	1	05	000	TUR	RST SM CROWN COLONY	TABLES	10		100	0	100	100	/ /	0.0		0.0	SWW/ 0	2.0
80	1	05	000	TUR	RST SM DRIFTWOOD INN	TABLES	10		100	0	100	100	/ /	0.0		0.0	/ 0	0.0
80	1	05	000	TUR	RST SM FRIGATE	TABLES	10		100	0	100	100	/ /	0.0		0.0	/ 0	0.0
80	1	05	000	WKF	GOV PRIV WORKERS	PERSON	30		15	0	70	100	/ /	0.0		0.0	/ 0	0.0
80	1	06	000	MED	CLINICAL LAB	EACH	2		100	0	750	100	/ /	0.0		0.0	/ 0	0.0
80	1	06	000	MED	DOCTORS DENTISTS OFF	DOCTOR	1		100	0	750	100	/ /	0.0		0.0	/ 0	0.0
80	1	06	000	DIH	RIV PARLORS	EACH	1		125	0	200	100	/ /	0.0		0.0	/ 0	0.0
80	1	06	000	DIH	GOLF COURSE - CVI	EACH	1		50000	0	0	0	/ /	0.0	WELLS/PUMP	5.0	/ 0	0.0
80	1	06	000	DIH	H S TRUMAN AIRPORT	EACH	1		30000	0	50000	100	/ /	0.0		0.0	/ 0	0.0
80	1	06	000	DIH	LND RD LAUNDRY	EACH	1		36000	0	1000	100	/ /	0.0		0.0	/ 0	0.0
80	1	06	000	DIH	LND SM LAUNDRY	EACH	2		21600	0	450	100	/ /	0.0		0.0	/ 0	0.0
80	1	06	000	RES	CVI DORM	PERSON	225		50	0	250	100	/ /	0.0	HILSID CHT	0.0	/ 0	0.0
80	1	06	000	RES	HOMES / APARTMENTS A	PERSON	900		35	20	250	80	/ /	0.0		0.0	SEA/ 35000	0.0
80	1	06	000	RES	HOMES / APARTMENTS B	PERSON	2670		50	0	250	80	/ /	0.0		0.0	/ 0	0.0
80	1	06	000	RES	HP ALTONA	PERSON	55		50	0	213	100	/ /	0.0		0.0	/ 0	0.0
80	1	06	000	RES	HP ALTONA-WOODLN	PERSON	30		50	0	200	100	/ /	0.0		0.0	/ 0	0.0
80	1	06	000	RES	HP HUMMFIELD	PERSON	20		50	0	150	100	/ /	0.0		0.0	/ 0	0.0
80	1	06	000	RES	HP H J KIRWAN TERR	PERSON	689		35	20	117	100	/ /	0.0	6 WELLS	25.0	SEA/ 35000	0.0
80	1	06	000	SCL	CVI	PUPILS	1464		15	0	75	100	/ /	0.0		0.0	/ 0	0.0
80	1	06	000	SCL	GRANDBKO NISKY	PUPILS	124		15	0	75	100	/ /	0.0		0.0	/ 0	0.0

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US VIRGIN ISLANDS WATER SUPPLY INFORMATION
VI DEPT OF CONSERVATION AND CULTURAL AFFAIRS

SEE APPENDIX I FOR AVERAGE ANNUAL RAINFALL
CATCHMENT EFFICIENCY 70 PERCENT

DATE 81 11 01
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ISLAND OF ST THOMAS
INPUT DATA FOR YEAR 1980

GENERAL INFORMATION									INDIVIDUAL DEMAND		INDIVIDUAL WATER SOURCES															
											FRESHWATER												NON-POTABLE WATER			
											CISTERNS		DESALINATION UNITS				OTHER SOURCES									
VR	I S L	D I S T	D S T	CAT	DESCRIPTION	UNITS USED	# OF UNITS	COD E	POTABLE GPD/UT	NON-POT GPD/UT	ROOF AREA FT2/UT	EFF	DESC OF TYPE/ FEED WATER/ MANUFACTURER	OUTPUT KGAL/D	DESC OF SOURCE	OUTPUT KGAL/D	DESC OF SOURCE/ IDS	OUTPUT KGAL/D								
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19								
80	1	06	000	SCL	HEADSTART DAYCARE	PUPILS	57		15	0	75	100	/ /	0.0		0.0	/	0	0.0							
80	1	06	000	SCL	H J KINNAN	PUPILS	620		15	0	75	100	/ /	0.0		0.0	/	0	0.0							
80	1	06	000	SCL	U P MULLER	PUPILS	559		15	0	75	100	/ /	0.0		0.0	/	0	0.0							
80	1	06	000	SCL	WESLEYAN	PUPILS	237		15	0	75	100	/ /	0.0		0.0	/	0	0.0							
80	1	06	000	TUR	HTL BEACHCOMBER	ROOMS	50		150	0	300	100	/ /	0.0		0.0	/	0	0.0							
80	1	06	000	TUR	HTL BEVERLY HILLS	ROOMS	12		150	0	300	100	/ /	0.0		0.0	/	0	0.0							
80	1	06	000	TUR	HTL CARIB BEACH	ROOMS	92		150	0	300	100	/ /	0.0		0.0	/	0	0.0							
80	1	06	000	TUR	HTL EMBERS	ROOMS	10		150	0	300	100	/ /	0.0		0.0	/	0	0.0							
80	1	06	000	TUR	HTL HILLTOP	ROOMS	18		150	0	300	100	/ /	0.0		0.0	/	0	0.0							
80	1	06	000	TUR	HTL ISLAND VIEW	ROOMS	9		150	0	300	100	/ /	0.0		0.0	/	0	0.0							
80	1	06	000	TUR	HTL MICHELE MOTEL	ROOMS	42		150	0	300	100	/ /	0.0		0.0	/	0	0.0							
80	1	06	000	TUR	HTL VIRGIN ISLE	ROOMS	200		150	0	300	100	/ /	0.0		0.0	/	0	0.0							
80	1	06	000	TUR	RST MD L ESCARGOT	TABLES	25		100	0	100	100	/ /	0.0		0.0	/	0	0.0							
80	1	06	000	TUR	RST MD VIRGIN ISLE	TABLES	25		100	0	100	100	/ /	0.0		0.0	/	0	0.0							
80	1	06	000	TUR	RST SN ALFREDOS	TABLES	10		100	0	100	100	/ /	0.0		0.0	/	0	0.0							
80	1	06	000	TUR	RST SN BEACHCOMBER	TABLES	10		100	0	100	100	/ /	0.0		0.0	/	0	0.0							
80	1	06	000	TUR	RST SN CARIB BEACH	TABLES	10		100	0	100	100	/ /	0.0		0.0	/	0	0.0							
80	1	06	000	TUR	RST SN JELLYS	TABLES	10		100	0	100	100	/ /	0.0		0.0	/	0	0.0							
80	1	06	000	WKF	GOV PRIV WORKERS	PERSON	6619		15	0	70	100	/ /	0.0		0.0	/	0	0.0							
80	1	07	000	DTH	ST THOMAS DAIRIES	EACH	1		11000	0	13000	100	[illegible]	15.0		0.0	/	0	0.0							
80	1	07	000	RES	HOMES / APARTMENTS	PERSON	1348		50	0	250	100	/ /	0.0		0.0	/	0	0.0							
80	1	07	000	SCL	PEACE CORPS	PUPILS	334		15	0	75	100	/ /	0.0		0.0	/	0	0.0							
80	1	07	000	TUR	GULF COURSE-MAN RUN	EACH	1		0	100000	0	0	/ /	0.0	WELLS	50.0	SWW/	0	>0.0							
80	1	07	000	TUR	HTL MAGENS PT	ROOMS	32		150	0	300	100	/ /	0.0		0.0	SWW/	0	0.0							
80	1	07	000	TUR	HTL MAHOGANY RUN	ROOMS	120		100	50	300	100	/ /	0.0		0.0	SWW/	0	0.0							
80	1	07	000	TUR	HTL MANDAHL INN	ROOMS	8		150	0	300	100	/ /	0.0		0.0	/	0	0.0							
80	1	07	000	TUR	RST MD LOBSTER POT	TABLES	25		100	0	100	100	/ /	0.0		0.0	/	0	0.0							
80	1	07	000	WKF	GOV PRIV WORKERS	PERSON	11		15	0	70	100	/ /	0.0		0.0	/	0	0.0							
80	1	08	000	MLD	DOCTORS DENTISIS OFF	DOCTOR	4		100	0	750	100	/ /	0.0		0.0	/	0	0.0							
80	1	08	000	RES	HOMES / APARTMENTS	PERSON	325		50	0	250	100	/ /	0.0		0.0	/	0	0.0							
80	1	08	000	RES	HP DONDE	PERSON	1297		50	0	111	100	/ /	0.0	2 WELLS	0.0	/	0	0.0							
80	1	08	000	WKF	GOV PRIV WORKERS	PERSON	58		15	0	70	100	/ /	0.0		0.0	/	0	0.0							
80	1	09	000	DTH	INV LG BAKERY	EACH	1		1350	0	1600	100	/ /	0.0		0.0	/	0	0.0							
80	1	09	000	DTH	LND LG LAUNDRY	EACH	1		50400	0	2500	100	/ /	0.0		0.0	/	0	0.0							
80	1	09	000	DTH	TILLEY TEXTILES	EACH	1		1500	0	35000	100	/ /	0.0		0.0	/	0	0.0							
80	1	09	000	RES	HOMES / APARTMENTS	PERSON	7100		50	0	250	100	/ /	0.0	4 WELLS	0.0	/	0	0.0							
80	1	09	000	RES	HP ESTATE HI RISE	PERSON	1995		50	0	62	100	/ /	0.0		0.0	/	0	0.0							
80	1	09	000	SCL	CHURCH OF GOD	PUPILS	91		15	0	75	100	/ /	0.0		0.0	/	0	0.0							
80	1	09	000	SCL	E B OLIVER	PUPILS	783		15	0	75	100	/ /	0.0		0.0	/	0	0.0							
80	1	09	000	SCL	HEADSTART DAYCARE	PUPILS	129		15	0	75	100	/ /	0.0		0.0	/	0	0.0							
80	1	09	000	SCL	J GOMEZ	PUPILS	1056		15	0	75	100	/ /	0.0		0.0	/	0	0.0							
80	1	09	000	SCL	J MADISON	PUPILS	212		15	0	75	100	/ /	0.0		0.0	/	0	0.0							
80	1	09	000	SCL	7TH DAY ADVENTISTS	PUPILS	337		15	0	75	100	/ /	0.0		0.0	/	0	0.0							
80	1	09	000	TUR	RST MD EL PAPAGAYO	TABLES	25		100	0	100	100	/ /	0.0		0.0	/	0	0.0							

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US VIRGIN ISLANDS WATER SUPPLY INFORMATION
VI DEPT OF CONSERVATION AND CULTURAL AFFAIRS

SEE APPENDIX I FOR AVERAGE ANNUAL RAINFALL
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ISLAND OF ST THOMAS
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GENERAL INFORMATION									INDIVIDUAL DEMAND		INDIVIDUAL WATER SOURCES											
											FRESHWATER								NON-POTABLE WATER			
	I S	D E S	D SI US				C O				CISTERNS		DESALINATION UNITS			OTHER SOURCES						
YR	L	T	BT	CAT	DESCRIPTION	UNITS USED	# OF UNITS	E	POTABLE GPD/UT	NON-POT GPD/UT	ROOF AREA FT2/UT	% OPR	DESC OF FEED WATER/ MANUFACTURER	OUTPUT KGAL/D	DESC OF SOURCE	OUTPUT KGAL/D	DESC OF SOURCE/ TUS	OUTPUT KGAL/D				
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19				
80	1	17	000	SCL	U ASPINALL JHS	PUPILS	1248		15	0	75	100	/ /	0.0		0.0	/	0	0.0			
80	1	17	000	TUR	HTL HARBOR VIEW	ROOMS	8		150	0	300	100	/ /	0.0		0.0	/	0	0.0			
80	1	17	000	TUR	HTL HOLIDAY ISLES	ROOMS	18		150	0	300	100	/ /	0.0		0.0	/	0	0.0			
80	1	17	000	TUR	HTL MAISON GREAUX	ROOMS	9		150	0	300	100	/ /	0.0		0.0	/	0	0.0			
80	1	17	000	TUR	HTL MILLER MANOR	ROOMS	22		120	30	300	100	/ /	0.0		0.0	SEA/	3500	0.0			
80	1	17	000	TUR	HTL VILLA OLGA	ROOMS	12		150	0	300	100	/ /	0.0		0.0	/	0	0.0			
80	1	17	000	TUR	HTL WINDWARD PASSAGE	ROOMS	144		150	0	300	100	/ /	0.0		0.0	/	0	0.0			
80	1	17	000	TUR	MARINA	EACH	1		15000	0	0	0	/ /	0.0		0.0	/	0	0.0			
80	1	17	000	TUR	RST MD BARTOLINOS	TABLE	25		100	0	100	100	/ /	0.0		0.0	/	0	0.0			
80	1	17	000	TUR	RST MD CHART HSE	TABLE	25		100	0	100	100	/ /	0.0		0.0	/	0	0.0			
80	1	17	000	TUR	RST MD L ESCARGOT	TABLE	25		100	0	100	100	/ /	0.0		0.0	/	0	0.0			
80	1	17	000	TUR	RST SM GREENHOUSE	TABLE	10		100	0	100	100	/ /	0.0		0.0	/	0	0.0			
80	1	17	000	TUR	RST SM HARBOR VIEW	TABLES	10		100	0	100	100	/ /	0.0		0.0	/	0	0.0			
80	1	17	000	TUR	RST SM LE BISTRO	TABLE	10		100	0	100	100	/ /	0.0		0.0	/	0	0.0			
80	1	17	000	TUR	RST SM MACARONIS	TABLE	10		100	0	100	100	/ /	0.0		0.0	/	0	0.0			
80	1	17	000	TUR	RST SM PANCHITAS	TABLE	10		100	0	100	100	/ /	0.0		0.0	/	0	0.0			
80	1	17	000	TUR	RST SM PORTUFINO	TABLE	10		100	0	100	100	/ /	0.0		0.0	/	0	0.0			
80	1	17	000	TUR	RST SM 8TH DECK	TABLE	10		100	0	100	100	/ /	0.0		0.0	/	0	0.0			
80	1	17	000	TUR	RST SM SPARKYS	TABLE	10		100	0	100	100	/ /	0.0		0.0	/	0	0.0			
80	1	17	000	WKP	GOV PRIV WORKERS	PERSON	6077		15	0	70	100	/ /	0.0		0.0	/	0	0.0			
80	1	18	000	RES	HOMES / APARTMENTS	PERSON	11		50	0	250	100	/ /	0.0		0.0	/	0	0.0			
80	1	19	000	RES	HOMES / APARTMENTS	PERSON	140		50	0	250	100	/ /	0.0		0.0	/	0	0.0			
80	1	19	000	TUR	HTL LIMESTONE REEF	ROOMS	8		150	0	300	100	/ /	0.0		0.0	/	0	0.0			
80	1	19	000	TUR	HTL SUGAR BIRD BEACH	ROOMS	99		150	0	300	100	/ /	0.0		0.0	/	0	0.0			
80	1	19	000	TUR	HTL SUGARBIRD VILLAS	ROOMS	10		150	0	300	100	/ /	0.0		0.0	/	0	0.0			
80	1	19	000	WKP	GOV PRIVATE WORKERS	PERSON	75		15	0	70	100	/ /	0.0		0.0	/	0	0.0			

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US VIRGIN ISLANDS WATER SUPPLY INFORMATION
VI DEPT OF CONSERVATION AND CULTURAL AFFAIRS

SEE APPENDIX I FOR AVERAGE ANNUAL RAINFALL
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YR	L	I S T	D I S T	D U S E	CAT	DESCRIPTION	UNITS USED	# OF UNITS	C O D E	INDIVIDUAL DEMAND POTABLE GPD/UT	INDIVIDUAL DEMAND NON-POT GPD/UT	CISTERNS ROOF AREA FT2/UT	CISTERNS % OPR	DESALINATION UNITS DESC OF FEED WATER/ MANUFACTURER	DESALINATION UNITS TYPE/ OUTPUT KGAL/D	OTHER SOURCES DESC OF SOURCE	OTHER SOURCES OUTPUT KGAL/D	NON-POTABLE WATER DESC OF SOURCE/ IDS	NON-POTABLE WATER OUTPUT KGAL/D
1	2	3	4	5		6	7	8	9	10	11	12	13	14	15	16	17	18	19
80	1	13	000	TUR	HTL	BOLONGO BAY	ROOMS	37		100	50	300	100	/ /	0.0		0.0	FWW/	0 2.0
80	1	13	000	TUR	HTL	FRENCHMAN REEF A	ROOMS	0		0	0	0	0	RO/SEA/WSA	60.0		0.0	/	0 0.0
80	1	13	000	TUR	HTL	FRENCHMAN REEF B	ROOMS	410		100	50	300	100	DI/SEA/DIH	100.0		0.0	FWW/	0 25.0
80	1	13	000	TUR	HTL	LIMETREE	ROOMS	84		100	50	300	100	/ /	0.0		0.0	FWW/	0 0.0
80	1	13	000	TUR	HTL	MORNINGSTAR	ROOMS	24		150	0	300	100	/ /	0.0		0.0	/	0 0.0
80	1	13	000	TUR	HTL	WATERGATE	ROOMS	100		100	50	300	100	/ /	0.0		0.0	SWW/	0 5.0
80	1	13	000	TUR	MARINA		EACH	1		10000	0	0	0	RO/SWW/PLY	10.0		0.0	/	0 0.0
80	1	13	000	TUR	RST	LG FRENCHMANS RF	TABLES	75		100	0	100	100	/ /	0.0		0.0	/	0 0.0
80	1	13	000	TUR	RST	MD WATERGATE TER	TABLES	25		100	0	100	100	/ /	0.0		0.0	/	0 0.0
80	1	13	000	TUR	RST	SM SEA SHANTY	TABLES	10		100	0	100	100	/ /	0.0		0.0	/	0 0.0
80	1	13	000	WKF	GOV	PRIVATE WORKERS	PERSON	250		15	0	70	100	/ /	0.0		0.0	/	0 0.0
80	1	14	000	RES	HOMES / APARTMENTS		PERSON	697		50	0	250	100	/ /	0.0		0.0	/	0 0.0
80	1	14	000	SCL	ANTILLES		PUPILS	364		15	0	75	100	/ /	0.0		0.0	/	0 0.0
80	1	14	000	WKF	GOV	PRIV WORKERS	PERSON	22		15	0	70	100	/ /	0.0		0.0	/	0 0.0
80	1	15	000	DIH	BTY	PARLOR	EACH	8		125	0	200	100	/ /	0.0		0.0	/	0 0.0
80	1	15	000	DIH	LND	SM LAUNDRY	EACH	1		21600	0	650	100	/ /	0.0		0.0	/	0 0.0
80	1	15	000	RES	HOMES / APARTMENTS		PERSON	1843		50	0	250	100	/ /	0.0		0.0	/	0 0.0
80	1	15	000	RES	HP	D E HARRIS CT	PERSON	1315		35	20	184	100	/ /	0.0		0.0	SEA/35000	0.0
80	1	15	000	SCL	HEADSTART DAYCARE		PUPILS	32		15	0	75	100	/ /	0.0		0.0	/	0 0.0
80	1	15	000	TUR	HTL	RAMSEYS	ROOMS	14		150	0	300	100	/ /	0.0		0.0	/	0 0.0
80	1	15	000	TUR	HTL	SCOTT	ROOMS	30		150	0	300	100	/ /	0.0		0.0	/	0 0.0
80	1	15	000	TUR	HTL	ST THOMAS	ROOMS	223		150	0	300	100	/ /	0.0		0.0	/	0 0.0
80	1	15	000	TUR	MARINA		EACH	1		8000	0	0	0	/ /	0.0		0.0	/	0 0.0
80	1	15	000	WKF	GOV	PRIVATE WORKERS	PERSON	400		15	0	70	100	/ /	0.0		0.0	/	0 0.0
80	1	16	000	MED	CLINICAL LABS		EACH	1		100	0	750	100	/ /	0.0		0.0	/	0 0.0
80	1	16	000	MED	DOCTORS DENTISTS OFF		EACH	13		100	0	750	100	/ /	0.0		0.0	/	0 0.0
80	1	16	000	MED	K HANSEN MEM HOSPITA		BEDS	100		250	0	400	100	/ /	0.0		0.0	/	0 0.0
80	1	16	000	DIH	BKY	LG BAKERY	EACH	1		1350	0	1600	100	/ /	0.0		0.0	/	0 0.0
80	1	16	000	DIH	BKY	SM BAKERY	EACH	6		250	0	400	100	/ /	0.0		0.0	/	0 0.0
80	1	16	000	DIH	BTY	PARLOR	EACH	6		750	0	200	100	/ /	0.0		0.0	/	0 0.0
80	1	16	000	DIH	FISH	MARKET	EACH	1		450	0	1800	100	/ /	0.0		0.0	/	0 0.0
80	1	16	000	DIH	LND	LG LAUNDRY	EACH	1		50400	0	2500	100	/ /	0.0		0.0	/	0 0.0
80	1	16	000	DIH	LND	MD LAUNDRY	EACH	1		36000	0	1000	100	/ /	0.0		0.0	/	0 0.0
80	1	16	000	DIH	LND	SM LAUNDRY	EACH	3		21600	0	650	100	/ /	0.0		0.0	/	0 0.0
80	1	16	000	RES	HOMES / APARTMENTS	A	PERSON	1100		35	20	250	80	/ /	0.0		0.0	SEA/35000	0.0
80	1	16	000	RES	HOMES / APARTMENTS	B	PERSON	3372		50	0	250	80	/ /	0.0		0.0	/	0 0.0
80	1	16	000	RES	HP	CHARLOTTE APTS	PERSON	145		50	0	75	100	/ /	0.0		0.0	/	0 0.0
80	1	16	000	RES	HP	H H BERGS HOME	PERSON	133		35	20	226	100	/ /	0.0		0.0	SEA/35000	0.0
80	1	16	000	RES	HP	H H BERGS HOME AD	PERSON	121		35	20	168	100	/ /	0.0		0.0	SEA/35000	0.0
80	1	16	000	RES	HP	HOSPITAL GROUND	PERSON	320		50	0	48	100	/ /	0.0		0.0	/	0 0.0
80	1	16	000	RES	HP	L MILLIN HOMES	PERSON	91		50	0	183	100	/ /	0.0		0.0	/	0 0.0
80	1	16	000	RES	HP	P H PEARSON GDNS	PERSON	740		35	20	123	100	/ /	0.0	1 WELL	4.0	SLA/35000	0.0
80	1	16	000	RES	HP	ROSS SAARNBERG	PERSON	120		50	0	60	100	/ /	0.0		0.0	/	0 0.0
80	1	16	000	RES	HP	W E BROWN I	PERSON	385		35	20	74	100	/ /	0.0	1 WELL	4.0	SEA/35000	0.0

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US VIRGIN ISLANDS WATER SUPPLY INFORMATION
VI DEPT OF CONSERVATION AND CULTURAL AFFAIRS

SEE APPENDIX I FOR AVERAGE ANNUAL RAINFALL
CATCHMENT EFFICIENCY 70 PERCENT

ISLAND OF ST THOMAS
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GENERAL INFORMATION								INDIVIDUAL DEMAND		INDIVIDUAL WATER SOURCES									
										FRESHWATER								NON-POTABLE WATER	
										CISTERNS		DESALINATION UNITS			OTHER SOURCES				
YR	LIS	DIST	SUBDIST	CAT	DESCRIPTION	UNITS USED	# OF UNITS	CODE	POTABLE GPD/UT	NON-POT GPD/UT	ROOF AREA FT2/UT	% OPR	DESC OF FEED WATER/ MANUFACTURER	OUTPUT KGAL/D	DESC OF SOURCE	OUTPUT KGAL/D	DESC OF SOURCE/ TDS	OUTPUT KGAL/D
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
80	1	17	000	SCL	H ASPINALL JHS	PUPILS	1248		15	0	75	100	/ /	0.0		0.0	/ 0	0.0
80	1	17	000	TUR	HTL HARBUR VIEW	ROOMS	8		150	0	300	100	/ /	0.0		0.0	/ 0	0.0
80	1	17	000	TUR	HTL HOLIDAY ISLES	ROOMS	18		150	0	300	100	/ /	0.0		0.0	/ 0	0.0
80	1	17	000	TUR	HTL MAISON GREAUX	ROOMS	9		150	0	300	100	/ /	0.0		0.0	/ 0	0.0
80	1	17	000	TUR	HTL MILLER MANOR	ROOMS	22		120	30	300	100	/ /	0.0		0.0	SEA/35000	0.0
80	1	17	000	TUR	HTL VILLA OLGA	ROOMS	12		150	0	300	100	/ /	0.0		0.0	/ 0	0.0
80	1	17	000	TUR	HTL WINDWARD PASSAGE	ROOMS	144		150	0	300	100	/ /	0.0		0.0	/ 0	0.0
80	1	17	000	TUR	MARINA	EACH	1		15000	0	0	0	/ /	0.0		0.0	/ 0	0.0
80	1	17	000	TUR	RST MD BARTOLINOS	TABLE	25		100	0	100	100	/ /	0.0		0.0	/ 0	0.0
80	1	17	000	TUR	RST MD CHART HSE	TABLE	25		100	0	100	100	/ /	0.0		0.0	/ 0	0.0
80	1	17	000	TUR	RST MD L ESCARGOT	TABLE	25		100	0	100	100	/ /	0.0		0.0	/ 0	0.0
80	1	17	000	TUR	RST SM GREENHOUSE	TABLE	10		100	0	100	100	/ /	0.0		0.0	/ 0	0.0
80	1	17	000	TUR	RST SM MARINA VIEW	TABLES	10		100	0	100	100	/ /	0.0		0.0	/ 0	0.0
80	1	17	000	TUR	RST SM LE BISTRO	TABLE	10		100	0	100	100	/ /	0.0		0.0	/ 0	0.0
80	1	17	000	TUR	RST SM MACARONIS	TABLE	10		100	0	100	100	/ /	0.0		0.0	/ 0	0.0
80	1	17	000	TUR	RST SM PANCHITAS	TABLE	10		100	0	100	100	/ /	0.0		0.0	/ 0	0.0
80	1	17	000	TUR	RST SM PORTOFINO	TABLE	10		100	0	100	100	/ /	0.0		0.0	/ 0	0.0
80	1	17	000	TUR	RST SM QTR DECK	TABLE	10		100	0	100	100	/ /	0.0		0.0	/ 0	0.0
80	1	17	000	TUR	RST SM SPARKYS	TABLE	10		100	0	100	100	/ /	0.0		0.0	/ 0	0.0
80	1	17	000	WKF	GOV PRIV WORKERS	PERSON	6077		15	0	70	100	/ /	0.0		0.0	/ 0	0.0
80	1	18	000	RES	HOMES / APARTMENTS	PERSON	11		50	0	250	100	/ /	0.0		0.0	/ 0	0.0
80	1	19	000	RES	HOMES / APARTMENTS	PERSON	140		50	0	250	100	/ /	0.0		0.0	/ 0	0.0
80	1	19	000	TUR	HTL LIMESTONE REEF	ROOMS	8		150	0	300	100	/ /	0.0		0.0	/ 0	0.0
80	1	19	000	TUR	HTL SUGAR BIRD BEACH	ROOMS	99		150	0	300	100	/ /	0.0		0.0	/ 0	0.0
80	1	19	000	TUR	HTL SUGARBIRD VILLAS	ROOMS	10		150	0	300	100	/ /	0.0		0.0	/ 0	0.0
80	1	19	000	WKF	GOV PRIVATE WORKERS	PERSON	75		15	0	70	100	/ /	0.0		0.0	/ 0	0.0

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APPENDIX A

Additional Quality Control Requirements For Method 524.2 Analysis

APPENDIX A

Additional Quality Control Requirements
for Method 524.2 Analysis

1. The parameter list for this site is the TCL. All method requirements must be followed for these compounds.

2. All samples are to be analyzed within holding times, 14 days from date if sampling when sample is preserved.

3. Sample batch is 20 samples maximum.

4. Detection limit determination must be performed for all analytes prior to start of sample collection. The lab must use the MDL determination procedures stated in Section 10.3 of M524.2. All results must be provided to this office. Include (for each analyte): concentration spiked into blank water, concentrations obtained for each 7 or more replicates, standard deviation, mean conc. of replicates, and the student t value used in the calculation. This information must enable the reviewer to regenerate the lab's calculations of the detection limit.

5. At minimum, a five point initial calibration must be performed within the two days preceding sample analysis. It has been shown that the five concentrations following often yield results which meet the required QC criteria: 4, 10, 20, 30, and 40 ug/l. The lab may use these or may extend their calibration range, however, all QC criteria must be adhered to for each analyte.

6. The continuing calibration standard must be analyzed prior to sample analysis and once per 12 hours in order to verify a valid initial calibration. Use the % Difference criteria specified in Method 524.2.

7. A laboratory fortified blank at a concentration of 1 ug/l for each analyte must be analyzed immediately following each continuing calibration. The accuracy for this standard must be between 80% - 120% recovery. (Exception for methylene chloride, acetone, 2-butanone and 2-hexanone, the accuracy must be between 50 - 150%). If this accuracy cannot be achieved, the problem must be located and corrected, then the instrument must be recalibrated prior to sample analysis.

8. The MS tune be verified at the beginning of each 12 hour period of analysis and all samples must be run within this 12 hour period.

9. A lab reagent blank must be analyzed prior to the samples shown to be free of contamination. Failure to obtain method blank values less than 1 ug/l requires that all samples prepared with that method blank be reprepared and reanalyzed for the affected parameters. (Exception for methylene chloride, acetone, the blank value is to be less than 2 ug/l.)

code of federal regulations

Protection of Environment

40

PARTS 100 TO 149

Revised as of July 1, 1986

TUT 001 1760

B-39

4. FINANCIAL ACCOUNTING

A.	Total Project Ceiling Authorized	$195,000.00
B.	Total Funds Authorized for Mitigation for Mitigation Contracts 68-01-7445	$80,000
C.	Expenditures for Mitigation Contracts	
	1.a Amount obligated DCN KCS 112 (09/87)	$30,000
	DCN KEO 081 (05/88)	$10,000
	DCN KEO 164 (09/88)	$40,000
	SUBTOTAL	$80,000
	1.b Estimated Expenditures as of 12/88	$28,487.21
	1.c Balance Remaining	$51,512.79
D.	Unobligated Balance Remaining	$0
E.	Estimate of Total Expenditures to Date for all Mitigation Contracts	$28,487.21
F.	Other Extramural Costs	
	1.a. TAT Salary/travel/expenses for TDD 8710-07 as of 09/30/88	$53,402.05
	for TDD 8810-63 as of 11/25/88	$10,194.56
	SUB TOTAL	$63,596.61
G.	Intramural Removal Costs	
	1.a. EPA travel and salaries 12/88	$8,985.00
H.	Total Expenditures	$101,068.82
	% of $2 Million	5.05%
I.	Percentage of Total Project Ceiling	51.8%

FINAL POLREP: _____

FURTHER POLREPS FORTHCOMING: ✓

SUBMITTED BY: Luis E. Santos
Luis E. Santos, OSC
Caribbean Field Office
and
Response and Prevention
Branch

DATE RELEASED: DEC 2 9 1988

· Chlorine, Total Residual," Methods for emical Analysis of Water and Wastes, A-600/4-79-020, U.S. Environmental Pro-tion Agency, Environmental Monitoring d Support Laboratory, Cincinnati, Ohio 268, March 1979.
14. Wong, A.S. et al. "The Determination 2,3,7,8-TCDD in Industrial and Municipal astewaters, Method 613, Part 1—Develop-ent and Detection Limits," G. Choudhay, Keith, and C. Ruppe, ed., Butterworth c., (1983).
15. "EPA Method Study 26, Method 613: 3,7,8-Tetrachlorodibenzo-p-dioxin," EPA 0/4-84-037, National Technical Informa-on Service, PB84-188879, Springfield, Vir-nia 22161, May 1984.

TABLE 1.—Chromatographic Conditions and Method Detection Limit

Parameter	Retention time (min)	Method detection limit (µg/L)
3,7,8-TCDD	13.1	0.002

Column conditions: SP-2330 coated on a 60 m long x 25 mm ID glass column with hydrogen carrier gas at 40 m/sec linear velocity, splitless injection using tetradecane. Column temperature held isothermal at 200°C for 1 min, then rogrammed at 8°C/min to 250 °C and held. Use of helium arrier gas will approximately double the retention time.

TAB —QC Acceptance Criteria—Method 613

Parameter	Test conc. (µg/L)	Limit for s (µg/L)	Range for X (µg/L)	Range for P, P_s (%)
2,3,7,8-TCDD	0.100	0.0276	0.0523–0.1228	46–129

s = Standard deviation of four recovery measurements, in µg/L (Section 8.2.4).
X = Average recovery for four recovery measurements, in µg/L (Section 8.2.4).
P, P_s = Percent recovery measured (Section 8.3.2, Section 8.4.2).

NOTE: These criteria are based directly upon the method performance data in Table 3. Where necessary, the limits for recovery have been broadened to assure applicability of the limits to concentrations below those used to develop Table 3.

AS FUNCTIONS OF CONCENTRATION—METHOD

	Accuracy, as recovery, X' (µg/L)	Single analyst precision, s_r' (µg/L)	Overall precision, S' (µg/L)
	0.86C+0.00145	0.13X̄+0.00129	0.18X̄+0.00088

of a sample containing a concentration of C, in µg/L
ments at an average concentration found of X̄, in µg/L
ments at an average concentration found of X̄, in µg/L

aining a concentration of C, in µg/L

METHOD 624—PURGEABLES

1. Scope and Application

1.1 This method covers the determination of a number of purgeable organics. The following parameters may be determined by this method:

Parameter	STORET No.	CAS No.
Benzene	34030	71-43-2
Bromodichloromethane	32101	75-27-4
Bromoform	32104	75-25-2
Bromomethane	34413	74-83-9
Carbon tetrachloride	32102	56-23-5
Chlorobenzene	34301	108-90-7
Chloroethane	34311	75-00-3
2-Chloroethylvinyl ether	34576	110-75-8
Chloroform	32106	67-66-3
Chloromethane	34418	74-87-3
Dibromochloromethane	32105	124-48-1
1,2-Dichlorobenzene	34536	95-50-1
1,3-Dichlorobenzene	34566	541-73-1
1,4-Dichlorobenzene	34571	106-46-7
1,1-Dichloroethane	34496	75-34-3
1,2-Dichloroethane	34531	107-06-2
1,1-Dichloroethene	34501	75-35-4
trans-1,2-Dichloroethene	34546	156-60-5
1,2-Dichloropropane	34541	78-87-5
cis-1,3-Dichloropropene	34704	10061-01-5
trans-1,3-Dichloropropene	34699	10061-02-6
Ethyl benzene	34371	100-41-4
Methylene chloride	34423	75-09-2
1,1,2,2-Tetrachloroethane	34516	79-34-5
Tetrachloroethene	34475	127-18-4
Toluene	34010	108-88-3
1,1,1-Trichloroethane	34506	71-55-6
1,1,2-Trichloroethane	34511	79-00-5
Trichloroethene	39180	79-01-6
Trichlorofluoromethane	34488	75-69-4
Vinyl chloride	39175	75-01-4

1.2 The method may be extended to screen samples for acrolein (STORET No. 34210, CAS No. 107-02-8) and acrylonitrile (STORET No. 34215, CAS No. 107-13-1), however, the preferred method for these two compounds in Method 603.

1.3 This is a purge and trap gas chromatographic/mass spectrometer (GC/MS) method applicable to the determination of the compounds listed above in municipal and industrial discharges as provided under 40 CFR 136.1.

1.4 The method detection limit (MDL, defined in Section 14.1)[1] for each parameter is listed in Table 1. The MDL for a specific wastewater may differ from those listed, depending upon the nature of interferences in the sample matrix.

1.5 Any modification to this method, beyond those expressly permitted, shall be considered as a major modification subject to application and approval of alternate test procedures under 40 CFR 136.4 and 136.5. Depending upon the nature of the modification and the extent of intended use, the applicant may be required to demonstrate that the modifications will produce equivalent results when applied to relevant wastewaters.

1.6 This method is restricted to use by or under the supervision of analysts experienced in the operation of a purge and trap system and a gas chromatograph/mass spectrometer and in the interpretation of mass spectra. Each analyst must demonstrate the ability to generate acceptable results with this method using the procedure described in Section 8.2.

2. Summary of Method

2.1 An inert gas is bubbled through a 5-mL water sample contained in a specially-designed purging chamber at ambient temperature. The purgeables are efficiently transferred from the aqueous phase to the vapor phase. The vapor is swept through a sorbent trap where the purgeables are trapped. After purging is completed, the trap is heated and backflushed with the inert gas to desorb the purgeables onto a gas chromatographic column. The gas chromatograph is temperature programmed to separate the purgeables which are then detected with a mass spectrometer.[2,3]

3. Interferences

3.1 Impurities in the purge gas, organic compounds outgassing from the plumbing ahead of the trap, and solvent vapors in the laboratory account for the majority of contamination problems. The analytical system must be demonstated to be free from contamination under the conditions of the analysis by running laboratory reagent blanks as described in Section 8.1.3. The use of non-Teflon plastic tubing, non-Teflon thread sealants, or flow controllers with rubber components in the purge and trap system should be avoided.

3.2 Samples can be contaminated by diffusion of volatile organics (particularly fluorocarbons and methylene chloride) through the septum seal into the sample during shipment and storage. A field reagent blank prepared from reagent water and carried through the sampling and handling protocol can serve as a check on such contamination.

3.3 Contamination by carry-over can occur whenever high level and low level samples are sequentially analyzed. To reduce carry-over, the purging device and sample syringe must be rinsed with reagent water between sample analyses. Whenever an unusually concentrated sample is encountered, it should be followed by an analysis of reagent water to check for cross contamination. For samples containing large amounts of water-soluble materials, suspended solids, high boiling compounds or

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...high purgeable levels, it may be necessary to wash the purging device with a detergent solution, rinse with distilled water, and then dry it in a 105 °C oven between analyses. The trap and other parts of the system are also subject to contamination; therefore, frequent bakeout and purging of the entire system may be required.

4. Safety

4.1 The toxicity or carcinogenicity of each reagent used in this method has not been precisely defined; however, each chemical compound should be treated as a potential health hazard. From this viewpoint, exposure to these chemicals must be reduced to the lowest possible level by whatever means available. The laboratory is responsible for maintaining a current awareness file of OSHA regulations regarding the safe handling of the chemicals specified in this methmd. A reference file of material data handling sheets should also be made available to all personnel involved in the chemical analysis. Additional references to laboratory safety are available and have been identified[**] for the information of the analyst.

4.2. The following parameters covered by this method have been tentatively classified as known or suspected, human or mammalian carcinogens: benzene, carbon tetrachloride, chloroform, 1,4-dichlorobenzene, and vinyl chloride. Primary standards of these toxic compounds should be prepared in a hood. A NIOSH/MESA approved toxic gas respirator should be worn when the analyst handles high concentrations of these toxic compounds.

5. Apparatus and Materials

5.1 Sampling equipment, for discrete sampling.

5.1.1 Vial—25-mL capacity or larger, equipped with a screw cap with a hole in the center (Pierce #13075 or equivalent). Detergent wash, rinse with tap and distilled water, and dry at 105 °C before use.

5.1.2 Septum—Teflon-faced silicane (Pierce #12722 or equivalent). Detergent wash, rinse with tap and distilled water, and dry at 105 °C for 1 h before use.

5.2 Purge and trap system—The purge and trap system consists of three separate pieces of equipment: A purging device, trap, and desorber. Several complete systems are now commercially available.

5.2.1 The purging device must be designed to accept 5-mL samples with a water column at least 3 cm deep. The gaseous head space between the water column and the trap must have a total volume of less than 15 mL. The purge gas must pass though the water column as finely divided bubbles with a diameter of less than 3 mm at the origin. The purge gas must be introduced no more than 5 mm from the base of the water column. The purging device illustrated in Figure 1 meets these design criteria.

5.2.2 The trap must be at least 25 cm long and have an inside diameter of at least 0.105 in. The trap must be packed to contain the following minimum lengths of adsorbents: 1.0 cm of methyl silicone coated packing (Section 6.3.2), 15 cm of 2,6-dyphenylene oxide polymer (Section 6.3.1), and 8 cm of silica gel (Section 6.3.3). The minimum specifications for the trap are illustrated in Figure 2.

5.2.3 The desorber should be capable of rapidly heating the trap to 180 °C. The polymer section of the trap should not be heated higher than 180 °C and the remaining sections should not exceed 200 °C. The desorber illustrated in Figure 2 meets these design criteria.

5.2.4 The purge and trap system may be assembled as a separate unit or be coupled to a gas chromatograph as illustrated in Figures 3 and 4.

5.3 GC/MS system:

5.3.1 Gas chromatograph—An analytical system complete with a temperature programmable gas chromatograph suitable for on-column injection and all required accessories including syringes, analytical columns, and gases.

5.3.2 Column—6 ft long x 0.1 in ID stainless steel or glass, packed with 1% SP-1000 on Carbopack B (60/80 mesh) or equivalent. This column was used to develop the method performance statements in Section 14. Guidelines for the use of alternate column packings are provided in Section 11.1.

5.3.3 Mass spectrometer—Capable of scanning from 20 to 260 amu every 7 s or less, utilizing 70 V (nominal) electron energy in the electron impact ionization mode, and producing a mass spectrum which meets all the criteria in Table 2 when 50 ng of 4-bromofluorobenzene (BFB) is injected through the GC inlet.

5.3.4 GC/MS interface—Any GC to MS interface that gives acceptable calibration points at 50 ng or less per injection for each of the parameters of interest and achieves all acceptable performance criteria (Section 10) may be used. GC to MS interfaces constructed of all glass or glass-lined materials are recommended. Glass can be deactivated by silanizing with dichlorodimethylsilane.

5.3.5 Data system—A computer system must be interfaced to the mass spectrometer that allows the continuous acquisition and storage on machine-readable media of all mass spectra obtained throughout the duration of the chromatographic program. The computer must have software that allows searching any GC/MS data file for specific m/z (masses) and plotting such m/z abundance versus time or scan number. This type of plot is defined as an Extracted Ion Current Profile (EICP). Software must also be available that allows integrating the abundance in any EICP between specified time or scan number limits.

5.4 Syringes—5-mL, glass hypodermic with Luerlok tip (two each), if applicable to the purging device.

5.5 Micro syringes—25-μL, 0.006 in. ID needle.

5.6 Syringe valve—2-way, with Luer ends (three each).

5.7 Syringe—5-mL, gas-tight with shut-off valve.

5.8 Bottle—15-mL, screw-cap, with Teflon cap liner.

5.9 Balance—Analytical, capable of accurately weighing 0.0001 g.

6. Reagents

6.1 Reagent water—Reagent water is defined as a water in which an interferent is not observed at the MDL of the parameters of interest.

6.1.1 Reagent water can be generated by passing tap water through a carbon filter bed containing about 1 lb of activated carbon (Filtrasorb-300, Calgon Corp., or equivalent).

6.1.2 A water purification system (Millipore Super-Q or equivalent) may be used to generate reagent water.

6.1.3 Reagent water may also be prepared by boiling water for 15 min. Subsequently, while maintaining the temperature at 90 °C, bubble a contaminant-free inert gas through the water for 1 h. While still hot, transfer the water to a narrow mouth screw-cap bottle and seal with a Teflon-lined septum and cap.

6.2 Sodium thiosulfate—(ACS) Granular.

6.3 Trap materials:

6.3.1 2,6-Diphenylene oxide polymer—Tenax, (60/80 mesh), chromatographic grade or equivalent.

6.3.2 Methyl silicone packing—3% OV-1 on Chromosorb-W (60/80 mesh) or equivalent.

6.3.3 Silica gel—35/60 mesh, Davison, grade-15 or equivalent.

6.4 Methanol—Pesticide quality or equivalent.

6.5 Stock standard solutions—Stock standard solutions may be prepared from pure standard materials or purchased as certified solutions. Prepare stock standard solutions in methanol using assayed liquids or gases as appropriate. Because of the toxicity of some of the compounds, primary dilutions of these materials should be prepared in a hood. A NIOSH/MESA approved toxic gas respirator should be used when the analyst handles high concentrations of such materials.

6.5.1 Place about 9.8 mL of methanol into a 10-mL ground glass stoppered volumetric flask. Allow the flask to stand, unstoppered, for about 10 min or until all alcohol wetted surfaces have dried. Weigh the flask to the nearest 0.1 mg.

6.5.2 Add the assayed reference material:

6.5.2.1 Liquids—Using a 100-μL syringe, immediately add two or more drops of assayed reference material to the flask, then reweigh. Be sure that the drops fall directly into the alcohol without contacting the neck of the flask.

6.5.2.2 Gases—To prepare standards for any of the four halocarbons that boil below 30 °C (bromomethane, chloroethane, chloromethane, and vinyl chloride), fill a 5-mL valved gas-tight syringe with the reference standard to the 5.0-mL mark. Lower the needle to 5 mm above the methanol meniscus. Slowly introduce the reference standard above the surface of the liquid (the heavy gas will rapidly dissolve in the methanol).

6.5.3 Reweigh, dilute to volume, stopper, then mix by inverting the flask several times. Calculate the concentration in μg/μL from the net gain in weight. When compound purity is assayed to be 96% or greater, the weight may be used without correction to calculate the concentration of the stock standard. Commercially prepared stock standards may be used at any concentration if they are certified by the manufacturer or by an independent source.

6.5.4 Transfer the stock standard solution into a Teflon-sealed screw-cap bottle. Store, with minimal headspace, at −10 to −20 °C and protect from light.

6.5.5 Prepare fresh standards weekly for the four gases and 2-chloroethylvinyl ether. All other standards must be replaced after one month, or sooner if comparison with check standards indicates a problem.

6.6 Secondary dilution standards—Using stock solutions, prepare secondary dilution standards in methanol that contain the compounds of interest, either singly or mixed together. The secondary dilution standards should be prepared at concentrations such that the aqueous calibration standards prepared in Section 7.3 will bracket the working range of the analytical system. Secondary dilution standards should be stored with minimal headspace and should be checked frequently for signs of degradation or evaporation, especially just prior to preparing calibration standards from them.

6.7 Surrogate standard spiking solution—Select a minimum of three surrogate compounds from Table 3. Prepare stock standard solutions for each surrogate standard in methanol as described in Section 6.5. Prepare a surrogate standard spiking solution from these stock standards at a concentration of 15 μg/mL in water. Store the solutions at 4 °C in Teflon-sealed glass contain-

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ers with a minimum of headspace. The solutions should be checked frequently for stability. The addition of 10 μL of this solution of 5 mL of sample or standard is equivalent to a concentration of 30 μg/L of each surrogate standard.

6.8 BFB Standard—Prepare a 25 μg/mL solution of BFB in methanol.

6.9 Quality control check sample concentrate—See Section 8.2.1.

7. Calibration

7.1 Assemble a purge and trap system that meets the specifications in Section 5.2. Condition the trap overnight at 180 °C by backflushing with an inert gas flow of at least 20 mL/min. Condition the trap for 10 min once daily prior to use.

7.2 Connect the purge and trap system to a gas chromatograph. The gas chromatograph must be operated using temperature and flow rate conditions equivalent to those given in Table 1.

7.3 Internal standard calibration procedure—To use this approach, the analyst must select three or more internal standards that are similar in analytical behavior to the compounds of interest. The analyst must further demonstrate that the measurement of the internal standard is not affected by method or matrix interferences. Some recommended internal standards are listed in Table 3.

7.3.1 Prepare calibration standards at a minimum of three concentration levels for each parameter by carefully adding 20.0 μL of one or more secondary dilution standards to 50, 250, or 500 mL of reagent water. A 25-μL syringe with a 0.006 in. ID needle should be used for this operation. One of the calibration standards should be at a concentration near, but above, the MDL (Table 1) and the other concentrations should correspond to the expected range of concentrations found in real samples or should define the working range of the GC/MS system. These aqueous standards can be stored up to 24 h, if held in sealed vials with zero headspace as described in Section 9.2. If not so stored, they must be discarded after 1 h.

7.3.2 Prepare a spiking solution containing each of the internal standards using the procedures described in Sections 6.5 and 6.6. It is recommended that the secondary dilution standard be prepared at a concentration of 15 μg/mL of each internal standard compound. The addition of 10 μL of this standard to 5.0 mL of sample or calibration standard would be equivalent to 30 μg/L.

7.3.3 Analyze each calibration standard according to Section 11, adding 10 μL of internal standard spiking solution directly to the syringe (Section 11.4). Tabulate the area response of the characteristic m/z against concentration for each compound and internal standard, and calculate response factors (RF) for each compound using Equation 1.

$$RF = \frac{(A_s)(C_{is})}{(A_{is})(C_s)}$$

Equation 1

where:

A_s = Area of the characteristic m/z for the parameter to be measured.

A_{is} = Area of the characteristic m/z for the internal standard.

C_{is} = Concentration of the internal standard.

C_s = Concentration of the parameter to be measured.

If the RF value over the working range is a constant (<35% RSD), the RF can be assumed to be invariant and the average RF can be used for calculations. Alternatively, the results can be used to plot a calibration curve of response ratios, A_s/A_{is} vs. RF.

7.4 The working calibration curve or RF must be verified on each working day by the measurement of a QC check sample.

7.4.1 Prepare the QC check sample as described in Section 8.2.2.

7.4.2 Analyze the QC check sample according to the method beginning in Section 10.

7.4.3 For each parameter, compare the response (Q) with the corresponding calibration acceptance criteria found in Table 5. If the responses for all parameters of interest fall within the designated ranges, analysis of actual samples can begin. If any individual Q falls outside the range, proceed according to Section 7.4.4.

NOTE: The large number of parameters in Table 5 present a substantial probability that one or more will not meet the calibration acceptance criteria when all parameters are analyzed.

7.4.4 Repeat the test only for those parameters that failed to meet the calibration acceptance criteria. If the response for a parameter does not fall within the range in this second test, a new calibration curve or RF must be prepared for that parameter according to Section 7.3.

8. Quality Control

8.1 Each laboratory that uses this method is required to operate a formal quality control program. The minimum requirements of this program consist of an initial demonstration of laboratory capability and an ongoing analysis of spiked samples to evaluate and document data quality. The laboratory must maintain records to document the quality of data that is generated. Ongoing data quality checks are compared with established performance criteria to determine if the results of analyses meet the performance characteristics of the method.

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When results of sample spikes indicate atypical method performance, a quality control check standard must be analyzed to confirm that the measurements were performed in an in-control mode of operation.

8.1.1 The analyst must make an initial, one-time, demonstration of the ability to generate acceptable accuracy and precision with this method. This ability is established as described in Section 8.2.

8.1.2 In recognition of advances that are occurring in chromatography, the analyst is permitted certain options (detailed in Section 11.1) to improve the separations or lower the cost of measurements. Each time such a modification is made to the method, the analyst is required to repeat the procedure in Section 8.2.

8.1.3 Each day, the analyst must analyze a reagent water blank to demonstrate that interferences from the analytical system are under control.

8.1.4 The laboratory must, on an ongoing basis, spike and analyze a minimum of 5% of all samples to monitor and evaluate laboratory data quality. This procedure is described in Section 8.3.

8.1.5 The laboratory must, on an ongoing basis, demonstrate through the analyses of quality control check standards that the operation of the measurement system is in control. This procedure is described in Section 8.4. The frequency of the check standard analyses is equivalent to 5% of all samples analyzed but may be reduced if spike recoveries from samples (Section 8.3) meet all specified quality control criteria.

8.1.6 The laboratory must spike all samples with surrogate standards to monitor continuing laboratory performance. This procedure is described in Section 8.5.

8.1.7 The laboratory must maintain performance records to document the quality of data that is generated. This procedure is described in Section 8.6.

8.2 To establish the ability to generate acceptable accuracy and precision, the analyst must perform the following operations.

8.2.1 A quality control (QC) check sample concentrate is required containing each parameter of interest at a concentration of 10 μg/mL in methanol. The QC check sample concentrate must be obtained from the U.S. Environmental Protection Agency, Environmental Monitoring and Support Laboratory in Cincinnati, Ohio, if available. If not available from that source, the QC check sample concentrate must be obtained from another external source. If not available from either source above, the QC check sample concentrate must be prepared by the laboratory using stock standards prepared independently from those used for calibration.

8.2.2 Prepare a QC check sample to contain 20 μg/L of each parameter by adding 200 μL of QC check sample concentrate to 100 mL of reagent water.

8.2.3 Analyze four 5-mL aliquots of the well-mixed QC check sample according to the method beginning in Section 10.

8.2.4 Calculate the average recovery ($\bar{X}$) in μg/L, and the standard deviation of the recovery (s) in μg/L, for each parameter of interest using the four results.

8.2.5 For each parameter compare s and $\bar{X}$ with the corresponding acceptance criteria for precision and accuracy, respectively, found in Table 5. If s and $\bar{X}$ for all parameters of interest meet the acceptance criteria, the system performance is acceptable and analysis of actual samples can begin. If any individual s exceeds the precision limit or any individual $\bar{X}$ falls outside the range for accuracy, the system performance is unacceptable for that parameter.

NOTE: The large number of parameters in Table 5 present a substantial probability that one or more will fail at least one of the acceptance criteria when all parameters are analyzed.

8.2.6 When one or more of the parameters tested fail at least one of the acceptance criteria, the analyst must proceed according to Section 8.2.6.1 or 8.2.6.2.

8.2.6.1 Locate and correct the source of the problem and repeat the test for all parameters of interest beginning with Section 8.2.3.

8.2.6.2 Beginning with Section 8.2.3, repeat the test only for those parameters that failed to meet criteria. Repeated failure, however, will confirm a general problem with the measurement system. If this occurs, locate and correct the source of the problem and repeat the test for all compounds of interest beginning with Section 8.2.3.

8.3 The laboratory must, on an ongoing basis, spike at least 5% of the samples from each sample site being monitored to assess accuracy. For laboratories analyzing 1 to 20 samples per month, at least one spiked sample per month is required.

8.3.1 The concentration of the spike in the sample should be determined as follows:

8.3.1.1 If, as in compliance monitoring, the concentration of a specific parameter in the sample is being checked against a regulatory concentration limit, the spike should be at that limit or 1 to 5 times higher than the background concentration determined in Section 8.3.2, whichever concentration would be larger.

8.3.1.2 If the concentration of a specific parameter in the sample is not being checked against a limit specific to that parameter, the spike should be at 20 μg/L or 1 to 5 times higher than the background concentration determined in Section 8.3.2, whichever concentration would be

8.3.2 Analyze one 5-mL sample aliquot to determine the background concentration (B) of each parameter. If necessary, prepare a new QC check sample concentrate (Section 8.2.1) appropriate for the background concentrations in the sample. Spike a second 5-mL sample aliquot with 10 μL of the QC check sample concentrate and analyze it to determine the concentration after spiking (A) of each parameter. Calculate each percent recovery (P) as 100(A-B)%/T, where T is the known true value of the spike.

8.3.3 Compare the percent recovery (P) for each parameter with the corresponding QC acceptance criteria found in Table 5. These acceptance criteria wer calculated to include an allowance for error in measurement of both the background and spike concentrations, assuming a spike to background ratio of 5:1. This error will be accounted for to the extent that the analyst's spike to background ratio approaches 5:1.[7] If spiking was performed at a concentration lower than 20 μg/L, the analyst must use either the QC acceptance criteria in Table 5, or optional QC acceptance criteria calculated for the specific spike concentration. To calculate optional acceptance criteria for the recoveryof a parameter: (1) Calculate accuracy (X') using the equation in Table 6, substituting the spike concentration (T) for C; (2) calculate overall precision (S') using the equation in Table 6, substituting X' for X; (3) calculate the range for recovery at the spike concentration as (100 X'/T) (±2.44(100 S'/T)%.[7]

8.3.4 If any individual P falls outside the designated range for recovery, that parameter has failed the acceptance criteria. A check standard containing each parameter that failed the criteria must be analyzed as described in Section 8.4.

8.4 If any parameter fails the acceptance criteria for recovery in Section 8.3, a QC check standard containing each parameter that failed must be prepared and analyzed.

NOTE: The frequency for the required analysis of a QC check standard will depend upon the number of parameters being simultaneously tested, the complexity of the sample matrix, and the performance of the laboratory. If the entire list of parameters in Table 5 must be measured in the sample in Section 8.3, the probability that the analysis of a QC check standard will be required is high. In this case the QC check standard should be routinely analyzed with the spiked sample.

8.4.1 Prepare the QC check standard by adding 10 μL of QC check sample concentrate (Section 8.2.1 or 8.3.2) to 5 mL of reagent water. The QC check standard needs only to contain the parameters that failed criteria in the test in Section 8.3.

8.4.2 Analyze the QC check standard to determine the concentration measured (A) of each parameter. Calculate each percent recovery (P_s) as 100 (A/T)%, where T is the true value of the standard concentration.

8.4.3 Compare the percent recovery (P_s) for each parameter with the corresponding QC acceptance criteria found in Table 5. Only parameters that failed the test in Section 8.3 need to be compared with these criteria. If the recovery of any such parameter falls outside the designated range, the laboratory performance for that parameter is judged to be out of control, and the problem must be immediately identified and corrected. The analytical result for that parameter in the unspiked sample is suspect and may not be reported for regulatory compliance purposes.

8.5 As a quality control check, the laboratory must spike all samples with the surrogate standard spiking solutions as described in Section 11.4, and calculate the percent recovery of each surrogate compound.

8.6 As part of the QC program for the laboratory, method accuracy for wastewater samples must be assessed and records must be maintained. After the analysis of five spiked wastewater samples as in Section 8.3, calculate the average percent recovery (P) and the standard deviation of the percent recovery (s_p). Express the accuracy assessment as a percent recovery interval from $P-2s_p$ to $P + 2s_p$. If P=90% and s_p=10%, for example, the accuracy interval is expressed as 70–110%. Update the accuracy assessment for each parameter a regular basis (e.g. after each five to ten new accuracy measurements).

8.7 It is recommended that the laboratory adopt additional quality assurance practices for use with this method. The specific practices that are most productive depend upon the needs of the laboratory and the nature of the samples. Field duplicates may be analyzed to assess the precision of the environmental measurements. Whenever possible, the laboratory should analyze standard reference materials and participate in relevant performance evaluation studies.

9. Sample Collection, Preservation, and Handling

9.1 All samples must be iced or refrigerated from the time of collection until analysis. If the sample contains residual chlorine, add sodium thiosulfate preservative (10 mg/40 mL is sufficient for up to 5 ppm Cl_2) to the empty sample bottle just prior to shipping to the sampling site. EPA Methods 330.4 and 330.5 may be used for measurement of residual chlorine.[8] Field test kits are available for this purpose.

9.2 Grab samples must be collected in glass containers having a total volume of at least 25 mL. Fill the sample bottle just to overflowing in such a manner that no air bubbles pass through the sample as the bottle is being filled. Seal the bottle so that no air bubbles are entrapped in it. If preservative has been added, shake vigorously for 1 min. Maintain the hermetic seal on the sample bottle until time of analysis.

9.3 Experimental evidence indicates that some aromatic compounds, notably benzene, toluene, and ethyl benzene are susceptible to rapid biological degradation under certain environmental conditions.[9] Refrigeration alone may not be adequate to preserve these compounds in wastewaters for more than seven days. For this reason, a separate sample should be collected, acidified, and analyzed when these aromatics are to be determined. Collect about 500 mL of sample in a clean container. Adjust the pH of the sample to about 2 by adding 1+1 HCl while stirring vigorously. Check pH with narrow range (1.4 to 2.8) pH paper. Fill a sample container as described in Section 9.2.

9.4 All samples must be analyzed within 14 days of collection.[8]

10. Daily GC/MS Performance Tests

10.1 At the beginning of each day that analyses are to be performed, the GC/MS system must be checked to see if acceptable performance criteria are achieved for BFB.[6] The performance test must be passed before any samples, blanks, or standards are analyzed, unless the instrument has met the DFTPP test described in Method 625 earlier in the day.[10]

10.2 These performance tests require the following instrumental parameters:

Electron Energy: 70 V (nominal)
Mass Range: 20 to 260 amu
Scan Time: To give at least 5 scans per peak but not to exceed 7 s per scan.

10.3 At the beginning of each day, inject 2 μL of BFB solution directly on the column. Alternatively, add 2 μL of BFB solution to 5.0 mL of reagent water or standard solution and analyze the solution according to section 11. Obtain a background-corrected mass spectrum of BFB and confirm that all the key m/z criteria in Table 2 are achieved. If all the criteria are not achieved, the analyst must retune the mass spectrometer and repeat the test until all criteria are achieved.

11. Sample Purging and Gas Chromatography

11.1 Table 1 summarizes the recommended operating conditions for the gas chromatograph. Included in this table are retention times and MDL that can be achieved under these conditions. An example of the separations achieved by this column is shown in Figure 5. Other packed columns or chromatographic conditions may be used if the requirements of Section 8.2 are met.

11.2 After achieving the key m/z abundance criteria in Section 10, calibrate the system daily as described in Section 7.

11.3 Adjust the purge gas (helium) flow rate to 40 mL/min. Attach the trap inlet to the purging device, and set the purge and trap system to purge (Figure 3). Open the syringe valve located on the purging device sample introduction needle.

11.4 Allow the sample to come to ambient temperature prior to introducing it into the syringe. Remove the plunger from a 5-mL syringe and attach a closed syringe valve. Open the sample bottle (or standard) and carefully pour the sample into the syringe barrel to just short of overflowing. Replace the syringe plunger and compress the sample. Open the syringe valve and vent any residual air while adjusting the sample volume to 5.0 mL. Since this process of taking an aliquot destroys the validity of the sample for future analysis, the analyst should fill a second syringe at this time to protect against possible loss of data. Add 10.0 μL of the surrogate spiking solution (Section 6.7) and 10.0 μL of the internal standard spiking solution (Section 7.3.2) through the valve bore, then close the valve. The surrogate and internal standards may be mixed and added as a single spiking solution.

11.5 Attach the syringe-syringe valve assembly to the syringe valve on the purging device. Open the syringe valves and inject the sample into the purging chamber.

11.6 Close both valves and purge the sample for 11.0±0.1 min at ambient temperature.

11.7 After the 11-min purge time, attach the trap to the chromatograph, adjust the purge and trap system to the desorb mode (Figure 4), and begin to temperature program the gas chromatograph. Introduce the trapped materials to the GC column by rapidly heating the trap to 180 °C while backflushing the trap with an inert gas between 20 and 60 mL/min for 4 min. If rapid heating of the trap cannot be achieved, the GC cloumn must be used as a secondary trap by cooling it to 30 °C (subambient temperature, if problems persist) instead of the initial program temperature of 45 °C.

11.8 While the trap is being desorbed into the gas chromatograph, empty the purging chamber using the sample introduction syringe. Wash the chamber with two 5-mL flushes of reagent water.

11.9 After desorbing the sample for 4 min, recondition the trap by returning the purge and trap system to the purge mode. Wait 15 s then close the syringe valve on the purging device to begin gas flow through the trap. The trap temperature

should be maintained at 180 °C. After approximately 7 min, turn off the trap heater and open the syringe valve to stop the gas flow through the trap. When the trap is cool, the next sample can be analyzed.

11.10 If the response for any m/z exceeds the working range of the system, prepare a dilution of the sample with reagent water from the aliquot in the second syringe and reanalyze.

12. Qualitative Identification

12.1 Obtain EICPs for the primary m/z (Table 4) and at least two secondary masses for each parameter of interest. The following criteria must be met to make a qualitative identification:

12.1.1 The characteristic masses of each parameter of interest must maximize in the same or within one scan of each other.

12.1.2 The retention time must fall within ±30 s of the retention time of the authentic compound.

12.1.3 The relative peak heights of the three characteristic masses in the EICPs must fall within ± 20% of the relative intensities of these masses in a reference mass spectrum. The reference mass spectrum can be obtained from a standard analyzed in the GC/MS system or from a reference library.

12.2 Structural isomers that have very similar mass spectra and less than 30 s difference in retention time, can be explicitly identified only if the resolution between authentic isomers in a standard mix is acceptable. Acceptable resolution is achieved if the baseline to valley height between the isomers is less than 25% of the sum of the two peak heights. Otherwise, structural isomers are identified as isomeric pairs.

13. Calculations

13.1 When a parameter has been identified, the quantitation of that parameter should be based on the integrated abundance from the EICP of the primary characteristic m/z given in Table 4. If the sample produces an interference for the primary m/z, use a secondary characteristic m/z to quantitate.

Calculate the concentration in the sample using the response factor (RF) determined in Section 7.3.3 and Equation 2.

$$\text{Concentration } (\mu g/L) = \frac{(A_s)(C_{is})}{(A_{is})(RF)}$$

Equation 2

where:

A_s = Area of the characteristic m/z for the parameter or surrogate standard to be measured.

A_{is} = Area of the characteristic m/z for the internal standard.

C_{is} = Concentration of the internal standard.

13.2 Report results in μg/L without correction for recovery data. All QC data obtained should be reported with the sample results.

14. Method Performance

14.1 The method detection limit (MDL) is defined as the minimum concentration of a substance that can be measured and reported with 99% confidence that the value is above zero.[1] The MDL concentrations listed in Table 1 were obtained using reagent water.[11] Similar results were achieved using representative wastewaters. The MDL actually achieved in a given analysis will vary depending on instrument sensitivity and matrix effects.

14.2 This method was tested by 15 laboratories using reagent water, drinking water, surface water, and industrial wastewaters spiked at six concentrations over the range 5–600 μg/L.[12] Single operator precision, overall precision, and method accuracy were found to be directly related to the concentration of the parameter and essentially independent of the sample matrix. Linear equations to describe these relationships are presented in Table 5.

References

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10. Eichelberger, J.W., Harris, L.E., and Budde, W.L. "Reference Compound to Calibrate Ion Abundance Measurement in Gas Chromatography—Mass Spectrometry Systems," *Analytical Chemistry, 47,* 995-1000 (1975).

11. "Method Detection Limit for Methods 624 and 625," Olynyk, P., Budde, W.L., and Eichelberger, J.W. Unpublished report, May 14, 1980.

12. "EPA Method Study 29 EPA Method 624—Purgeables," EPA 600/4-84-054, National Technical Information Service, PB84-209915, Springfield, Virginia 22161, June 1984.

13. "Method Performance Data for Method 624," Memorandum from R. Slater and T. Pressley, U.S. Environmental Protection Agency, Environmental Monitoring and Support Laboratory, Cincinnati, Ohio 45268, January 17, 1984.

TABLE 1.—CHROMATOGRAPHIC CONDITIONS AND METHOD DETECTION LIMITS

Parameter	Retention time (min)	Method detection limit (μg/L)
Chloromethane	2.3	nd
Bromomethane	3.1	nd
Vinyl chloride	3.8	nd
Chloroethane	4.6	nd
Methylene chloride	6.4	2.8
Trichlorofluoromethane	8.3	nd
1,1-Dichloroethene	9.0	2.8
1,1-Dichloroethane	10.1	4.7
trans-1,2-Dichloroethene	10.8	1.8
Chloroform	11.4	1.6
1,2-Dichloroethane	12.1	2.8
1,1,1-Trichloroethane	13.4	3.8
Carbon tetrachloride	13.7	2.8
Bromodichloromethane	14.3	2.2
1,2-Dichloropropane	15.7	6.0
cis-1,3-Dichloropropene	15.9	5.0
Trichloroethene	16.5	1.9
Benzene	17.0	4.4
Dibromochloromethane	17.1	3.1
1,1,2-Trichloroethane	17.2	5.0

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TABLE 1.—CHROMATOGRAPHIC CONDITIONS AND METHOD DETECTION LIMITS—Continued

Parameter	Retention time (min)	Method detection limit (μg/L)
trans-1,3-Dichloropropene	17.2	nd
2-Chloroethylvinyl ether	18.6	nd
Bromoform	19.8	4.7
1,1,2,2-Tetrachloroethane	22.1	6.9
Tetrachloroethene	22.2	4 1
Toluene	23.5	6.0
Chlorobenzene	24.6	6.0
Ethyl benzene	26.4	7.2
1,3-Dichlorobenzene	33.9	nd
1,2-Dichlorobenzene	35.0	nd
1,4-Dichlorobenzene	35.4	nd

Column conditions: Carbopak B (60/80 mesh) coated with 1% SP-1000 packed in a 6 ft by 0.1 in. ID glass column with helium carrier gas at 30 mL/min. flow rate. Column temperature held at 45°C for 3 min., then programmed at 8°C/min. to 220°C and held for 15 min.
nd = not determined.

TABLE 2.—BFB KEY M/Z ABUNDANCE CRITERIA

Mass	m/z Abundance criteria
50	15 to 40% of mass 95.
75	30 to 60% of mass 95.
95	Base Peak, 100% Relative Abundance.
96	5 to 9% of mass 95.
173	<2% of mass 174.
174	>50% of mass 95.
175	5 to 9% of mass 174.
176	>95% but < 101% of mass 174.
177	5 to 9% of mass 176.

TABLE 3.—SUGGESTED SURROGATE AND INTERNAL STANDARDS

Compound	Retention time (min)*	Primary m/z	Secondary masses
Benzene d-6	17.0	84	
4-Bromofluorobenzene	26.3	95	174, 176
1,2-Dichloroethane d-4	12.1	102	
1,4-Difluorobenzene	19.6	114	63, 88
Ethylbenzene d-5	26.4	111	
Ethylbenzene d-10	26.4	98	
Fluorobenzene	18.4	96	70
Pentafluorobenzene	23.5	168	
Bromochloromethane	9.3	128	49, 130, 51
2-Bromo-1-chloropropane	19.2	77	79, 156
1, 4-Dichlorobutane	25.8	55	90, 92

*For chromatographic conditions, see Table 1.

TABLE 4.—CHARACTERISTIC MASSES FOR PURGEABLE ORGANICS

Parameter	Primary	Secondary
Chloromethane	50	52.
Bromomethane	94	96.
Vinyl chloride	62	64.
Chloroethane	64	66.
Methylene chloride	84	49, 51, and 86.
Trichlorofluoromethane	101	103.
1,1-Dichloroethene	96	61 and 98.
1,1-Dichloroethane	63	65, 83, 85, 98, and 100.
trans-1,2-Dichloroethene	96	61 and 98.
Chloroform	83	85.
1,2-Dichloroethane	98	62, 64, and 100.
1,1,1-Trichloroethane	97	99, 117, and 119.
Carbon tetrachloride	117	119 and 121.
Bromodichloromethane	127	83, 85, and 129.
1,2-Dichloropropane	112	63, 65, and 114.
trans-1,3-Dichloropropene	75	77.
Trichloroethene	130	95, 97, and 132.
Benzene	78	

TABLE 4.—CHARACTERISTIC MASSES FOR PURGEABLE ORGANICS—Continued

Parameter	Primary	Secondary
Dibromochloromethane	127	129, 208, and 206.
1,1,2-Trichloroethane	97	83, 85, 99, 132, and 134.
cis-1,3-Dichloropropene	75	77.
2-Chloroethylvinyl ether	106	63 and 65.
Bromoform	173	171, 175, 250, 252, 254, and 256.
1,1,2,2-Tetrachloroethane	166	83, 85, 131, 133, and 166.
Tetrachloroethene	164	129, 131, and 166.
Toluene	92	91.
Chlorobenzene	112	114.
Ethyl benzene	106	91.
1,3-Dichlorobenzene	146	148 and 113.
1,2-Dichlorobenzene	146	148 and 113.
1,4-Dichlorobenzene	146	148 and 113.

TABLE 5.—CALIBRATION AND QC ACCEPTANCE CRITERIA—METHOD 624[a]

Parameter	Range for Q (μg/L)	Limit for s (μg/L)	Range for X̄ (μg/L)	Range for P, P_s (%)
Benzene	12.8–27.2	6.9	15.2–26.0	37–151
Bromodichloromethane	13.1–26.9	6.4	10.1–26.0	35–155
Bromoform	14.2–25.8	5.4	11.4–31.1	45–169
Bromomethane	2.8–37.2	17.9	D–41.2	D–242
Carbon tetrachloride	14.8–25.4	5.2	17.2–23.5	70–140
Chlorobenzene	13.2–26.8	6.3	16.4–27.4	37–160
Chloroethane	7.6–32.4	11.4	8.4–40.4	14–230
2-Chloroethylvinyl ether	D–44.8	25.9	D–60.4	D–305
Chloroform	13.5–26.5	6.1	13.7–24.2	51–138
Chloromethane	D–40.8	19.8	D–45.9	D–273
Dibromochloromethane	13.5–26.5	6.1	13.8–28.6	53–149
1,2-Dichlorobenzene	12.8–27.4	7.1	11.8–34.7	18–190
1,3-Dichlorobenzene	14.8–25.4	5.5	17.0–28.8	59–156
1,4-Dichlorobenzene	12.8–27.4	7.1	11.8–34.7	18–190
1,1-Dichloroethane	14.5–25.5	5.1	14.2–29.5	59–155
1,2-Dichloroethane	13.8–26.4	6.0	14.3–27.4	49–155
1,1-Dichloroethene	10.1–29.9	9.1	3.7–42.3	D–234
trans-1,2-Dichloroethene	13.9–26.1	5.7	13.8–28.5	54–156
1,2-Dichloropropane	8.8–33.2	13.8	3.8–36.2	D–210
cis-1,3-Dichloropropene	4.8–35.2	15.8	1.0–39.0	D–227
trans-1,3-Dichloropropene	10.0–30.0	10.4	7.8–32.4	17–183
Ethyl benzene	11.8–28.2	7.5	17.4–28.7	37–162
Methylene chloride	12.1–27.9	7.4	D–41.0	D–221
1,1,2,2-Tetrachloroethane	12.1–27.9	7.4	13.5–27.2	46–157
Tetrachloroethene	14.7–25.3	5.0	17.0–28.6	64–148
Toluene	14.9–25.1	4.8	16.6–28.7	47–150
1,1,1-Trichloroethane	15.0–25.0	4.6	13.7–30.1	52–162
1,1,2-Trichloroethane	14.2–25.8	5.5	14.3–27.1	52–150
Trichloroethene	13.3–26.7	6.6	16.6–27.6	71–157
Trichlorofluoromethane	9.6–30.4	10.0	8.9–31.5	17–181
Vinyl chloride	0.8–39.2	20.0	D–43.5	D–251

Q = Concentration measured in QC check sample, in μg/L (Section 7.5.3).
s = Standard deviation of four recovery measurements, in μg/L (Section 8.2.4).
X̄ = Average recovery of four recovery measurements, in μg/L (Section 8.2.4).
P, P_s = Percent recovery measured, (Section 8.3.2, Section 8.4.2).
D = Detected; result must be greater than zero.
[a]Criteria were calculated assuming a QC check sample concentration of 20 μg/L.

NOTE: These criteria are based directly upon the method performance data in Table 6. Where necessary, the limits for recovery have been broadened to assure applicability of the limits to concentrations below those used to develop Table 6

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TABLE 6.—METHOD ACCURACY AND PRECISION AS FUNCTIONS OF CONCENTRATION—METHOD 624

Parameter	Accuracy, as recovery, X̄ (μg/L)	Single analyst precision, s_r (μg/L)	Overall precision, S (μg/L)
Benzene	0.93C + 2.00	0.26X̄ – 1.74	0.25X̄ – 1.33
Bromodichloromethane	1.03C – 1.58	0.15X̄ + 0.59	0.20X̄ + 1.13
Bromoform	1.18C – 2.35	0.12X̄ + 0.38	0.17X̄ + 1.36
Bromomethane[a]	1.00C	0.43X̄	0.56X̄
Carbon tetrachloride	1.10C – 1.68	0.12X̄ + 0.25	0.11X̄ + 0.37
Chlorobenzene	0.98C + 2.26	0.16X̄ – 0.09	0.26X̄ – 1.92
Chloroethane	1.18C + 0.81	0.14X̄ + 2.78	0.22X̄ + 1.75
2-Chloroethylvinyl ether[a]	1.00C	0.62X̄	0.84X̄
Chloroform	0.93C + 0.33	0.16X̄ + 0.22	0.18X̄ + 0.16
Chloromethane	1.03C + 0.81	0.37X̄ + 2.14	0.56X̄ + 0.43
Dibromochloromethane	1.01C – 0.03	0.17X̄ – 0.18	0.17X̄ + 0.49
1,2-Dichlorobenzene[b]	0.94C + 4.47	0.22X̄ – 1.46	0.30X̄ – 1.20
1,3-Dichlorobenzene	1.09C + 1.66	0.14X̄ – 0.48	0.18X̄ – 0.82
1,4-Dichlorobenzene[b]	0.94C + 4.47	0.22X̄ – 1.45	0.30X̄ – 1.20
1,1-Dichloroethane	1.05C + 0.36	0.13X̄ – 0.05	0.16X̄ + 0.47
1,2-Dichloroethane	1.02C + 0.45	0.17X̄ – 0.32	0.21X̄ – 0.38
1,1-Dichloroethene	1.12C + 0.61	0.17X̄ + 1.06	0.43X̄ – 0.22
trans-1,2-Dichloroethene	1.05C + 0.03	0.14X̄ + 0.09	0.19X̄ + 0.17
1,2-Dichloropropane[a]	1.00C	0.33X̄	0.45X̄
cis-1,3-Dichloropropene[a]	1.00C	0.38X̄	0.52X̄
trans-1,3-Dichloropropene[a]	1.00C	0.25X̄	0.34X̄
Ethyl benzene	0.98C + 2.48	0.14X̄ + 1.00	0.26X̄ – 1.72
Methylene chloride	0.87C + 1.88	0.15X̄ + 1.07	0.32X̄ + 4.00
1,1,2,2-Tetrachloroethane	0.93C + 1.76	0.16X̄ + 0.69	0.20X̄ + 0.41
Tetrachloroethene	1.08C + 0.80	0.13X̄ – 0.18	0.16X̄ – 0.45
Toluene	0.96C + 2.03	0.15X̄ – 0.71	0.22X̄ – 1.71
1,1,1-Trichloroethane	1.08C + 0.73	0.12X̄ – 0.15	0.21X̄ – 0.39
1,1,2-Trichloroethane	0.95C + 1.71	0.14X̄ + 0.02	0.18X̄ + 0.00
Trichloroethene	1.04C + 2.27	0.13X̄ + 0.26	0.12X̄ + 0.59
Trichlorofluoromethane	0.89C + 0.39	0.33X̄ – 1.46	0.34X̄ – 0.39
Vinyl chloride	1.00C	0.46X̄	0.65X̄

X̄ = Expected recovery for one or more measurements of a sample containing a concentration of C, in μg/L.
s_r = Expected single analyst standard deviation of measurements at an average concentration found of X̄, in μg/L.
S = Expected interlaboratory standard deviation of measurements at an average concentration found of X̄, in μg/L.
C = True value for the concentration, in μg/L.
X̄ = Average recovery found for measurements of samples containing a concentration of C, in μg/L.
[a]Estimates based upon the performance in a single laboratory.[18]
[b]Due to chromatographic resolution problems, performance statements for these isomers are based upon the sums of their concentrations.

10. All samples, blanks, duplicates, and calibration standards must be spiked with the surrogates and internal standard compounds stated in Section 7.5.1 of M.524.2 at the specified concentrations. Re-analysis is required if one or more % recoveries as stated in the 2/88 CLP SOW are exceeded.

11. The primary and secondary ions listed in the 2/88 CLP SOW for organics must be used for identification of the TCL parameters not listed in Method 524.2.

12. A laboratory generated mass spectrum must be provided for all compounds detected above and below the detection limit.

13. All calibration and analytical procedures given in Method 524.2 whether presented or optional or required, must be followed.

14. Up to ten volatile organic compounds (not on the TCL) of greatest apparent concentration shall be tentatively identified via a forward search of the NBS mass spectral library as described in the 2/88 CLP SOW for organics. Only tentatively identified compounds (TICs) with a peak area >40% of the nearest internal standard are to be reported.

15. If the EPA RPM wishes MMB to audit a certain percentage of the data validation effort of Geraghty & Miller, and EPA-CLP type deliverables package must be made available. This will also include a detailed example calculation that clearly demonstrates the manner in which the final results were derived. Where applicable, each component of the calculation must be explained (eg. if the calculation includes a dilution factor, it must be clear how and why each dilution occurred). The laboratory must supply any and all information required to reproduce, during an EPA data validation, all results reported.

APPENDIX B

Well Sampling Procedures

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APPENDIX B

Well Sampling Procedures

Twenty-five wells along Route 38 within the Tutu Wells Site will be initially sampled and analyzed for TCL and TAL constituents with the exception of PCBs during the initial sampling event. During subsequent quarterly sampling events, samples from the 25 wells will be submitted for laboratory analysis of TCL VOCs. If the validated data from the initial sampling event indicates the presence of TCL semi-volatiles, pesticides, or TAL constituents above the detection limit, then samples collected from those wells during subsequent quarterly sampling events will be analyzed for the analyte group detected, in addition to TCL VOCs.

1.0 Preparation for Sampling

1.1 The location of the well relative to the nearest road, the house, and other visible structures will be sketched and described. The location of septic systems, any work shops, and/or other potential constituent sources will be carefully noted, sketched, and described.

1.2 The well and the piping system will be examined, sketched, and described. The sketch and description will include the type of pump and treatment systems, if present; any holding tanks; the piping material and solder, if possible; and the location of the sampling point.

1.3 The well will be sampled as close to the pump as possible. It may be necessary to temporarily disconnect the pump from the piping to the point of use to ensure that the sample is collected before the water passes through a holding tank or treatment. Permission to disconnect the piping or to effect any other plumbing changes must be received in writing from the owner or resident. After sampling, the system will be restored immediately to its original configuration.

2.0 Sampling Procedure

2.1 For wells sampled from the tap, the pump, faucet, or outside tap will be run at full capacity to purge the well prior to collecting the sample. At least one well volume will be evacuated, if this calculation can be made from the information available. If the well volume cannot be estimated, the well will be pumped for a minimum of 15 minutes. The temperature, pH, and specific conductance of the discharge water will be measured at intervals no greater than 5 minutes in length during purging. . If it is determined that one or more of these parameters continues to change after the evacuation of a well volume or at the end of 15 minutes, the purge time will be extended until stabilization occurs.

2.2 After the purge process, the flow rate will be reduced, and the samples will be collected directly into the sample containers. Sampling personnel will wear surgical gloves during handling of the containers. The gloves will be disposed after sampling is finished at each location.

2.3 For wells sampled from the well head, at least one well volume will be evacuated prior to sample collection using a Teflon™ bailer, centrifugal pump, or submersible pump. The method of evacuation used will depend on well diameter, depth to water, and well head access. Temperature, pH, and specific conductance will be measured initially and after the removal of each well volume. If one or more of these parameters continues to change after the evacuation of one well volume, evacuation will continue until stabilization occurs.

2.4 For wells sampled from the well head, samples will be collected using a Teflon™ bailer. Samples will be poured directly from the bailer into the sample containers. Bailer cord will consist of stainless steel wire, Teflon™ coated wire, or polypropylene monofilament.

2.5 Bailers and bailer cord will be decontaminated prior to use by washing with laboratory-grade detergent (Micro™ or equivalent); rinsed with tap water; rinsed with ultra-pure grade 10% nitric acid (when metals are being analyzed for); rinsed with tap water; rinsed with pesticide-grade methanol; rinsed with pesticide-grade hexane; allowed to air dry; rinsed with demonstrated analyte free deionized water; allowed to air dry; wrapped in aluminum foil until use.

2.6 Pumps which are to be used for well evacuation (other than pumps which are permanently installed in the well) will be decontaminated prior to each use by washing in tap water mixed with laboratory grade detergent. The detergent-water mix will be run through the pump to decontaminate the internal components. Next the pump will be washed/pumped with tap water, followed by a final wash/pump with deionized water.

2.7 Samples to be analyzed for VOCs will be collected first. Samples will be preserved immediately upon collection. VOC samples will be acidified with ultra pure grade 1:1 hydrochloric acid (HCl) to pH <2. Metal samples will be acidified with ultra pure grade concentrated nitric acid (HNO_3) to pH <2. Metals samples will not be filtered. In order to determine if VOC and metals samples are acidified to pH <2, a third portion of sample of equal volume will be acidified and its pH tested using pH paper. Acidification will be performed by adding the acid drop by drop until a pH of 2 or less is attained. An equal number of drops of acid will then be added to the sample to be submitted to the laboratory. If acidification of the VOC test sample causes effervescence, the sample will not be acidified, but will be cooled to 4°C.

2.8 Sample containers will be labeled prior to sample collection. The following information will be recorded on each sample label:

- Project name
- Sample identification
- Sample matrix
- Requested analysis
- Chemical preservation and pH achieved (if applicable)
- Date and time of sample collection
- Sampler signature

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3.0 Field Analyses

3.1 After the laboratory containers are filled, approximately 0.5 gallon of sample will be collected in a clean, unpreserved glass container and its color, odor, and appearance will be noted. The pH, temperature, and specific conductance of the sample will be measured.

3.2 Temperature will be measured immediately after collection of the sample with a mercury-filled Celsius thermometer in order to calibrate the pH and specific conductance meters.

3.3 pH will be measured with a glass hydrogen-ion electrode against a reference electrode of known potential by means of pH meter. Calibration of the pH meter will be completed before analysis with two buffer solution standards bracketing the sample pH (nominal pH values of 4 and 7, or 7 and 11). The probe will be lowered into the sample and gently stirred to allow equilibration before the reading is taken.

3.4 Specific conductance will be measured with a battery-powered specific conductance meter. The probe will be lowered into the sample and the reading will be immediately taken.

3.5 The field analyses and sample descriptions will be recorded on a Geraghty & Miller, Inc. Water Sampling Log (attached).

3.6 All parts of the field instrumentation which come in contact with the sample must be cleaned initially and between samples with a stream of deionized or distilled water.

5c 4-6

GERAGHTY & MILLER, INC.
Ground-Water Consultants

SAMPLING OF MONITORING WELLS
DAILY CHECKLIST

PROJECT: _____ WELL(S): _____

LOCATION: _____ DATE: _____

G&M PERSONNEL ON SITE: _____ TIME: _____

CHECKED BY: _____

ITEMS	OK/NA	COMMENTS
PRIOR TO DRILLING:		
Health & safety precautions (HASP) received; equipment ready.		
Sample containers, coolers, received from laboratory ice or ice packs ready.		
Sampling equipment and supplies inventoried, clean and operational.		
Check [illegible] client at site.		
Integrity of well noted.		
Well area prepared for sampling; plastic placed around well; gasoline-powered pumps placed downwind.		
Well and water-level measurements made and recorded along with other pertinent field information on water sampling log.		
Field instruments calibrated.		
Sample containers labelled; preservatives added, if necessary.		
DURING AND AFTER SAMPLING:		
Well purged three to five times its volume.		
Sample collected using a bailer or pump as per sampling plan.		
Measurement of field parameters recorded on sampling log.		
Sample containers filled according to collection protocol of analyses.		
Field and trip blanks collected; replicates or split samples collected as per sampling plan.		
Samples stored at 4°C in coolers for transport to lab.		
Water sampling log and chain-of-custody form completed.		
Reusable equipment decontaminated; non-reusable equipment disposed of in appropriate manner.		
Well secured and locked.		
Laboratory contacted to confirm receipt and condition of samples.		

Additional Comments:

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Instructions: Original to Field Project File; copy to Project Manager and to QA Representative.

G&M Form 13-5-86

Southwest 87-1777

APPENDIX C

Sampling Quality Assurance/Quality Control Protocols

APPENDIX C

Sampling Quality Assurance/Quality Control Protocols

The objective of the sampling QA/QC program is to ensure the reliability and safety of all data and documentation generated as a part of the monitoring program. Major elements of the program are: quality control sampling, sample custody and handling, and data management.

1.0 Quality Control Sampling

1.10 Field Replicate Samples

1.11 One field replicate water sample will be collected and analyzed for every ten water samples submitted to the laboratory. Care will be taken to ensure that each sample and sample replicate pair can be compared as a homogeneous sample split in two.

1.12 Each field replicate sample will be given a fictitious sample identification so that it is not identified in the laboratory as a replicate sample.

1.20 Blank Samples

1.21 One equipment blank sample will be collected on every day that sampling occurs for which sampling equipment is used. The equipment sample will be analyzed for every parameter analyzed for on that day in accordance with the CLP SOWs for Organics and Inorganics Analysis. The equipment blank sample will be collected by pouring deionized water over the bailer so that the rinsate flows directly into the sample container(s).

1.22 One trip blank sample will be submitted to the laboratory for every day on which sampling occurs. Trip blank samples will be prepared at the beginning of each day that sampling occurs and will accompany the samples collected on a given day. Trip blank samples will be analyzed for VOCs in accordance with the CLP SOW for Organics Analysis. Trip blank samples will be prepared in an identical manner to sample preparation for VOC analysis.

1.30 Spike Samples

1.31 One matrix spike/matrix spike duplicate (MS/MSD) will be analyzed for organics per sample delivery group. Since all 25 samples will be collected and submitted to the laboratory within 14 calendar days, one MS/MSD sample will be analyzed for every 20 ground-water samples analyzed for organics.

1.32 Triple sample volume of organics analysis will be collected for each MS/MSD analysis.

1.33 One duplicate and one spike sample will be analyzed for metals per sample delivery group. Since all 25 samples will be collected and submitted to the laboratory within 14 calendar days, one duplicate and spike sample will be analyzed for every 20 ground-water samples analyzed for metals.

1.40 Water Blank Samples

1.41 One blank sample of the water to be used for equipment blanks and decontamination will be analyzed each quarter. The water blank sample will be analyzed for every parameter analyzed for each quarter.

2.0 Sample Custody

2.1 The sampling team will be responsible for maintaining custody of the samples until they are delivered to the courier for shipment to the laboratory. All samples shipped to the laboratory will be accompanied by the Geraghty & Miller, Inc. Chain-of-Custody Record (attached). The Chain-of-Custody Record will be completed in the field; the original form will accompany the shipment and a copy will be retained in the field project file. The Chain-of-Custody form will include the project name and the signatures of the sampling team members who participated in collecting the samples. Each sample container and the corresponding information for each container will be listed on the form.

- Sample identification
- Sample matrix
- Requested analysis
- Chemical preservation and pH achieved (if applicable)
- Date and time of sample collection

2.2 The original Chain-of-Custody Record form will be placed in a plastic bag and taped to the underside of the lid of the cooler.

2.3 Samples will be placed in a clean, dry, undamaged cooler such that there is sufficient packaging material (vermiculite and/or bubble wrap) to prevent bottle breakage. Sufficient ice will be placed in each cooler to ensure that sample temperature is maintained at approximately 4°C until arrival at the laboratory. Ice will be placed in double zip lock plastic bags. The ice-filled bags will be distributed in the cooler evenly, in order to ensure that all samples are maintained at approximately 4°C. The cooler will be sealed by wrapping nylon-reinforced packing tape entirely around the cooler.

2.4 To provide a means of detecting any potential tampering during shipment, all shipment containers (coolers) will be affixed with signed Geraghty & Miller, Inc. sample seals (attached). Two seals will be affixed to each cooler, on opposite ends.

2.5 The courier service utilized for sample shipment and the number which identifies each shipment will be recorded on the Chain-of-Custody form. A receipt from the courier service or copy of the airbill which identifies each shipment will be retained in the field project file. Samples will be shipped to the laboratory daily. Shipment will be arranged such that samples arrive at the laboratory within 48 hours of collection.

3.0 Data Management

3.1 Field data and documentation will be recorded in serialized sheets for every day during which activities occur at the site.

3.2 Field procedures, measurements, and observations will be described in sufficient detail, so as to enable others to reconstruct the events.

3.3 The project manager will maintain all project documentation in a central project file. This file will include:

- o Project plans and specifications
- o Field data and documentation
- o Chain-of-Custody documentation
- o Sample identification documents
- o Laboratory data packages
- o Data review notes
- o Report notes and calculations
- o Final maps and drawings

4.0 Sample Container Quality Control

4.1 In order to document the quality of sample containers, containers will be proven clean by analysis for each quarterly sampling event in accordance with the CLP Sample Bottle Repository (SBR) Statement of Work (SOW). Sample bottle analysis will be performed by either Ceimic Corporation upon I-Chem Series 200 sample bottles or by I-Chem upon their Series 300 sample bottles or Eagle Pitcher upon their Level I sample bottles.

4.2 Results of the bottle blank analyses will be provided to USEPA Region II prior to each quarterly sampling event.

GERAGHTY & MILLER, INC.
Environmental Services

Laboratory Task Order No

CHAIN-OF-CUSTODY RECORD

Page of

Project Number

Project Location

Laboratory

Sampler(s)/Affiliation

SAMPLE BOTTLE / CONTAINER DESCRIPTION

SAMPLE IDENTITY	Code	Date/Time Sampled	Lab ID										TOTAL

Sample Code: L = Liquid; S = Solid; A = Air

Total No. of Bottles/ Containers

Relinquished by	Organization		Seal Intact?
Received by	Organization	Date / / Time	Yes No N/A
Relinquished by	Organization		Seal Intact?
Received by	Organization	Date / / Time	Yes No N/A

Special Instructions/Remarks:

Delivery Method: ☐ In Person ☐ Common Carrier ____ SPECIFY ☐ Lab Courier ☐ Other SPECIFY

G&M Form 08 190

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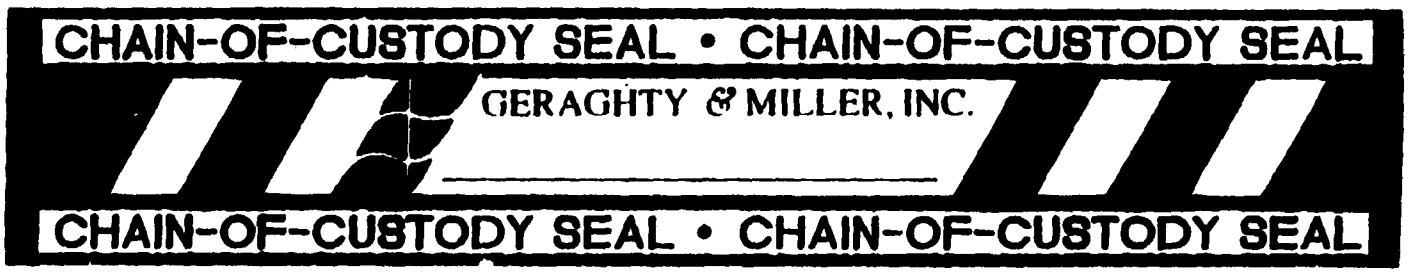
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REFERENCE NO. 46

TAT-02-F-04642

TUTU WELL SITE
POTABLE WATER ALTERNATIVES REPORT
ANNA'S RETREAT, ST. THOMAS, U.S. VIRGIN ISLANDS

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December 1988

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1.0 SYNOPSIS

1.1 Summary

On July 16, 1987, the U.S. EPA received a request from the U.S. Virgin Islands Department of Planning and Natural Resources (DPNR) to sample and analyze one well, which exhibited a strong unpleasant odor, in the Tutu area of St. Thomas. This well was used as a main source of drinking water supply on the eastern portion of the island. Subsequently, samples were taken from 6 additional wells which service residential customers in the immediate area. Eventually a total of 24 wells; (14 commercial, 6 private, 3 institutional and 1 public) in the Tutu area, were sampled and analyzed. Also, a total of 123 cisterns serviced by water haulers from this area were sampled and analyzed. Analytical results showed 3 wells with contaminants above the 175 ppb Health Advisory level for PCE and 8 wells above the recommended maximum volatile organic compound (VOC) levels in drinking water. Twenty four (24) well samples showed the presence of 1,2-transdichloroethylene (DCE), trichloroethylene (TCE), tetrachloroethylene (PCE), toluene (TOL), benzene (BEN) and tertbutyl methyl ether (TBME) in concentrations ranging from 61 parts per billion (ppb) to 120,000 ppb. Based on these results, 13 commercial and 5 private wells were ordered closed. Also, 5 cisterns were found to be contaminated. These cisterns were cleaned, disinfected and filled with high quality drinking water.

EPA also conducted a Hazardous Substance List (HSL) analysis on the twenty four (24) wells to confirm the previous analyses. Results of this latest HSL testing showed the presence of additional metal contamination. Three (3) of the wells tested, showed high volatile organic compounds (VOC) and metals concentrations such as arsenic (15 ppb) selenium (15 ppb) and zinc (340 ppb).

Based on prior sampling results, EPA initiated a limited CERCLA removal action by providing water truck deliveries to fill three cisterns. The three cisterns serve an estimated 50 persons in two homes and one apartment complex. On December 3, 1987, EPA initiated a study to consider various alternatives to find a safe and permanent potable water supply for the affected homes. The initial phase of the study is contained herein.

1.2 Conclusions and Recommendations

This report considered the following alternatives:

1. No Action.

2. Extend the existing water main.

3. Install new and deeper wells within the contamination area.

4. Install new wells beyond the area of contamination.

5. Install a whole house reverse osmosis (R.O.) unit at each location.

6. Construct a reverse osmosis central plant.

7. Construct a water treatment plant.

8. Increase the capacity of the cisterns.

9. Install individual activated carbon filters

The alternatives were comparatively evaluated for environmental impact, cost, and their ability to provide a reasonably safe and permanent water supply to the persons with contaminated drinking water wells.

Most of the alternatives meet the cost criteria but failed to provide a safe and permanent water supply without negative environmental impact.

The report found the extension of the existing water main to be the safest and most permanent water supply alternative.

This proposed water main extension will be connected to the existing water main at the intersection of Routes 382 and 38, southeast on Route 38 to the intersection of Routes 38 and 32 (Fort Mylner Shopping Center) and then south on Route 342 to a circle, 700 feet south of the Fort Mylner intersection (see Figure 8-1 page 39). The cost of the water main installation has been estimated at $630,000.

The no action alternative was considered not acceptable and therefore, was not addressed.

The new and deeper wells alternative would pull the contamination further down from the Turpentine aquifer (the major aquifer) into another aquifer in St. Thomas, thus spreading the contamination vertically.
The cost of this alternative has been estimated at $375,000.

The wells drilled beyond the area of contamination alternative would, in the long term, pull the contamination towards their circle of influence and

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extend the contamination through a greater area, increasing the risk area and affecting more persons. The cost of this alternative has been estimated at $545,000.

The two alternatives involving wells would not provide a permanent and safe water supply, and in addition would also pose a definite threat to other aquifers in St. Thomas.

The whole house reverse osmosis (R.O.) units produce a highly contaminated brine which would pose a great monetary burden on the affected persons because of disposal costs. The cost of this alternative has been estimated at $38,000,000.

The conventional water treatment plant alternative will not effectively remove the selenium from the water, will require full-time 24/hours day monitoring by a water treatment plant operator, and will require the addition of a wide variety of treatment chemicals. The plant is also extremely noisy to operate and may affect the neighbors. In addition, the resultant sludge has to be properly disposed of due to contamination. The water treatment plant requires land acquisition for the installation of an elevated storage tank and distribution piping. The initial cost of this alternative has been estimated at $400,000. and would have ongoing operational costs along with it.

The central reverse osmosis plant at an estimated cost of ($375,000) will convert salt water into potable water and will need an intake structure, a cyclone filter to remove silt and sand particles from the salt water, an elevated storage tank, 8,000 feet of distribution piping, a pump to transfer the treated water to the elevated storage tank, and land for the right of way.

The installation of Activated Carbon Filters at a total estimated cost of ($95,000) will remove the volatile organic compounds (VOC) from the water. However, these filters need frequent sampling to monitor for breakthough, and the columns along with the spent carbon have to be replaced regularly. The carbon slurry produced will be contaminated with VOC's and will have to be disposed of as hazardous waste by the affected people. The carbon (4 cu. ft.) when replaced produces 3-55 gallon drums of VOC contaminated carbon slurry.

Increasing the cisterns volume at an estimated cost of ($360,000), is of questionable reliabilty. The island's rainfall appears to be decreasing so the potential for water catchment is also declining. There does not

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appear to be sufficient land available to increase the cistern volumes laterally. The only way the volume could be increased is by making deeper cisterns. This operation would require the shoring of the existing homes and apartments, therefore, risking the possibilty of structural damage to these residences.

2.0 SITE DESCRIPTION AND CONDITIONS

2.1 Site Background and Conditions

The Tutu Well site is located at the eastern end of the Island at the Anna's Retreat Section of St. Thomas (see Figure 2-1 page 5). Most of the wells are used for public drinking water supply. The wells appear to be drilled into the Turpentine Run aquifer.

On, or about July 7, 1987, Mr. Eric Tillett, contacted the U.S. Virgin Islands (U.S.V.I.) Department of Planning and Natural Resources (DPNR) regarding an odor emanating from the raw well water on his property located at Anna's Retreat, St. Thomas, U.S.V.I.

On July 16, 1987, the USEPA received a request from the DPNR in St. Thomas, for sampling and analyses of several wells in Tutu. On July 21, the USEPA and its Technical Assistance Team (TAT) contractor, Roy F. Weston, Inc., mobilized to St. Thomas, to perform sampling on the drinking water wells suspected of being contaminated. These wells were also reported to have a strong, unpleasant odor and were found to be contaminated with hazardous substances.

The EPA and its Technical Assistance Team (TAT) in coordination with DPNR, initiated sampling of wells in the affected area in July 1987. The test results showed the presence of high concentrations of gasoline and chlorinated organic compounds. Four wells: Elgin, Four Winds, Harthman, and Virgin Islands Housing Authority (VIHA) were closed down by order of DPNR due to high VOC concentrations.

Several of the wells in this area are major commercial well services used for public drinking water supply, therefore, the incident was classified as major, and the DPNR Commissioner requested the EPA to assume the role of Lead Agency. The well locations can be seen in Figure 2-2 page 6.

A Texaco station, located opposite the Tillet Well, is suspected as a possible source of contamination. A Petrotight test conducted on the underground storage tanks at this facility indicated leaks in two of

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the three tanks. These failures may have contributed to the groundwater pollution problem resulting in the contamination of nearby wells. Another suspected source of contamination is the Tutu Esso gas station. This facility stores waste oil in an underground storage tank. The facility has had problems in the past with leakage from their underground gasoline storage tank and is suspected of using solvents in the mechanic shop. At the time of inspection, the nature of the problem had not been determined.

EPA continued its efforts towards the identification of; affected wells in the area, customers which had received water from contaminated wells, and possible alternate water supplies and remedial action alternatives.

A testing program of wells located outside of the known area of contamination was conducted to evaluate those areas as possible alternate water supply sources.

Sampling of cisterns served by the contaminated wells was also performed. EPA directed the Emergency Response Cleanup Services contractor (ERCS) to; clean and disinfect the five (5) cisterns which had tested positive for PCE, modify the existing home plumbing, disconnect the contaminated wells, and dispose of the contaminated water. At EPA's direction, ERCS also contracted a local water hauler to deliver uncontaminated drinking water to the cisterns by tank truck. A well sampling program was established by the EPA to monitor the wells at the Tutu site for a one year period.

Nine potential responsible parties have been identified. These facilities included three gasoline service stations, two vehicle maintenance repair shops, two territorial government agencies, one dry cleaner and one abandoned gasoline service station. EPA has identified Texaco as a viable potentially responsible party, based on the results of a soil/gas survey conducted on the Texaco Property under order from DPNR and under the supervision of EPA. The survey found total hydrocarbon concentrations up to 690 ppm of benzene. EPA is continuing its efforts to identify potential responsible parties.

2.2 Topography and Geology[1]

"St. Thomas is the most northwest island of the U.S. Virgin Islands and the second largest. The island is approximately 14 miles long and 2 to 3 miles wide and has an area of 32 square miles.

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The land surface is almost entirely sloping and extends seaward from a central ridge, 800 to 1,200 feet high, running the length of the island. The slopes, which commonly exceed 35 degrees, are dissected by numerous stream courses of steep gradient. The general appearance is a panorama of steep interstream spurs and rounded peaks. Flat inland is confined to the Charlotte Amalie area and a few small alluvial-filled embayments. The only variation in the general topography is in the upper valley of Turpentine Run in eastern St. Thomas. The valley has relatively gentle topography consisting of rolling hills in a basin surrounded by steep slopes and sharp ridges.

The Tutu Formation, the youngest rock exposed on St. Thomas is composed almost entirely of angular debris derived from the Louisenhoj Formation (an older volcanic formation) and minor limestone debris from thin limestone deposited contemporaneously with the Tutu Formation.

The rocks were subsequently tilted to form a northward-dipping homocline. Dips range from 15 to 90 degrees and average about 50 degrees. Locally the formations are overturned.

The permeable zones that these rocks once may have had after deposition have been destroyed by metamorphism or by deposition of minerals in pore spaces. Groundwater movement is now limited to openings along joints and fault zones. The homoclinal structure is cut by sets of faults trending N 45°W, N 55°E and north. Three well-defined joint sets parallel each of the major fault directions. The valleys of the island have similar trends and are apparently the result of selective erosion of rock weakened by faulting and jointing. Prime zones of groundwater availability, therefore, follow the valleys.

Small alluvial deposits ranging from Pleistocene to Holocene in age, lie in the valley of Turpentine Run in east-central St. Thomas and the larger coastal embayments.

The alluvium of Turpentine Run lies in a narrow band seldom more than 200 feet in width along the stream. Maximum thickness of the alluvium is about 40 feet. Most of the alluvium, which is composed of silt, fine sand, and clay and contains discontinuous beds of sand and gravel 2 to 3 feet thick; lies in the Mt. Zion-Tutu area of the upper basin and in the narrow valley from Mariendal to Mangrove Lagoon in the lower basin. The alluvium extends out under the lagoon near the mouth of Turpentine Run. Although composed predominately of fine-grained material, the alluvium readily infiltrates

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streamflow when the groundwater level is below the base of the stream. As such, the alluvium forms a readily rechargeable aquifer, although it is of small extent and yield.

Some coastal embayments headed by intermittant streams contain small deposits of alluvium similar to that of Turpentine Run. Maximum thickness of these deposits is estimated to be 50 feet, and their areal extent seldom is greater than a few acres (an exception being the Long Bay and Airport areas near Charlotte Amalie). Near the sea, the alluvium interfingers with calcareous sand and at times contains lenses of mangrove swamp deposits. Therefore, the deposits are of minor significance as sources of water".[1]

2.3 Rainfall[1]

"Rain is the only natural source of fresh water to replenish the water resources of the island. Rainfall is seasonal, with a rainy season in late summer and early fall and a secondary wet season usually in May. Nearly half the rain falls during August-November. Rains exceeding 1 inch in 24 hours come six or seven times a year. Four to 15 inches of rain falls in a 48-hour period about once every 2 years in large storms. These rains can occur in any month, but are more likely during the hurricane season (August-November). About 50 percent of the time annual rainfall is between 40 to 50 inches. Less than 10 percent of the time annual rainfall is under 35 inches, which usually means a major deficiency during the normal wet season and drought.

The cumulative departure from average and the 10-year running average of rainfall shows that at this time of writing (1967) the island may be entering a period of deficient rainfall. With the exception of a few years in the late 1940's and early 1950's, rainfall in the past 30 years has been below average. There has been a long-term decline of about 10 inches in annual rainfall since the peak of the surplus rainfall period in the early 1930's. The most severe droughts on record occcurred in 1964 and 1967, when only 27 and 24 inches of rain fell, respectively.

Areal distribution of long-term rainfall, is controlled by topography and the prevailing easterly to northeasterly winds. However, individual storms may or may not show the effects of orographic control or prevailing winds and the areal distribution of the storms can be very irregular".[1] See Figure 2-3, page 10, for average yearly rainfall.

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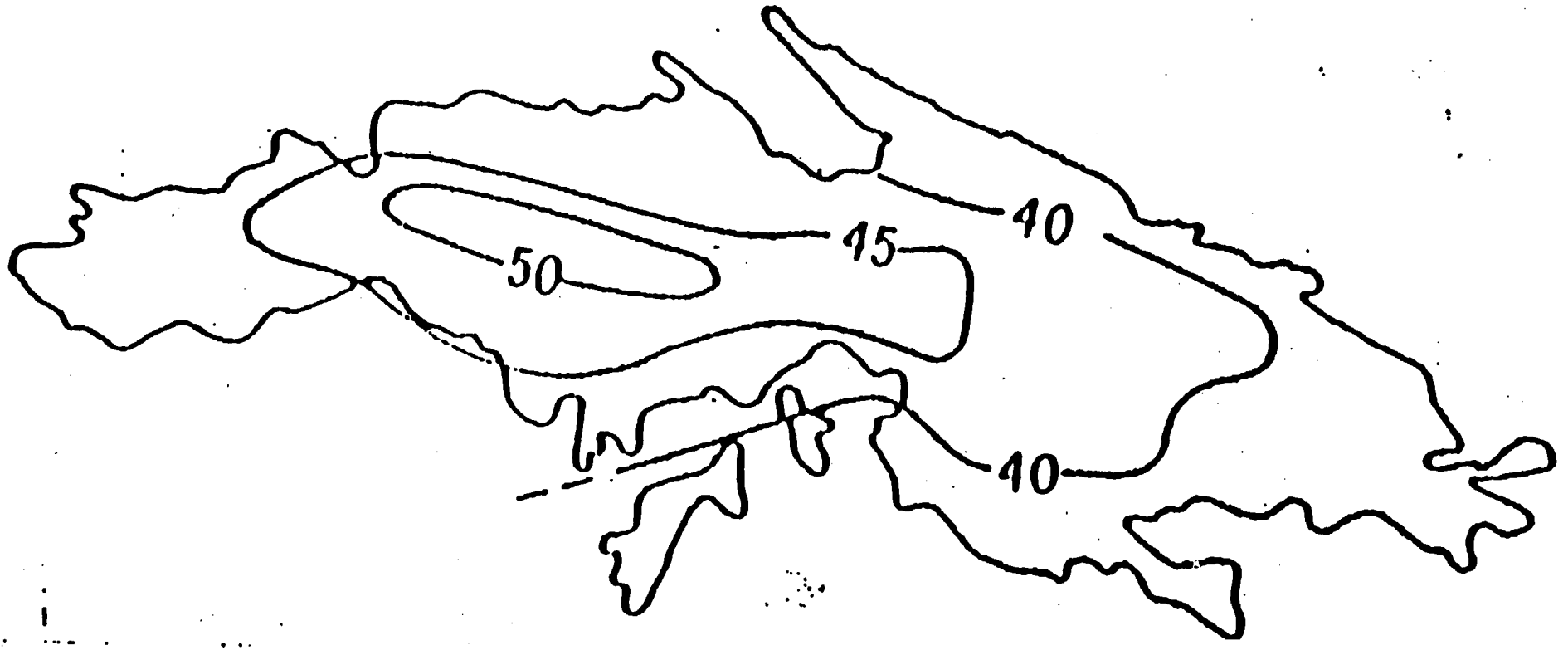
ST. THOMAS: AVERAGE ANNUAL RAINFALL (IN INCHES)



From: A Survey of The Water Resources of
St. Thomas, Virgin Islands
D.C. Jordan and O.J. Cosner

WESTON SPILL PREVENTION & EMERGENCY RESPONSE DIVISION In association with ICF, Inc., Jacobs Engineering, Inc., & Tetra Tech, Inc.	EPA PM C. O'Neill TAT PM R. Hafner	FIGURE 2-3 St. Thomas, U.S.V.I. Average long term rainfall in inches.

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2.4 Sampling Results

The Tutu well site has been sampled repeatedly over the last ten months and found to contain definite contamination. The initial assessment was conducted in July through September of 1987. Subsequent sampling and analysis has proceeded on a monthly basis. The initial assessment considered 24 wells and approximately 50 cisterns. Of these wells and cisterns; 24 wells and 5 cisterns were found to be contaminated. The 5 cisterns were cleaned and disinfected by the ERCS contractor. Subsequent monitoring has been considered for the 24 wells that showed some type of contamination.

Table 2-1 pg. 32, lists the wells included in the current sampling program. Tables 2-2 and 2-3 , pages 33-36, show the volatile organic analysis results of the contaminated wells and give the highest concentration of organic contamination found during the last six months.

The sampling, and most of the preliminary Photovac portable GC screening was conducted by the U.S. EPA Region II TAT. Certified drinking water laboratories have performed formal analyses to verify the photovac screening results and to cover the entire spectrum of possible hazardous contaminants.

Although, the concentration of these contaminants fluctuates monthly, it is noteworthy that the major contaminants have been 1,2-trans-dichloroethylene (DCE), trichloroethylene (TCE), tetrachloroethylene (PCE), toluene (TOL), benzene (BEN), tertbutyl methyl ether (TBME) and various metals. Their high concentration in four wells; Tillet, Harvey, Smith and Steele has been evident from the initial assessment. These wells show concentrations of volatile organics (VO) in excess of 1,000 ppb. The major and most consistent contaminant appears to be PCE. The Tillet well has also shown very high DCE and BEN contamination. Four other wells; Francois, Mathias, Four Winds, and Elgin; were confirmed to have >50 ppb VOCs.

The last confirmation analysis conducted during October 1987, included the entire Hazardous Substance List (HSL), (consisting of approximately 150 chemicals). At that time, significant levels of TBME up to 470 ppb, and methylene chloride up to 120,000 ppb were detected. Some samples have also shown traces of vinyl chloride, chloroform, 1,1,1-trichloroethane, bromodichloroethane, xylene, and ethylbenzene.

Finally, the HSL analysis also showed the presence of

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EP toxic metals. The report showed the presence of eight distinct metals in some of the wells examined. (See Table 2-4 page 37). Zinc was the most abundant element detected at a level of 460 ug/l. Selenium was also measured in two wells (VIHA #1 and Steele) at concentrations exceeding the PDWR limit of 10 ug/l.

In summary, the Tutu Wells Site monitoring has indicated persistent contamination in the well drinking water and the need for immediate remediation.

3.0 DRINKING WATER STANDARDS

3.1 EPA Regulations

The Safe Drinking Water Act of 1974, and amended in 1977, established primary and secondary drinking water standards. The primary standards were established to protect public health, while the secondary standards mainly addressed the physical characteristics of drinking water such as taste, odor, color and corrosivity. (See Tables 3-1, 3-2, and 3-3, pages 38 and 39).

The Maximum Contaminant Level (MCL) and the Recommended Maximum Contaminant Level (RMCL) were developed by the EPA Office of Drinking Water to provide acceptable concentrations of specific organics and inorganics in public water supply systems. RMCL's are contaminant levels at which there are no known or anticipated adverse health effects to a human being. MCL's are enforceable health standards that are set as close to the RMCL's as feasible based upon practical considerations such as treatment technology, cost, and analytical methods and detection limits.

Removal Action Levels (OSWER Directive 9360.1-10)

Under the 1982 National Contingency Plan (NCP), removal actions were taken in response to "immediate and significant" threats to human health or the environment. The removal program used the 10-Day Health Advisory as the principal benchmark to identify those drinking water contamination incidents that posed the most acute threats to human health. The November 1985 NCP broadened removal authority by authorizing response in situations that present a "threat" to human health or the environment. Therefore, removal actions may now be taken in less urgent situations than under the 1982 NCP.

In response to this expansion of removal authority, the Office of Emergency and Remedial Response (OERR) is

revising removal program action levels for contaminated drinking water sites. This guidance is contained in OSWER Directive 9360.1-10, "The Interim Final Guidance on Removal Action Levels at Contaminated Drinking Water Sites". This guidance was approved by the Director of OERR on October 6, 1987. This guidance expands the previous policy in a number of ways. First, the numeric action levels are now based on levels that are protective for a lifetime exposure rather than a 10-day exposure. Second, both carcinogenic and non-carcinogenic health effects are considered, Tables 3-4, Pages 39,40. Third, a reduction factor is used for volatiles to account for exposure due to inhalation. Finally, additional guidance is provided on the use of site-specific factors to trigger removal actions.

The action levels established in this guidance allow a site to qualify for removal response if either: 1) the numeric trigger is exceeded at the tap, or 2) site-specific factors otherwise indicate that a significant health threat exists. The guidance also discusses information sources on health threats from drinking water contamination, factors to consider in determining the extent of action, action levels vs. cleanup standards, prioritizing removal sites, and obtaining exemptions to the statutory limits for alternate water supply sites.

The appropriate calculation to determine action levels in accordance with each chemical category is listed below:

1. Non-volatile non-carcinogens -- Action level equals the Drinking Water Equivalent Level (DWEL).*

   *DWEL= Reference Dose (RFD) x $\frac{70kg}{2 \text{ liters/day}}$

2. Volatile non-carcinogens -- Action level equals 50 percent of the DWEL.

3. Non-volatile carcinogens -- Action level is determined by comparing the DWEL to the 10^{-4} Lifetime Upperbound Cancer Risk Level, and choosing the lower of the two.

4. Volatile carcinogens -- Action level is determined by comparing 50 percent of the DWEL to the 10^{-4} Lifetime Upperbound Cancer Risk Level, and choosing the lower of the two.

The action level for methylene chloride, for example, is calculated as follows. Methylene chloride is a volatile and a potential human carcinogen (classified as a "B2" under EPA guidelines). The DWEL for

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methylene chloride equals 1750 ppb and the 10^{-4} Cancer Risk Level equals 48 ppb. The action level is determined by comparing 50 percent of the DWEL, or 875 ppb, to the 10^{-4} Cancer Risk Level, or 48 ppb, and choosing the lower of the two, which is 48 ppb.

The following is a summary of the maximum concentrations of the primary pollutants found in the contaminated wells and the statutory source for their designation as a hazardous substance under CERCLA.

Contaminant	Maximum Concentration Found (ppb)	Removal Action Level (ppb)	Statutory Sources For Designation As A Hazardous Substance Under CERCLA
Methylene Chloride	120,000	48	Clean Water Act Sec. 307(a)
Tetrachloroethylene	2,040	66	Clean Water Act Sec. 307(a)
Trichloroethylene (TCE)	711	128	Clean Water Act Sec. 311(b)(4)
Trans 1-2,Dichloroethylene (DCE)	620	175	Clean Water Act See. 307(a)
Benzene (BEN)	6,950	120	Clean Water Act Sec. 307(a)
Selenium	15	10	Clean Water Act Sec. 307(a)

3.2 USVI Department of Planning and Natural Resources (DPNR) Regulations

The Department of Planning and Natural Resources (DPNR) on September 1, 1987, adopted interim maximum permissible concentrations for volatile organic compounds in drinking water, 50 ppb for a single compound, or 100 ppb for total organic compounds.

4.0 LIST OF ALTERNATIVES

In order to provide a permanent water supply to the two three family homes and one apartment building housing twelve studio units, the EPA has considered the following alternatives:

1. No action.
2. Extend the existing water main.
3. Install new and deeper wells within the contamination area.
4. Install new wells beyond the area of contamination.
5. Install a whole house reverse osmosis unit at each location.
6. Construct a reverse osmosis central plant.

7. Construct a water treatment plant.

8. Increase the capacity of the cisterns.

9. Install individual activated carbon filters.

These alternatives will be briefly discussed in the next section.

5.0 DESCRIPTION OF ALTERNATIVES

5.1 No Action

This alternative is not acceptable within the regulatory and public health framework.

5.2 Extend Existing Water Main

This alternative would extend the existing 16 inch diameter (dia.) water main from the intersection of Routes 38 and 382 south to the intersection of Routes 32 and 38 by the Fort Mylner Shopping Center, and then east along Route 32. This extension will conform to the V.I. planned expansion of the present potable water system. The water main extension will include two branches, a 6" dia. main to the vicinity of Smith's residence, which will include a fire hydrant, and a 2" dia. pipe which will serve the Harvey residence and Steele apartment complex.

This alternative will provide safe potable water for the affected area. The water main will also serve a shopping center, various individual shops, and the local population which depend on ground water or water deliveries. In addition, the installation of hydrants provides fire protection in compliance with local fire codes.

The source of water would be the V.I. Water and Power Authority desalination plants in Crown Bay.

5.3 New and Deeper Wells Within The Contamination Area

The selection of a deeper well as an alternative would depend on the availability of an uncontaminated aquifer in the deeper zone. However, since the area consists primarily of fractured and jointed rock zones and water movement is limited to the openings along the cracks, the rate of contaminant migration into the aquifer is high. Also, because of the geology in St. Thomas, there is no deeper aquifer which would be shielded from the contamination. There is also a serious danger of salt water intrusion in this area, especially during long periods without recharge such as drought periods.

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5.4 New Wells Located In Areas Beyond Contamination

Wells drilled in areas, 1, 3 and 5 (Figure 5-1 pg. 17 would presently be in non-contaminated zones. The yields obtained from these areas are relatively low and contain high concentrations of salt because of salt-water intrusion into the aquifer. Pumping of the new wells may also induce the contaminants to move toward the wells, thus defeating their purpose.

In addition, a piping distribution system would be necessary to deliver drinking water to the contaminated well area; thus this alternative does not provide a viable long term solution.

This alternative would also require easement land purchase for the delivery pipe to the apartment complex and two (2) homes affected by the contamination. In addition, purchase of the land for easement rights requires a minimum of six months.

5.5 Whole House Reverse Osmosis

This alternative would provide a reverse osmosis (R.O.) system in each location for the treatment of contaminated well water. The R.O. process consists of a semi-permeable selective membrane which permits passage of certain components of a solution while restricting others.

The ideal R.O. system is used at a constant flow rate 24 hours/day. Constant flow rate operation provides more efficient removal of solute than variable flow rate opeations; and R.O. systems should operate at least 18 hours/day. The use of a R.O. unit for groundwater treatment will require hardness and alkalinity removal to minimize possible precipitation of insoluble chemicals within the unit.

There are two types of membrane materials available: cellulose membranes and thin film composite membranes. Cellulose membranes are not resistant to bacterial attack, the thin film composite membranes do not tolerate chlorine; as a result, depending on the membrane bacteria or chlorine must be removed prior to reaching the membranes. The capacity of the R.O. system will decrease with decreasing water temperature; therefore, a preheater may be needed in some cases.

The R.O. unit should monitor the flow inlet, water pressure, product water and waste water for efficient performance.

TDT 001 1795

This alternative would require an NPDES permit which would take at least one year to obtain.

5.6 Reverse Osmosis Central Plant

Many processes are used for desalination plants: distillation, electrodialysis, freezing, reverse osmosis and ion exchange.

The only process which could be used in this particular application is the R.O. because they are the smallest units available. The desalination plant would be situated by the ocean and would consist of a salt water intake, high pressure pumps to pump salt water into the plant, a pump station to pump the desalinated water to a storage tank, a force main, an elevated storage tank, and associated piping to supply water to each home.

One major drawback is the availability of land at a reasonable cost and the lengthy time required to purchase the land.

5.7 Water Treatment

This alternative would treat the combined well water of the apartment complex and the homes at a central location. The contaminated water would be brought into the treatment plant by a pipeline from each affected well, then treated, and pumped to an elevated, centrally located storage tank. The treated water will be redistributed by gravity to each apartment and home affected as needed. This alternative would require extensive surveying, piping, a pump station, an elevated distribution storage tank and land purchases. One major drawback is the availability of land at a reasonable cost and the lengthy time required to purchase the land.

5.8 Increase Capacity of Cisterns

Roof top catchments and cisterns provide a means for storing drinking water in the area. Rainfall in this area averages 40 in./year, of which 70% is recoverable. Assuming a catchment area of 500 square feet per family home and the rainfall occurring in a 4 month period, the required cistern size would be extremely large and impractical to store sufficient water for year round services. Also, storage of water over considerable periods of time results in bacterial growth with a resulting poor quality of water. Land for the construction of these larger catchments is not available.

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5.9 Individual Activated Carbon Filters

These types of filters are excellent VOC removal medium. Carbon filters have been used and are presently being used to remove VOC's at NPL sites with great success. The systems, if properly designed, can last for up to 20 months or longer removing VOC's, however, carbon does not remove metals. Also, water samples have to be regularly collected after the units are installed to monitor the carbon treatment's effectiveness and the possibility of contaminant breakthrough. Therefore, the use of activated carbon filters at Tutu is not recommended.

The design is based on the carbon adsorption capabilities for a particular compound, contaminant concentration, contaminant loading capability, flow rate, column volume, and column longevity. Normally, two columns are mounted in series to prevent contamination in case of column breakthrough.

6.0 EVALUATION OF ALTERNATIVES

Each alternative will be evaluated based on the criteria listed in 6.1 to 6.8.

6.1 Design Parameters

a) Water Demand

The current water demand in St. Thomas is 38 gallons per capita per day (gpcd) or 152 gallons per day (gpd) per household of four persons. Any alternative will have to take into consideration the total population served by the wells which is 50 persons.

The Smith well serves three families, or 12 persons.

The water demand for the Smith Household will be 12 persons x 38 gcpd x $\frac{1 \text{ day}}{1440 \text{ min/day}}$ =

= 0.32 gallons per minute (gpm) = 456 gpd

The Steele well serves 28 persons.

The water demand for the Steele service will be 28 persons x 38 gcpd x
$\frac{1 \text{ day}}{1440 \text{ min/day}}$ = 0.74 gpm

= 1064 gpd

The Harvey well serves 10 persons and their demand will be

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10 persons x 38 gcpd x $\frac{1 \text{ day}}{1440 \text{ min/day}}$ = 0.26 gpm

= 380 gpd

The total demand for the wells affected by the groundwater contamination is 0.32 gpm + 0.74 gpm + 0.26 gpm = 1.32 gpm or 1,900 gallons per day.

b) Water Quality

The EPA is required to provide a safe, permanent and reliable potable water supply to the affected homes. Therefore, the water supplied to the homeowners must meet current drinking water quality standards.

Potable water shall be provided to the house cisterns in the risk area as a temporary measure until a reliable and safe alternate water supply is found and in operation.

6.1. General Preliminary Evaluation

The construction of new wells, either deeper or shallow, or wells removed from the area of contamination, does not appear to be a permanent alternative. These additional wells will increase the potential for salt water encroachment from the brackish water underlying, or adjacent to the fresh water. In addition, the cone of depression resulting from deeper wells may cause the contaminants to move deeper into the aquifer, thus contaminating a greater area of the aquifer.

Wells placed outside the area of contamination will induce contaminant movement into the clean area and could contaminate additional potable water wells.

Increasing cistern capacity is also not a permanent solution because of the rainfall fluctuation and its downward trend over the recently past years. The storage of water over a long period of time would also greatly increase the bacterial growth and would require individual water disinfection systems.

The reverse osmosis (R.O.) system, as mentioned in Sections 5.5 and 5.6, is used for desalination as well as for water purification. Some R.O. systems need to operate continuously to avoid biological membrane fouling and need very high levels of particulate removal (5 microns) to produce good quality water. The water purification plant will have to be specifically designed to remove all contaminants in the well water. Both the desalination and water purification units use a high pressure water feed; 800-1000 pound per square

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inch (psi) for the desalination plant, 200 psi for the water purification units.

Lately, new materials have been used for constructing the R.O. membranes especially in whole house systems. Culligan has new R.O. units whose membrane is a thin film composite which the manufacturers say lasts 4-7 years longer than cellulose acetate membranes whose life span is 3 to 4 years. The thin filter composite R.O. systems will have a rejection rate of about 80% for VOC's and have a removal rate of 99% on all VOC's. The rejection rate is the amount of water rejected as "brine" by the R.O., so that a system treating 1000 gpd and having a rejection rate of 50% assuming it is filtering VOC's will only produce 500 gallons of drinking water, the rest will be brine water.

The R.O. must have pretreatment, such as activated carbon filters and water softening. Whole house units for Smith and Harvey will cost $7,000 each including a 400 gallon storage tank. Mr. Steele's unit will cost $14,000 including a 1000 gallon storage tank.

The daily amount of feed water required from Mr. Steele's well will be at (50% rejection) 1100 gpd/ $(1.0 - 0.50)^2$ = 4,400 gpd or 3.10 gpm. The membrane will produce 3,300 gpd of brine, which will be contaminated with VOCs and will have to be properly disposed of.

The activated carbon filters are good only for the adsorption and removal of volatile organic compounds but will not remove metals. In addition, the activated carbon filters must be monitored frequently for breakthrough of the hazardous substances and the carbon has to be replaced approximately every year depending on the contaminant load. The contaminated carbon must be disposed of as hazardous material, or regenerated if the particular state in which the carbon filters are in operation allows it. New York State requires that the carbon which fills the columns be virgin carbon, not regenerated carbon. Also, carbon loses approximately 10% of its volume by regeneration. Therefore, because of lack of metal adsorbtion in the carbon and the potential disposal problems, activated carbon will not be considered in this report.

The reverse osmosis system is a complicated one to install in the Virgin Islands due to the lack of technical services on the islands. A repair to the system would take considerable time and money and would probably leave the consumers without drinking water for several months while service personnel

arrived from the mainland.

The R.O. unit would require the installation of a water main. The water main would consist of 2300 linear feet (L.F.) of 12 inch ductile iron pipe (DIP) and 950 L.F. of 6 inch DIP; 1000 L.F. of 2 inch plastic pipe will supply the Steele and Harvey residences. Virgin Islands Fire Department regulations require a minimum pipe size of 6 inches, a maximum distance of 500 feet between fire hydrants, and a pipe to be able to supply upon demand 1,000 gpm water at 50 pounds per square inch (psi) delivery pressure.

6.2 Environmental Impact

All alternatives will have adverse environmental effects except for the extension of the water main. The wells will produce salt water intrusion and/or spread the area of contamination. Reverse osmosis plants produce brine which will be highly contaminated not only with metals, but with VOC's. The disposal of the brine water will significantly increase the project operation cost for homeowners, as it will have to be disposed of as highly hazardous waste. The activated carbon units will produce about three 55-gallon drums of highly contaminated aqueous slurry. The water treatment plant will also produce contaminated aqueous slurry from the chemicals introduced to aid in the settling process.

6.3 Operation and Maintenance

The operation and maintenance efforts for the package water treatment and the R.O. plants would be extensive as compared with any of the other alternatives. Qualified personnel would be required to maintain and operate the plants. In addition, both water treatment and an R.O. central plant system would require a distribution reservoir, piping and a pump station to transfer water to and from the reservoir. The water treatment plant will require chemicals for treatment and disposal of the sludge. The desalination plant will require an intake structure. The maintenance required by the water main extension will be minimal because water mains generally are trouble-free.

6.4 Reliability

Each alternative must provide safe drinking water without extensive long term maintenance.

New deeper wells or wells located beyond the contamination zone would not provide a reliable long term solution because of the possibilities of salt-

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water encroachment and a higher rate of contaminant migration.

Desalination plants and water treatment plants are generally reliable; however, the equipment required is subject to breakdowns. The reverse osmosis, desalination and water treatment plants will require a skilled person working a minimum of one day per week to check the operation, dispense chemicals, make adjustments, and perform possible repairs for the continued production of potable water.

The extension of the existing water mains to the contaminated area would provide the most reliable source of safe drinking water to the residents.

6.5 Site Constraints

There are no site constraints for any of the alternatives proposed. All alternatives could be reasonably installed without any unusual site problems except for the alternatives requiring elevated reservoirs, on-site treatment and desalination.

6.6 Public Acceptance

The proposed alternatives do not present any objectionable problems which would be unacceptable to the public. The water main extension is probably the alternative that the public would most readily accept because water supplied from a main source is generally considered safer because of the daily monitoring required by personnel who are constantly in attendance.

6.7 Summary of Cost Estimate For Alternatives (See Appendix, Page 44 for detailed estimates for each alternative)

1.	NO ACTION	$ 0.0
2.	EXTENTION OF THE EXISTING WATER MAIN. (See Selected Alternative, Page 46 for detailed estimate).	$ 630,000
3.	INSTALL DEEPER WELLS WITHIN THE CONTAMINATED AREA	$ 375,000
4.	INSTALL A NEW WELL BEYOND THE AREA OF CONTAMINATION	$ 545,000
5.	WHOLE HOUSE REVERSE OSMOSIS	$38,000,000
6.	CONSTRUCT A WATER TREATMENT PLANT	$ 400,000
7.	CONSTRUCT A REVERSE OSMOSIS CENTRAL PLANT	$ 375,000
8.	INCREASE CAPACITY OF CISTERNS	$ 360,000

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- ACTIVATED CARBON FILTERS $ 100,000

6.8 Implementation Time

The implementation time would be the longest for alternatives requiring the construction of a water treatment plant, especially if it is constructed in an area where no surveys have been made. Therefore, it can be assumed that for the desalination and package water treatment plant it would take a minimum of six months to a year to study the pipe routing, survey, possible land purchases, and drawings. In addition, permits would be required and may be difficult to procure as any water main installation will infringe on the utility rights (WAPA). Of all the alternatives proposed, the water main extension would be the quickest to construct. The survey and drawings are already completed and construction is ready to begin. Based on the estimate, the water main could be in place in five months.

7.0 ALTERNATIVES COMPARISON AND SELECTION

7.1 Alternative Comparison Summary

The various alternatives discussed in Sections 5 and 6 are summarized in Table 7-1, page 36. The different alternatives were rated for reliability, maintenance, long term safe drinking water, implementation time, legal liabilities and cost. Every alternative was given a numerical rating from 1 to 5 for each criteria.

7.2 Selection

The alternative selected is the extension of the existing water mains. This alternative will provide the residents with safe drinking water at a reasonable cost, maintenance free, and over a long period of time.

The comparison chart, Table 7-1, page 36, shows the acceptable and unacceptable features of each alternative and the reasoning for making the selection.

At the right end of the chart the ratings for each alternative are totalled, the lower the total number the more acceptable is the alternative.

Thus, the water main extension is the preferred alternative.

This alternative can be implemented in the quickest time period and will, therefore, reduce the cost for bottled water delivery.

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8.0 SELECTED ALTERNATIVE

8.1 Description of the Selected Alternative

The apartment complex and homes with contaminated drinking water wells will be connected to the proposed water main extension along Routes 38 and 32 at EPA expense. Installation of this water main will provide a safe and reliable drinking water supply to the inhabitants of the apartment complex and homes and prevent health risks associated with exposure to contaminated groundwater.

The selected alternative will extend the existing 16 inch DIP water line south along Route 38 to the Fort Mylner Shopping Center and then east along Route 32 (see Figure 8-1, pg 27). The pipe lengths to be installed are as follows: 2,232 L.F. of 12 inch dia. pipe, 950 L.F. of 6 inch dia. pipe, and 1,000 L.F. of 2 inch dia. pipe. The proposed alternative will cover part of the 1990 plan referred to in the "Water Distribution System Master Plan for St. Thomas, U.S. Virgin Islands" prepared for the Department of Conservation and Cultural Affairs (DCCA) in December 1983 by CH2M Hill, Gainesville, Florida[4]. The proposed alternative will include a 12 inch diameter main with a 2 inch and a 6 inch diameter lateral. There are three proposed hydrants along the water main extension, two in the 12 inch dia. pipe and one in the 6 inch dia. lateral. Prior to the connection to the existing main, a thorough investigation of the last 1,700 feet of the existing main would be necessary. This part of the main has never been used. The pipe and the valves should be checked and parts may need to be replaced before the system could be operational. In addition, the 1,700 feet of water main would have to be pressure tested and disinfected. This installation will provide drinking water connections for the persons using the contaminated wells for drinking water.

8.2 Detailed Costs

The detailed costs for the selected alternative were based on average daily production rates for the various tasks taken from the means construction cost data book.

The estimate provides for funding to the engineering company for the survey, profile drawings, piping design for the Route 32 Circle, checking of existing pipe drawings and specifications.

The costs assume that the mains (6" dia. and 12" dia.

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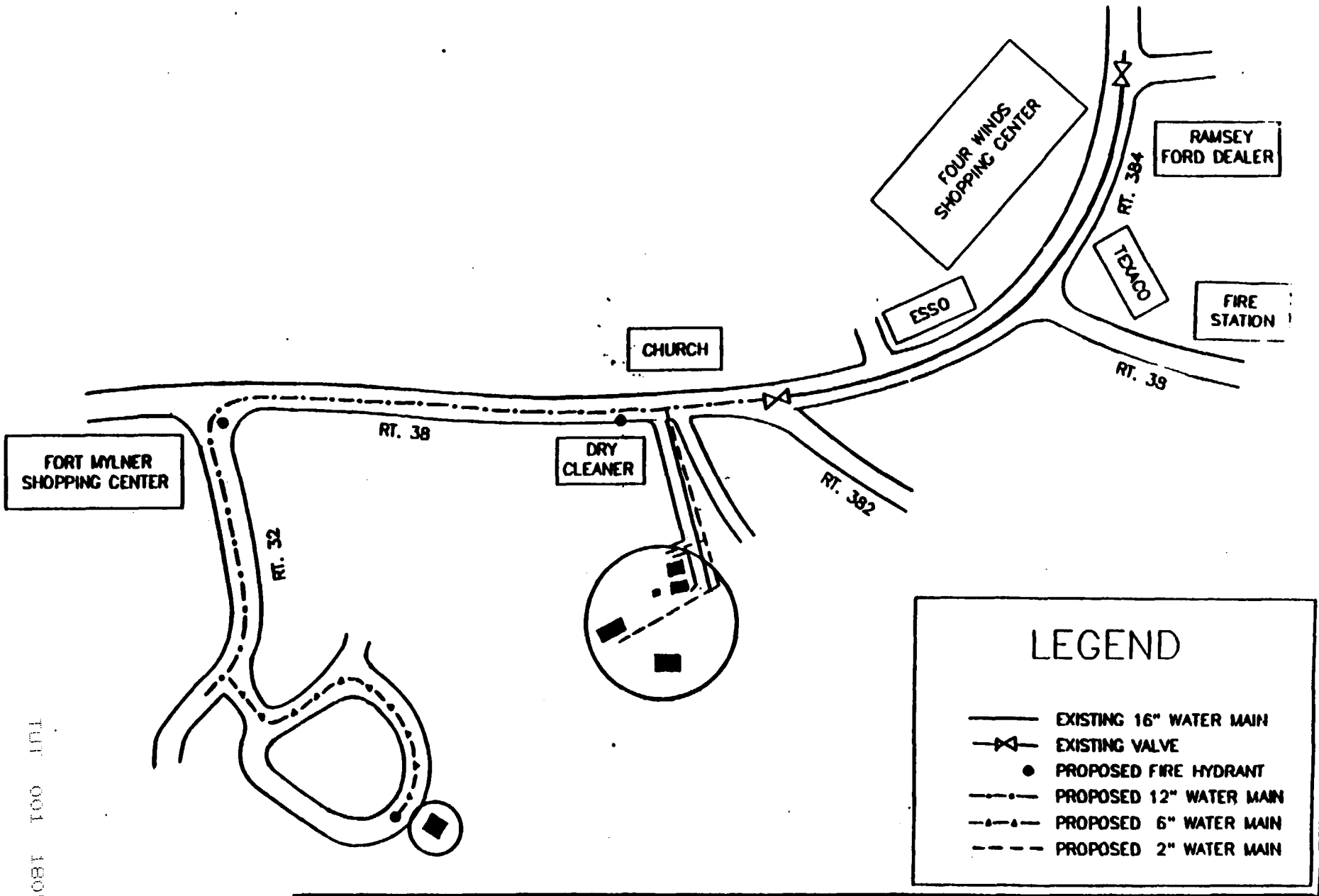
pipes) will be ductile iron pipe (DIP), cement lined, class 250; that polyvinyl chloride (PVC) 2" dia. pipe will be installed from the water main up to the house property line, Steele and Harvey, and house connections will be made as per current WAPA specifications and will include water meters. It is further assumed that the PVC pipe will be installed concurrently with the water main installation. The checking, disinfection and possible repairs to the existing, but unused, 16" dia. main will take 10 working days, connection of the new water main to the existing 16" dia. DIP main will take 5 working days and the three house connections, 2 working days. Pipe fittings, disinfection, trenching, filling, compaction and road restoration are included in the installation costs per L.F. of pipe.

It is assumed that the ERCS response manager (R.M.) will be in St. Thomas full time for the first three weeks; the first two weeks procuring permits, drawing, and other pertinent information; and the first week of actual construction, then he will be present three days every three weeks and the entire last week of the project to ensure the total completeness of the project.. TAT will also be on St. Thomas during the first two weeks of site preparation and during the entire project duration. The project will require two TAT members who will replace each other every three weeks.

Project costs for the selected alternative are summarized on the pages 28 and 29.



WESTON SPILL PREVENTION & EMERGENCY RESPONSE DIVISION

In Association with ICF Technology Inc., C.C. Johnson & Associates, Inc., Resource Applications, Inc., Geo/Resource Consultants, Inc., and Environmental Toxicology International

EPA PM
CARLOS O'NEILL

TAT PM
R. HAFNER

FIGURE 8-1
PROPOSED WATER MAIN EXTENSION
TUTU, ST. THOMAS
U.S. VIRGIN ISLANDS

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PROJECT COST USING A LOCAL CONTRACTOR WITH MINIMAL ERCS SUPERVISION

The following costs are based on a 12 hour day, 5 days a week (60 hours/week). Length of pipe installed per 12 hour day: 62 linear feet (L.F.) per day of 12" dia. DIP and 106 L.F. per day of 6" dia. DIP.

I. EXTRAMURAL COSTS

A. ERCS Contractor Costs

a) Engineering

Survey, Profile drawings, Specifications	$ 22,000

b) Labor and Materials

2232 L.F. 12" dia. DIP @ $70 L.F.	$ 156,240
950 L.F. 6" dia. DIP @ $50 L.F.	47,500
1000 L.F. 2" dia. PVCP @ $5.00 L.F.	5,000
3 hydrants @ $1,700 each	5,100
3 Valves @ $500 each	1,500
Check existing 16" dia. DIP and repair	18,000
Connection to existing 16" DIP	8,000
House connections 3 @ $500	1,500
SUBTOTAL	$ 264,840

c) Personnel

Response Manager (Level 3)	
29 days x 12 hour days x $55/hr	$ 19,140
29 days per diem at $180/day	$ 5,220
Rental car 29 days at $55 day	$ 1,595
Five (5) airfare Newark - St. Thomas at $500/each	$ 2,500
Field Clerk/Typist (N.J.) 120 hour x $29/hour	$ 3,480
Equipment	$ 1,330
Office Trailer, 1,300/mo x 3 mo	$ 3,900
Subtotal	$ 37,965
Subtotal Mitigation Costs (a+b+c)	$ 302,805
* Contingency 25%	$ 75,702
Total Mitigation Costs	$ 378,507
Rounded Mitigation Costs	$ 379,000

*Modified (contingency percentage from 15% to 25% due to unknown labor costs, in V.I.

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B. TAT Costs

80 days x 12 hours x $71/hour	$ 68,160
Three (3) airfare Newark-St. Thomas at $500/each	$ 1,500
Five (5) airfare Puerto Rico-St. Thomas at $80/each	$ 400
Office support 75 hours x $55/hour	$ 4,125
80 days per diem x 180/day	$ 14,400
Subtotal	$ 88,585
Contingency (15%)	$ 13,288
TOTAL	$ 101,873
ROUNDED COSTS	$ 102,000

II. INTRAMURAL COSTS

[960 hrs (Region) + 960 x .10 (Headquarters)] x $30/hr.	$ 31,680
80 days per diem x $180/day	$ 14,400
Rental car 80 days x $45/day	$ 3,600
Eight airfare Puerto Rico-St. Thomas at $80/each	$ 640
Subtotal	$ 50,320
Contingency (15%)	$ 7,548
TOTAL	$ 57,868
ROUNDED COSTS	$ 58,000
REMOVAL PROJECT CEILING ESTIMATE	$ 539,000

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8.3 Implementation Schedule

The implementation schedule is presented in Figure 8-2, page 31. The figure shows a total of twenty one weeks of scheduled tasks. The main items in the schedule are: procurement of materials, eight (8) weeks, check, repair, and disinfect existing water main, two week, 12 inch water main connection, one week, new water main installation 12 inch and 6 inch and road resurfacing, nine and a half weeks, and house connections, one half week. The installation of the new 2 inch water main to serve the Harvey and Steele residences and backfilling will be done concurrently with the 12 inch main. Survey, drawings and specifications preparations and approval, construction permits will be done during the last five (5) of the initial eight weeks alloted for the procurement of materials. It is assumed that TAT will be present in St. Thomas to assist in acquiring the necessary permits approvals and design drawing inspection during the two weeks prior to construction.

Time To Complete The Project:

$\frac{2232 \text{ L.F.}}{62 \text{ L.F./Day}} + \frac{950 \text{ L.F.}}{106 \text{ L.F./Day}} + 17 \text{ Days} = 62.4 \text{ Days}$

Say 65 Working Days = 13 Weeks; TAT = 13 + 2 = 15 Weeks

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Figure 8-2
PROPOSED WORK SCHEDULE
FOR ERCS CONTRACTOR WORK
(12 HRS/DAY 5 DAYS/WEEK)

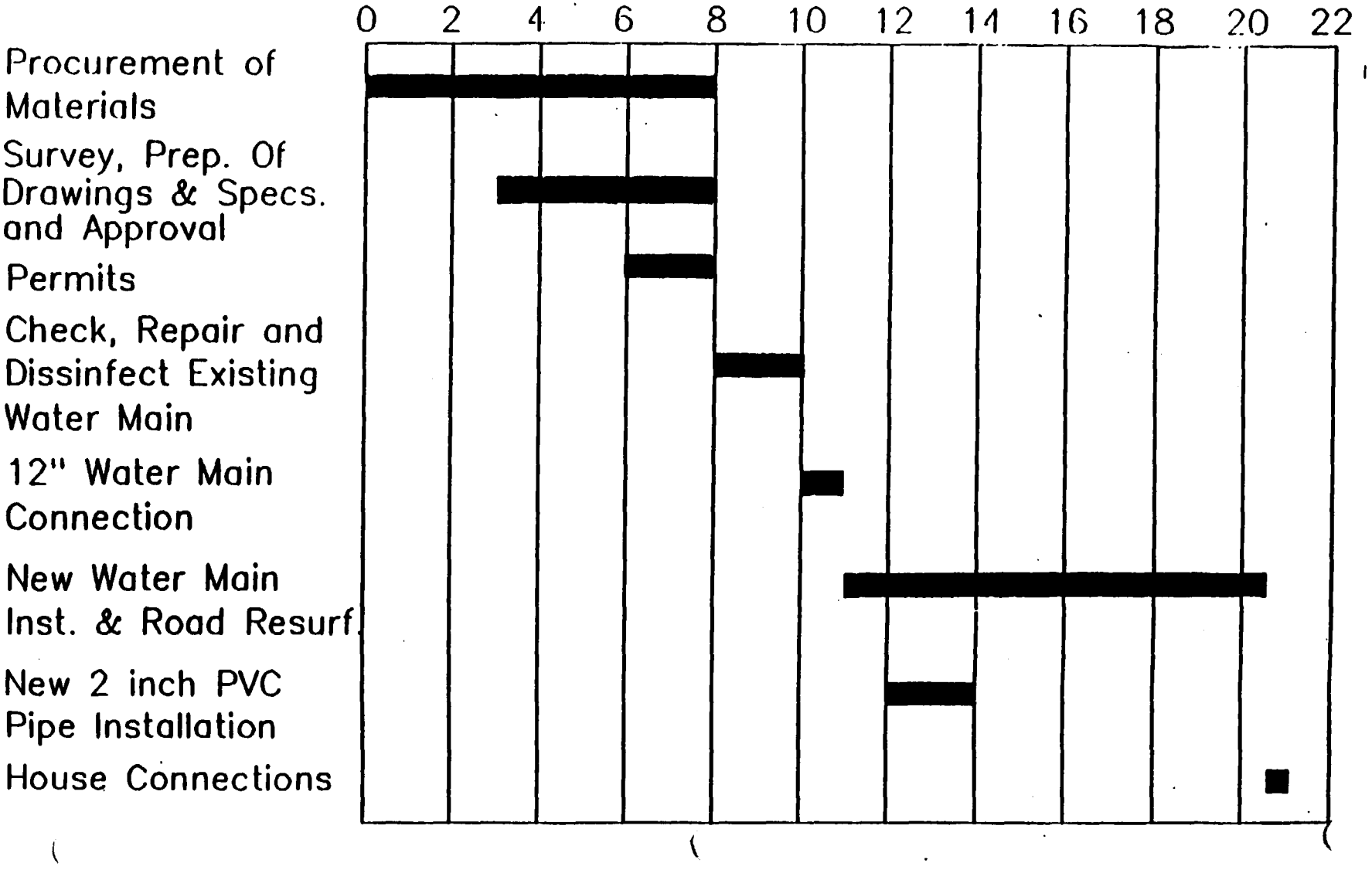

TABLE 2-1
CURRENT WELL MONITORING PROGRAM
AND CLASSIFICATION AT TUTU WELL SITE

WELL NAME	CLASSIFICATION	OPEN/CLOSED
1. Dede	Public	Open
2. Steele	Private	Closed
3. Elgin #1	Commercial	Closed
Elgin #2	Commercial	Closed
Elgin #3	Commercial	Closed
4. Four Winds	Commercial	Closed
5. Smith	Private	Closed
6. Bryan	Commercial	Open
7. Harvey	Private	Closed
8. Tillet	Commercial	Closed
9. Harthman Estate	Private	Closed
10. Devcon #1	Commercial	Open
Devcon #3	Commercial	Open
11. VIHA #1	Institutional	Closed
VIHA #3	Institutional	Closed
12. Dench	Commercial	Pump/No Power
13. Ramsey	Private	Open
14. Harthman Crusher	Commercial	Closed
15. Alpha Leonard	Private	Open
16. Francois	Private	Open
17. Demitris	Commercial	Open
18. Rodriguez Auto	Private	Open
19. Harthman Bakery	Commercial	Closed
20. Mathias	Private	Open

Definition of Classifications

Private: Wells which serve one or two houses.

Commercial: Wells that are used to yield water for sale.

Institutional: Wells owned and operated by a non-profit institution or governmental agency.

Public: Wells that are for public use.

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TABLE 2-2

HIGHEST AMOUNT OF CONTAMINATION DETECTED ON PHOTOVAC FROM SEPTEMBER 1987 TO JANUARY 1988

	CONTAMINANT (PPB)				
WELL	BEN	TOL	PCE	TCE	DCE
EGLIN #2	ND	< 5	40	10	< 5
EGLIN #3	ND	1	105	< 20	< 5
SMITH	ND	ND	>25	7	< 1
TILLET	ND	250	475	75	< 10
4 WINDS	ND	2	125	< 15	5
STEELE	ND	ND	575	9	< 5
HARVEY	ND	ND	500-2500	15	< 1
DEMETRIS	ND	ND	ND	ND	ND
DEDE	ND	ND	ND	ND	ND
DEVCON #1	ND	ND	ND	ND	ND
DEVCON #3	ND	ND	ND	ND	ND
VIHA #1	ND	ND	14	< 1	0
VIHA #3	ND	ND	ND	<<1	ND
EGLIN #3	ND	1	60	<10	<5
DENCH	ND	ND	ND	ND	ND
RAMSEY	ND	ND	8	<<1	ND
H. CRUSHE	ND	ND	14	1	<1
H. BAKERY	ND	ND	1	<1	ND
H. ESTATE	ND	ND	ND	ND	ND
LEONARD	ND	ND	ND	ND	ND
FRANCOIS	ND	1	180	25	5
RODRIGUEZ	ND	ND	ND	ND	ND

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TABLE 2-2 (cont'd)

HIGHEST AMOUNT OF CONTAMINATION DETECTED ON PHOTOVAC FROM SEPTEMBER 1987 TO JANUARY 1988

	CONTAMINANT (PPB)				
WELL	BEN	TOL	PCE	TCE	DCE
BRYAN	ND	ND	ND	ND	ND
MATHAIS	ND	ND	118	3	<1
RAL	120	ND	66	128	175

LEGEND:

< LESS THAN
> GREATER THAN
BEN BENZENE
TOL TOLUENE
PCE PERCHLOROETHYLENE
TCE TRICHLOROETHYLENE
DCE 1,1-DICHLOROETHYLENE
ND NOT DETECTED

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TABLE 2-3

HIGHEST AMOUNT OF CONTAMINATION CONFIRMED BY GC/MS FROM SEPTEMBER 1987 TO JANUARY 1988

	CONTAMINANT (PPB)					
WELL	BEN	TOL	PCE	TCE	DCE	TBME*
BENCH	0	0	0	0	1	
RAMSEY	5	30	154	46	3	0
H.CRUSHER	5	38	130	46	12	0
H. BAKERY	<1	633	3	5	<1	
H. ESTATE	<1	1	3	0	0	
LEONARD	0	1	3	0	0	0
FRANCOIS	0	1	>1000	180	140	180
DEMETRIS	<1	3	4	2	<1	
DEDE	<1	0	0	< 1	1	
DEVCON #1	0	0	0	< 1	< 1	
DEVCON #3	0	0	0	0	< 1	
EGLIN #1	2	5	450	300	63	
EGLIN #2	3	6	760	404	74	
EGLIN #3	0	1	500	268	66	
SMITH	1	1	>1000	130	81	34
4 WINDS	7	6	450	100	213	470
STEELE	0	0	>1000	160	61	37
HARVEY **	0	1	760	350	56	
RODRIGUEZ	0	0	1	<1	<1	
BRYAN	0	0	0	<1	0	
MATHAIS	0	1	6348	<55	9	
VIHA #1	15	6	36	9	12	

TUT 001 1813

TABLE 2-3 (cont'd)

HIGHEST AMOUNT OF CONTAMINATION
CONFIRMED BY GC/MS FROM
SEPTEMBER 1987 TO JANUARY 1988

	CONTAMINANT (PPB)					
WELL	BEN	TOL	PCE	TCE	DCE	TBME*
VIHA #3	<1	3	2	1	7	
TILLET	6950	492	2040	711	620	470
RAL	120		66	128	175	

* FROM 10/87 HSL ANALYSIS BY EPA

** SHOWED A CONCENTRATION OF 120,000 PPB METHYLENE CHLORIDE IN THE 10/87 HSL

LEGEND

BEN BENZENE
TOL TOLUENE
PCE PERCHLOROETHYLENE
TCE TRICHLOROETHYLENE
DCE 1,1-DICHLOROETHYLENE
RAL EPA REMOVAL ACTION LEVEL

TUT 001 1814

TABLE 2-4

METALS AND CYANIDE CONCENTRATIONS AT TUTU WELL SITE DURING RSL OCTOBER 1987 SAMPLING

Contaminant (ug/l)

Well	Cyanide (mg/l)	Antimony	Arsenic	Chromium	Copper	Selenium	Thallium	Zinc
Field Blank	0.016M							10
Bryan								30
Tillet	0.051M			8M	10M			10
Four Winds				6M	5M			51
Elgin #3				6M	5M		3M	98
Elgin #2					8M			200
Elgin #1	0.058				5M			82
Francois	0.018M			9M				108
VI Housing#1	0.023				10M	13*		30
VI Housing#3	0.019M				22M	3M		30
Harthman Estate						4M		20
Demitri					20J	3M		40
Rodriguez					5M			30
Ramsey	0.018	2M						10
Steele		3M		20M	20M	15*		20
Harvey				10M	8M			340
Mathias					9M	5.6		10
Smith					7M	3M		460
Devcon#1								10
Devcon#2				10M		7.1		20
A. Leonard						8.5		10
M. Crusner			15					10
Dede					10M			30
Dench		4M			10M		12*	68
N. Bakery		1M						20
Drinking Water Standard			50 ug/l		1	10 ug/l		500 ug/l
Guidelines	220,000				1,400,000			

M = Detected but not quantified J = Estimated * = Significant value

Note: In lab report all units are ug/l except cyanide which is reported as mg/l

TUT 001 1815

BLE 3-1 PRIMARY DRINKING WATER REGULATIONS FOR INORGANICS (40 CFR, PART 141)

Contaminant	[(mg/l)]
Arsenic	0.05
Barium	1
Cadmium	0.010
Chromium	0.05
Fluoride	1.4-2.4
Lead	0.05
Mercury	0.002
Nitrate (as N)	10
Selenium	0.01
Silver	0.05

TABLE 3-2 PRIMARY DRINKING WATER REGULATIONS FOR ORGANICS (40 CFR, PART 141)

Contaminant	Maximum Level [mg/l]
(a) Pesticides	
Endrin	0.0002
Lindane	0.004
Methoxychlor	0.1
Toxaphene	0.0005
(b) Chlorophenoxys	
2,4-D, (2,4-Dichlorophenoxyacetic acid)	0.1
2,4,5-TP (Silvex) (2,4,5,-trichlorophenoxypropionic acid)	0.01
(c) Total trihalomethanes	0.10

TUT 001 1816

TABLE 3-3 NATIONAL SECONDARY DRINKING WATER STANDARDS (40 CFR, PART 143)

Contaminant	Maximum Level
Chloride	250 mg/l
Color	15 color units
Copper	1 mg/l
Corrosivity	Non-corrosive
Foaming Agents	0.5 mg/l
Iron	0.3 mg/l
Manganese	0.05 mg/l
Odor	Threshold Odor Number 3
pH	6.5 - 8.5
Sulfate	250 mg/l
TDS	500 mg/l
Zinc	5 mg/l

TDT 001 1817

TABLE 3-4
1987 WATER QUALITY CRITERIA BASED ON HEALTH FOR NON-CARCINOGENIC (THRESHOLD) POLLUTANTS

Substance	Criterion [a] (ug/l)	Comment
Acenaphthalene	20	Organoleptic propertie
Acrolein	320	
Antimony	145	
Cadmium	10	
Chlorobenzene	20	
bis-(2-chloroisopropyl)ether	34.7	
Chlorophenols (all mono isomers)	0.1	Organoleptic propertie
Chromium (VI)	50	
Chromium (III)	170,000	
Copper	1,000	
Cyanide	200	
Dibutylphthalate	34,000	
Dichlorobenzenes (all isomers)	400	
2,3-dichlorophenol	0.04	Organoleptic propertie
2,4-dichlorophenol	3,090	
	0.3	Organoleptic propertie
2,5-dichlorophenol	0.5	Organoleptic propertie
2,6-dichlorophenol	0.2	Organoleptic propert
3,4-dichlorophenol	0.3	Organoleptic propertie
1,3-Dichloropropenes	87	
Di-2-ethylhexyl phthalate	15,000	
Diethylphthalate	350,000	
2,4-dimethyl phenol	400	Organoleptic propertie
Dimethyl phthalate	313,000	
2,4-dinitro-o-cresol	13.4	
2,4-Dinitrophenol	70	
Endosulfan	74	
Endrin	1	
Ethylbenzene	1,400	
Fluoranthene	42	
Hexachlorocyclopentadiene	1.0	Organoleptic propertie
Isophorone	5,200	
Lead	50	
Mercury	0.144	
2-methyl-4-chlorophenol	1,800	Organoleptic propertie
3-methyl-4-chlorophenol	3,000	Organoleptic propertie
3-methyl-6-chlorophenol	20	
Nickel	13.4	
Nitrobenzene	30	Organoleptic propertie

TUT 001 1818

TABLE 3-4
CRITERIA BASED ON HEALTH FOR NON-CARCINOGENIC (THRESHOLD) POLLUTANTS
(Continued)

Substance	Criterion [a] (ug/l)	Comment
Pentachlorophenol	30	Organoleptic propert
Phenol	3,500	Organoleptic propert
Selenium	10	
Silver	50	
2,3,4,6-tetrachlorophenol	1.0	Organoleptic properti
Thallium	13	
Toluene	14,300	
1,1,1-trichloroethane	18,400	
2,4,5-trichlorophenol	1.0	Organoleptic propertie
Zinc	5,000	Organoleptic propertie

[a] Unless otherwise indicated, the criterion is based on ingestion of water and contaminated organisms.

TUT 001 1219

Table 7-1
Alternative Comparison Chart

Alternative	Public Acceptibility	Reliability	Maintenance	Long Term Safe Drinking Water	Implement-ation Time	Cost	Total
No Action	5	*	*	*	*	*	*
New Wells	3	1	1	4	5	4	18
Deeper Wells	3	1	1	4	5	3	17
Reverse Osmosis	3	5	5	3	5	5	25
R.O. Central Plant	3 3	5	5	3	5	3	23
Water Treatment Plant	3	3	4	3	5	3	21
Increase Cistern Volume	4	4	1	5	2	1	18
New Water Main Extension	1	1	1	1	3	4	11
Activated Carbon	2	2	4	4	2	1	16

TUT 001 1820

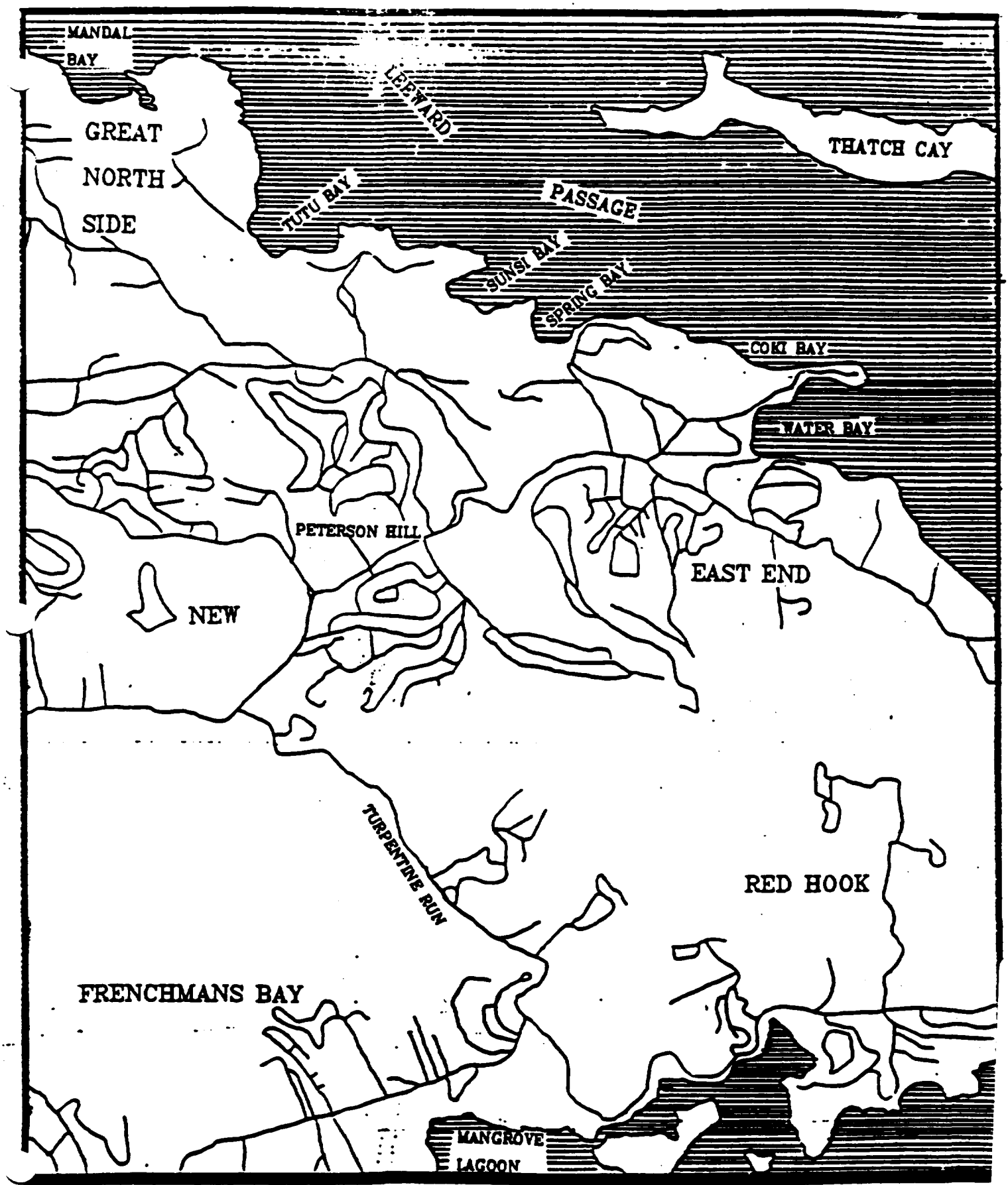
1. D.G. Jordan and O.J. Cosner; A Survey of the Water Resources of St. Thomas, Virgin Islands, United States Department of Interior, Geological Survey, 1973.

2. Lynn E. Applegate; Membrane Separation Process, Chemical Engineering, June 11, 1984.

3. AWWA, Water Quality and Treatment, Third Edition, McGraw-Hill, New York, 1971, p. 587-622.

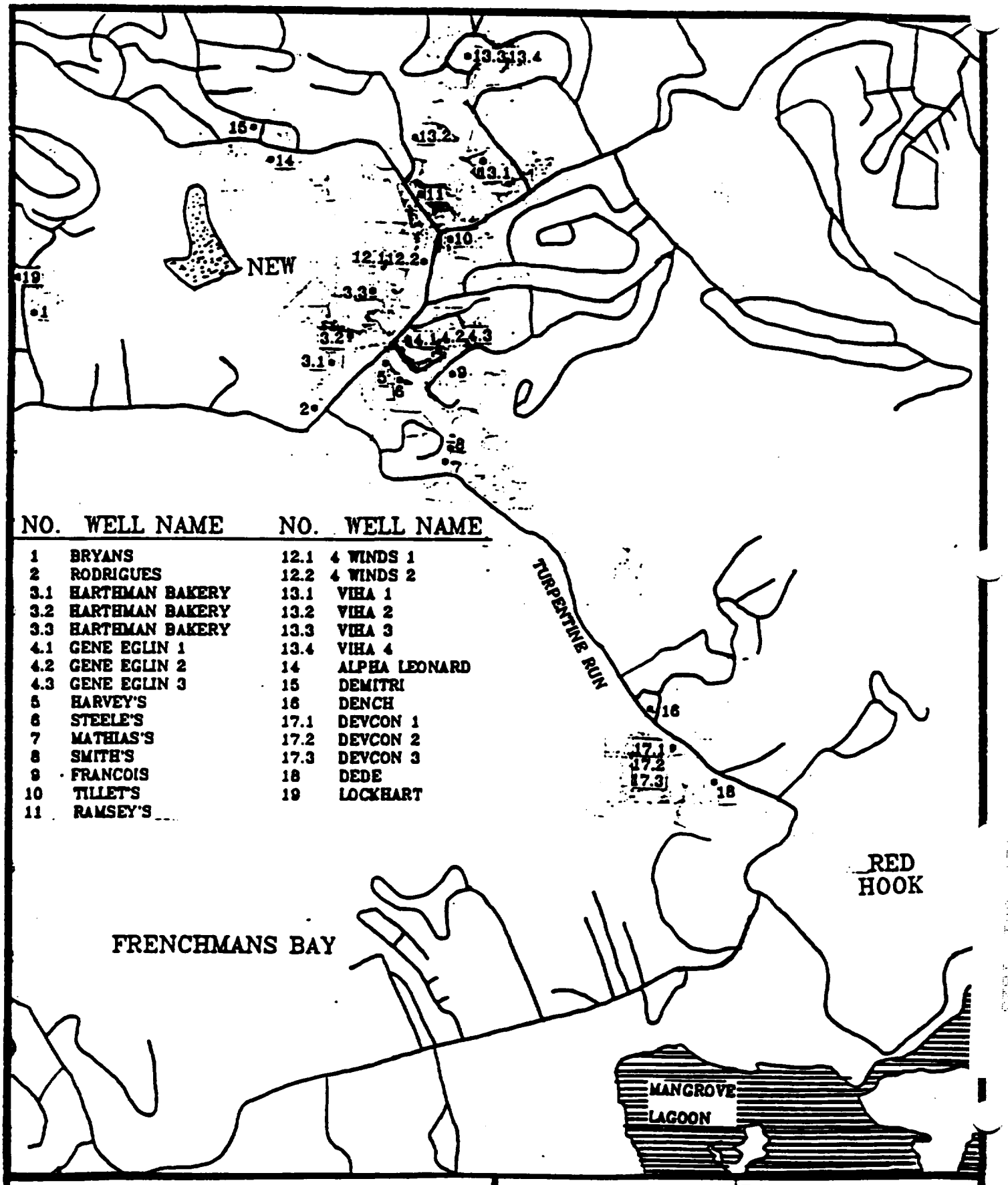
4. CH2MHill, Water Distribution Master Plan for St. Thomas, U.S. Virgin Islands, Vol. 1, December, 1983. Prepared for the Department of Public Works, Government of the Virgin Islands.

TUT 001 1821



WESTON	SPILL PREVENTION & EMERGENCY RESPONSE DIVISION	EPA PM CARLOS O'NEILL	FIGURE 2-1 SITE LOCATION MAP TUTU ST. THOMAS U.S. VIRGIN ISLAND
In Association with ICF Technology Inc., C.C. Johnson & Associates, Inc., Resource Applications, Inc., Geo/Resource Consultants, Inc., and Environmental Toxicology International, Inc.		TAT PM R. HAFNER	

001 1822



NO.	WELL NAME	NO.	WELL NAME
1	BRYANS	12.1	4 WINDS 1
2	RODRIGUES	12.2	4 WINDS 2
3.1	HARTHMAN BAKERY	13.1	VIHA 1
3.2	HARTHMAN BAKERY	13.2	VIHA 2
3.3	HARTHMAN BAKERY	13.3	VIHA 3
4.1	GENE EGLIN 1	13.4	VIHA 4
4.2	GENE EGLIN 2	14	ALPHA LEONARD
4.3	GENE EGLIN 3	15	DEMITRI
5	HARVEY'S	16	DENCH
6	STEELE'S	17.1	DEVCON 1
7	MATHIAS'S	17.2	DEVCON 2
8	SMITH'S	17.3	DEVCON 3
9	FRANCOIS	18	DEDE
10	TILLET'S	19	LOCKHART
11	RAMSEY'S		

WESTON — SPILL PREVENTION & EMERGENCY RESPONSE DIVISION

In Association with ICF Technology Inc., C.C. Johnson & Associates, Inc., Resource Applications, Inc., Geo/Resource Consultants, Inc.

EPA PM: CARLOS O'NEILL

TAT PM

FIGURE 2-2
WELL LOCATION MAP
TUTU ST. THOMAS
U.S. VIRGIN ISLAND

REFERENCE NO. 47

U.S. ENVIRONMENTAL PROTECTION AGENCY

POLLUTION REPORT

DATE: July 24, 1987

Region II
Response and Prevention Branch
Edison, New Jersey 08837

(201) 548-8730 - Commercial & FTS
24 Hour Emergency

TO: C. Daggett, EPA
S. Luftig, EPA
F. Rubel, EPA
J. Marshall, EPA
ERD Washington
(E-Mail)
USCG 7th District (mep)
G. Zachos, EPA
B. Sprague, EPA
P. Gelabert EPA
T. Taccone, EPA
A. Smith, DCCA
J. Lee, DOI
TAT

POLREP NO.	One (1)
INCIDENT/SITE NO.:	Tutu Well Site
POLLUTANT:	Gasoline
CLASSIFICATION:	Potential Major
SOURCE:	Underground gasoline storage tank
LOCATION:	Wheymouth-Rhymer Highway, Tutu St. Thomas, Virgin Islands
AMOUNT:	Unknown, greater than 100 gallons
WATER BODY:	Caribbean Sea, Altantic Ocean and Groundwater

1. SITUATION:

A. On July 16, 1987, the U.S. EPA received a request from the Department of Planning and Natural Resources (DPNR) [formally known as the Department of Conservation and Cultural Affairs (DCCA)] St. Thomas, Virgin Islands (VI) for analytical support in the sampling of several wells which were reported to exhibit a strong unpleasant odor. The wells, several of which are major well services used for distribution of the public drinking water supply, are located on the eastern end of the island in the Tutu section of Annas Retreat St. Thomas, VI.

B. The source of contamination is as of the present unknown. A suspected source is a local Texaco Station which had exhibited poor storage practices in the past. A petrotight test was conducted at this service station in the early part of July resulting in the failure of two of three tanks. Further information on the extent of tank leakage has not been forwarded to the DPNR or the U.S. EPA UST Program Director.

LIST OF APPENDICES

	APPENDIX
Action Memo	A
POLREPS	B
Well Sampling Results	C
Texaco Final Report on Soil Gas Survey, Tutu, St. Thomas U.S. Virgin Islands	D
Detailed Cost Estimates for Alternatives #3 to #9	E

TUT 001 1826

2. ACTION TAKEN:

A. On July 21, 1987, U.S. EPA and their Technical Assistance Team contractor Roy F. Weston, Inc. responded to the VI to assist the DPNR in well sampling and provide analytical services to determine the extent of contamination.

B. On July 22, 1987, samples from six wells were collected and sent to a laboratory in New Jersey for volatile organic analysis and total organic carbon content.

C. No product was discovered in the wells, therefore, no fingerprinting analysis could be performed by the USCG Coil Laboratory.

D. On Thursday, July 23, 1987, DPNR held a meeting with Texaco, to discuss an implementation schedule and work plan for the Texaco Station.

Cause Codes: (M) - Tank failure

(G) - Lack of indicator/detection equipment

3. FUTURE PLANS AND RECOMMENDATIONS:

A. U.S. EPA will forward sample results to DPNR as soon as they are received.

B. DPNR will formally notify Texaco in writing as to the proper cleanup practices to initiate at this site to ensure compliance with VI and Federal regulations.

FINAL POLREP___ (TAT) FURTHER POLREPS FORTHCOMING _X_ SUBMITTED BY: Paula A. Cammarata

Paula Cammarata, OSC
Response and Prevention Branch

DATE RELEASED: 7-31-87

B-3

U.S. ENVIRONMENTAL PROTECTION AGENCY

POLLUTION REPORT

DATE: July 31, 1987

Region II
Response and Preventive Branch
Edison, New Jersey 08837

(201) 548-8730 - Commercial & FTS
24 Hour Emergency

TO: C. Daggett, EPA
S. Luftig, EPA
R. Salkie, EPA
F. Rubel, EPA
P. Gelabert, EPA
J. Marshall, EPA
W. Sawyer, EPA
ERD Washington
(E-Mail)
J. Czapor
USCG 7th District (mep)
G. Zachos, EPA
B. Sprague, EPA
T. Taccone, EPA
A. Smith, DPNR
J. Lee, DOI
J. Zark, USGS
TAT

POLREP NO.	Two (2)
INCIDENT/SITE NO.:	Tutu Well Site
POLLUTANT:	Gasoline , Solvents, Voltile Organics
CLASSIFICATION:	Potential Major
SOURCE:	Underground Gasoline Storage Tank
LOCATION:	Wheymouth-Rhymer Highway, Tutu St. Thomas, Virgin Islands
AMOUNT:	Unknown, greater than 100 gallons
WATER BODY:	Caribbean Sea, Atlantic Ocean and Groundwater

1. SITUATION:

A. See previous polrep.

2. ACTION TAKEN:

Monday, July 27, 1987

A. USEPA arrived on St. Thomas and met with Commissioner Smith of the Department of Planning and Natural Resources (DPNR) to coordinate the weeks activities and to exchange information on the status of work accomplished from the prior week.

B. Commissioner Smith of DPNR issued an order to Texaco Caribbean, Inc. to cease tank removal activity at the Tutu Texaco Service Station located at Anna's Retreat. This order refrained the removal of tanks, soil, and/or any activity which would disturb the immediate area.

Tuesday, July 28, 1987

C. USEPA received the preliminary results from the sampling conducted on July 22, 1987.

D. USEPA met with Commissioner Smith and DPNR staff to discuss results of the sampling and to establish the next phase of activities to be accommplished.

Wednesday, July 29, 1987

E. At 1000 hours, USEPA and DPNR met with Texaco to discuss the necessary sequence of events with must be met prior to initiating excavation at the Tutu Texaco Service Station.

F. USEPA met with Commissioner Smith and DPNR staff to commence the development of the modified order to Texaco to include a Safety Plan, Sampling Plan, Action Levels and the assignment of an Operations Coordinator to work with EPA and DPNR to assure all local and federal regulations are complied with.

G. At 1000 hours, a hearing was held at the DPNR office. Representatives from DPNR, USEPA, Texaco and Tutu Water Supply were in attendance. The hearing was held to ensure that Texaco was in full understanding of the order issued on July 27, 1987 and its restrictions. Texaco stated during the hearing they would fully comply with local and federal regulations and would cooperate with DPNR. The Commissioner announced a modified order would be forthcoming with regard to the specificity of the requirements of the first order.

H. USEPA and DPNR became aware of another Texaco Service Station (Reese) located at Harwood Highway which was in the process of excavating tanks and installing new tanks due to a failed petro-tight test conducted earlier in July, 1987. Apparent local and federal regulations were violated during the inspection. The acknowledgement of apparent violations led to a meeting scheduled for Thursday morning between USEPA, DPNR and Texaco.

Thursday, July 30, 1987

I. At 1000 hours, a meeting was held at the DPNR office. Representatives from DPNR, USEPA and Texaco were in attendance. At this time, EPA requested Texaco, Corp. be notified of these concerns which were substantiated by the lack of compliance with Virgin Islands regulations displayed at numerous sites on St. Thomas.

Friday, July 31, 1987

J. EPA and DPNR contact well owners Tillett, Harthman, Eglin and Four Winds to discuss sampling results. A request for customer names who purchase their water was made. Each well owner was notified of the excess MCL levels of trichloroethylene found in their wells.

K. DPNR issued an order to Mr. Eric Tillet, President of Tutu Waters to close the Tillett well until further notice.

L. Commissioner Smith verbally requests USEPA to assume the lead on the contamination problem in the Tutu area.

M. EPA recommended DPNR to compile the following: an inventory of all wells both private and commercial, and all underground storage tanks in the Tutu area.

3. FUTURE ACTION:

EPA returns to St. Thomas to undertake the contamination problem in the Tutu area and to assume the role of lead agency.

- EPA will initiate the compilation of inventory of wells and underground storage tanks in the area to identify potential sources of contamination.
- EPA will conduct further sampling of all potential wells for contamination and to further define the extent of contaminants.
- EPA will set up additional well water sampling in the Tutu area.

FINAL POLREP_____ FURTHER POLREPS FORTHCOMING__X__ SUBMITTED BY Paula A. Cammarata

Paula A. Cammarata
On-Scene Coordinator
Response & Prevention Branch

DATE OSC RELEASED: Aug 18, 1987

B-7

U.S. ENVIRONMENTAL PROTECTION AGENCY

POLLUTION REPORT

DATE: August 8, 1987

Region II
Response and Prevention Branch
Edison, New Jersey 08837

(201) 548-8730 - Commercial & FTS
24 Hour Emergency

TO: C. Daggett, EPA
S. Luftig, EPA
R. Salkie, EPA
F. Rubel, EPA
P. Celabert, EPA
J. Marshall, EPA
ERD Washington
(E-Mail)
W. Sawyer, EPA
USCG 7th District (mep)
J. Czapor, EPA
G. Zachos, EPA
B. Sprague, EPA
T. Taccone, EPA
A. Smith, DPNR
J. Lee, DOI
J. Zark, USGS
TAT

POLREP NO. Three (3)
INCIDENT/SITE NO.: Tutu Well Site
POLLUTANT: Gasoline, Solvents, Volatile Organics
CLASSIFICATION: Major
SOURCE: Underground gasoline storage tank
LOCATION: Wheymouth-Rhymer Highway, Tutu
St. Thomas, Virgin Islands
AMOUNT: Unknown, greater than 100 gallons
WATER BODY: Caribbean Sea, Altantic Ocean
and Groundwater

1. SITUATION:

A. See previous POLREP.

2. ACTION TAKEN:

I. Monday, August 3, 1987

A. U.S. EPA arrived on St. Thomas to assist the DPNR with the drafting of orders to Water Haulers, the modification order to Texaco, and the order to well owners identified to be closed.

B. EPA and the DPNR finalized logistics for meeting with Texaco representatives on Wednesday, August 5, 1987.

C. A meeting was held with EPA, Commissioner Smith and DPNR Staff to present the status report of current events and projected schedule of EPA activities. EPA requested two people from the DPNR to be assigned to the Tutu project.

II. Tuesday, August 4, 1987

A. EPA met with DPNR staff to explain the long and short term goals and formally introduce the Tutu well contamination problem to the staff. DPNR assigned Mr. Gregory Rhymer and Mr. Leonard Reed to the TuTu project. This will enable EPA to train these individuals as OSC for future regional actions.

B. EPA recommended DPNR to develop a Task Force. The Task Force is to be comprised of WAPA, VI Housing Authority, VITEMA, Department of Health, Fire Services, Governor's Office, Public Works and Caribbean Research Institute.

C. DPNR initiated activities to identify all commercial, institutional and private wells in the Tutu area. In addition, DPNR contacted well drillers on St. Thomas for further information.

D. EPA requested assistance from U.S. Geological Survey (USGS) hydrogeologic support. EPA initiated activities for th development of a cooperative agreement with U.S. Geological Survey.

E. DPNR initiated activities to identify all underground tanks in the Tutu area.

F. DPNR initiated activities to identify all sources of contamination.

G. DPNR receives petro-tight test results from Texaco indicating Tank #1 is "grossly leaking".

III. Wednesday, August 5, 1987

A. DPNR issued a modified order to Texaco Caribbean Inc.

B. EPA developed logistics for TAT support and sampling of water, soil, sludge, product and waste oil for VOAs and PCBs.

C. Representatives from Texaco, EPA and DPNR met to discuss the issuance of the modified DPNR order which requires Texaco to submit an extensive sampling/contingency plan prior to excavation activities.

D. Task Force meeting was held at the DPNR Office. Representatives from WAPA, VITEMA, DOH, Fire Services, CRI, DPNR and EPA attended. DPW and VIHA were unable to attend.

IV. Thursday, August 6, 1987

A. EPA and DPNR met with VIHA to discuss the laboratory results on July 22, 1987. Well #1 in the Tutu area was sampled. Approximately, 7,000-8,000 people reside within the Housing Projects.

B. EPA and DPNR met with DPW to discuss the identification of alternate water supplies and the feasibility of distributing this water. DPW has only two (2) standpipes for water haulers to unload water. There is also a storage tank adjacent to the Tutu area, which has a 5.5 million gallon or 12 day reserve capacity

C. Two additional underground tanks have been identified in the Tutu area; O'Henry Dry Cleaner, and Home Oil in Ft. Milner.

D. EPA recommended that the DPN identify and contact the private well owners and suggest they not use their wells.

V. Friday, August 7, 1987

A. USGS completes preliminary assessments of wells.

B. Press release was issued to private well owners recommending they cease the use of their wells.

C. DPNR identified fourteen commercial wells, three institutional wells, six private wells, and one public well.

D. DPNR prepared orders to close the following wells: Eglin, Four Winds (Plaza Associates), Harthman, and VIHA. DPNR served order to Harthman and Eglin. Plaza Associates and VIHA cannot be reached.

E. EPA met with Asst. Commissioner Canegata to present a status report of the activities completed and to be scheduled.

VI. Saturday, August 8, 1987

A. DPNR identified ten potential and/or actual sources of contamination to the Tutu Turpentine Run Aquifer.

B. DPNR initiated the creation of a database for each well and source of contamination.

C. Seven well owners have been identified as potential alternate water suppliers.

TUT 001 1834

D. DPNR continued to identify water haulers.

E. DPNR, EPA and EPA/TAT conducted a field investigation of the Tutu area for sampling strategy.

3. FUTURE PLANS AND RECOMMENDATIONS:

A. Complete inventory of all wells in the Tutu area.

B. Complete inventory and investigation of underground storage tanks.

C. Complete listing of water haulers and their customers.

D. DOH will assess health effects with ATSDR (CDC) by setting up a survey system which would further assess the demographics and the need for examination clinics.

FINAL POLREP (TAT) ____ FURTHER POLREPS FORTHCOMING _X_ SUBMITTED BY: Carlos E O'Neill P.

Carlos O'Neill, OSC
Response and Prevention Branch

DATE RELEASED: 8-20-87

U.S. ENVIRONMENTAL PROTECTION AGENCY

B-11.

POLLUTION REPORT

DATE: August 18, 1987

Region II
Response and Prevention Branch
Edison, New Jersey 08837

(201) 548-8730 - Commercial & FTS
24 Hour Emergency

TO: C. Daggett, EPA
S. Luftig, EPA
R. Salkie, EPA
P. Rubel, EPA
P. Gelabert, EPA
J. Marshall. EPA
ERD Washington
(E-Mail)
W. Sawyer. EPA
USCG 7th District (map)
J. Czapor, EPA
G. Zachos, EPA
B. Sprague, EPA
T. Taccone, EPA
A. Smith, DPNR
J. Lee. DOI
J. Zack, USGS
TAT

POLREP NO.	Four (4)
INCIDENT/SITE NO.:	Tutu Well Site
POLLUTANT:	Gasoline, Solvents, Volatile Organics
CLASSIFICATION:	Major
SOURCE:	Underground gasoline storage tank
LOCATION:	Wheymouth-Rhymer Highway, Tutu St. Thomas, Virgin Islands
AMOUNT:	Unknown, greater than 100 gallons
WATER BODY:	Caribbean Sea, Altantic Ocean and Groundwater

1. SITUATION:

A. See previous POLREP.

2. ACTION TAKEN:

Sunday August 9, 1987

A. EPA and ATSDR met with Commissioner A. Smith of DPNR to discuss a comprehensive coordinated effort to address the problem at hand. An update of the problem was presented to the Commissioner.

B. EPA and DPNR agreed to develop a comprehensive plan to address public concerns with special emphasis in all media coverage. EPA will develop a Community Relations Plan.

C. EPA and ATSDR meet with Commissioner Smith to discuss sampling of additional water wells and introduce him to the Federal Potable Water Criteria and Guidelines.

Monday August 10, 1987

A. EPA and ATSDR meet with Commissioner Smith of the Department of Health to present an update of EPA, DPNR activities.

B. A Task Force Meeting is held to discuss current activities. A press conference is held after the task force.

C. Samples of water were collected from 24 wells in the Tutu area for volatile organic analysis. A total of 16 commercial, 7 private and 1 public well were sampled.

D. A press conference was held and broadcast over local AM Radio. The Commissioner of DPNR and a representative of EPA-OEP were interviewed on local television.

E. DPNR issue a notice to all water hauler not to haul water from Tutu area.

Tuesday August 11, 1987

A. VOA samples were shipped out via express air carrier to York Laboratories in New Jersey.

B. Photovac portable gas chromatography and chemist arrived.

C. ATSDR and VIDOH met to address health related issues. A hotline was set up for people to call about health related problems.

D. DOH notify the adoption of a 5 Point Plan to Governor Farelly:

1) Make a comprehensive medical study

2) Set up a hotline

3) Provide specialized training to doctors

4) Identify funds and resources

5) Develop an extensive follow-up examination and/or retesting.

Wednesday August 12, 1987

A. Commissioner Smith of DPNR calls for a meeting with Task Froce representatives. DPNR requests support from agencies during the removal and replacement of water from cisterns. DPNR also states that VI will soon adopt drinking water standards which may impact cisterns in the area.

B. EPA and ATSDR meet with Commissioner A. Smith to assist him in adoption of Drinking Water Standards.

C. Alternate well water sources were sampled for VOA analysis by photovac.

D. A sample was taken off the top of the well water in Tilletts well to determine if free product was present for fingerprinting. No free product was found.

E. A screening procedure for telephone requests of private cistern sampling was adopted. Priority to cisterns having received water from Tilletts well since April 1, 1987, will be given and will be sampled for VOA analysis using the photovac.

F. A meeting between EPA, TAT and DPNR was held to discuss the logistics of opening and sampling an abandoned underground gasoline storage tank located in the Fort Mylner Shopping Plaza Area.

G. Approximately 27 water haulers received orders from DPNR not to haul water from the Tutu area and to submit customer names and addresses from April 1, 1987 through July, 1987.

Thursday August 13, 1987

A. A total of 27 cisterns were sampled from three Virgin Islands Housing Authority Projects; Tutu Highrise, Donoe and Bovoni. Fifty five cisterns were identified. However, in the Donoe and Bovoni Projects several cisterns were filled from one centralized tank.

Samples taken:

Project	Sampling Points	# Of Samples
Donoe	Tank, Building #32, central	3
Tutu Highrise	All cisterns	22
Bovoni	Building D, central	2
		27

3. FUTURE PLANS AND RECOMMENDATIONS:

A. Complete inventory of all wells in the Tutu area.

B. Complete inventory and investigation of underground storage tanks.

C. Complete listing of water haulers and their customers.

D. DOH will assess health effects with ATSDR (CDC) by setting up a survey system which would further assess the demographics and examination clinics.

E. VI will establish Drinking Water Standards.

FINAL POLREP____ (TAT) FURTHER POLREPS FORTHCOMING X SUBMITTED BY: for Paula E. Cammarata

Paula Cammarata, OSC
Response and Prevention Branch

DATE RELEASED: 8-27-87

B-15

U.S. ENVIRONMENTAL PROTECTION AGENCY

POLLUTION REPORT

DATE: August 24, 1987

Region II
Response and Prevention Branch
Edison, New Jersey 08837

(201) 548-8730 - Commercial & FTS
24 Hour Emergency

TO: C. Daggett, EPA
S. Luftig, EPA
R. Salkie, EPA
F. Rubel, EPA
P. Gelabert, EPA
J. Marshall, EPA
ERD Washington
(E-Mail)
W. Sawyer, EPA
USCG 7th District (mep)
J. Csapor, EPA
G. Zachos, EPA
B. Sprague, EPA
T. Taccone, EPA
A. Smith, DPNR
J. Lee, DOI
J. Zack, USGS
B. Nelson, ATSDR
TAT

POLREP NO.	Five (5)
INCIDENT/SITE NO.:	Tutu Well Site
POLLUTANT:	Gasoline, Solvents, Volatile Organics
CLASSIFICATION:	Major
SOURCE:	Underground gasoline storage tank
LOCATION:	Wheymouth-Rhymer Highway, Tutu St. Thomas, Virgin Islands
AMOUNT:	Unknown. greater than 100 gallons
WATER BODY:	Caribbean Sea, Altantic Ocean and Groundwater

1. SITUATION:

A. See previous POLREP.

2. ACTION TAKEN:

Monday August 17, 1987

A. EPA/TAT sampling continues; 14 samples collected from 2 wells and 12 cisterns in the Tutu area. Samples analyzed VOA by photovac, no contamination detected in any of the samples.

B-16

B. EPA and [illegible] met with Texaco Caribbean Inc. and its consultant. Texaco presented their proposed action plan for Texaco Tutu Station. Several issues were discussed:

- Chain of command and decision making for field activities.
- Health and Safety Plan Strategy.
- Identification of individuals and their respective roles.
- Development of a site specific plan.

C. EPA met with ERT representative to discuss the possible use of photovac for soil sampling.

D. EPA met with DPNR Commissioner A. Smith to discuss photovac analysis results. A copy of the analysis report was given to DPNR. A summary of results are as follows: Parameters; benzene, toluene, TCE and PCE.

- Total number of wells sampled: 13
  Wells with no detectable amount: 10
  Wells with detectable amount: 3

- Total cisterns sample: 32
  Cisterns with no detectable amounts: 29
  Cisterns with detectable amounts: 3

E. USGS initiates field survey of wells in the Tutu area.

F. A total of twelve (12) waste oil samples were collated for VOA and PCB analysis. Samples will be shipped off island to a CLP Laboratory.

Tuesday August 18, 1987

A. Sampling continues; 11 cisterns sampled in the Tutu area for VOA analysis by photovac.

B. DPNR Commissioner A. Smith met with water hauler/tank truck owners in an effort to gain their cooperation to identify homeowners that had received water from the Tutu wells during the period of April through July, 1987. This will allow EPA and DPNR to schedule photovac sampling of these cisterns.

C. Resampling of wells for full GS/MS VOC's analysis completed. The following wells and cisterns were resampled:

Wells	Cisterns
St. Thomas Hospital	VIHA Building #4 Tutu
Sookran	VIHA Building #32 Donoe
Lima #6	Tillet
	VIHA Holding Tank Donoe
	Red Hook Plaza

Wednesday August 19, 1987

A. Sampling continues; 10 cisterns sampled in the Tutu area for VOA analysis by photovac.

B. Task Force meeting was held at DPNR Office. Representatives from VITEMA, DOH, Fire Service, VIHA, DPNR and EPA attended. DPW, WAPA, CRI were unable to attend. The followng issues were discussed:

- Status of EPA and DPNR activities
- Photovac test results
- DOH reported they received many phone calls asking for blood and urine tests, but less than 20 persons have gone to the assigned clinic.
- VIHA ask for guidance regarding what sampling for VOC's requirements they could impose to water vendors and well owners to access the quality of the water.

Thursday, August 20, 1987

A. Sampling continues; 10 cisterns sampled in the Tutu area for VOA analysis by photovac.

B. VIHA notifies DPNR of the existence of an old abandoned underground waste oil storage tank at their main office building in Tutu area.

Friday August 21 1987

A. Sampling continues; 9 cisterns sampled in the Tutu area for VOA analysis by photovac.

B. Fifteen water samples shipped to Martin Marietta (CLP Laboratory) for VOA analysis.

C. Commissioner Smith serves three orders to ESSO Standard Oil, Ltd: to stop work at Tutu service station; Newton's water heaters to provide a list of customers; and Plaza Associates to stop utilization of existing well.

3. <u>FUTURE PLANS AND RECOMMENDATIONS</u>:

A. DPNR will adopt drinking water standards for VOC's for well water.

B. EPA/TAT will continue sampling cisterns for photovac analysis.

C. EPA will set a cut off date for calls for sampling of cisterns of Friday, August 28, 1987.

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FURTHER
POLREPS

FINAL POLREP____ FORTHCOMING X SUBMITTED BY: Carlos E O'Neill, P.E.
(TAT)

Carlos E. O'Neill, OSC
Response and Prevention
Branch

DATE RELEASED: 08-27-87

U.S. E[illegible]RONMENTAL PROTECTION AGE[illegible]

B-19

POLLUTION REPORT

DATE: August 28, 1987

Region II
Response and Prevention Branch
Edison, New Jersey 08837

TO: C. Daggett, EPA
S. Luftig, EPA
J. Marshall, EPA
R. Salkie, EPA
F. Rubel, EPA
ERD Washington
(E-Mail)
W. Sawyer, EPA
USCG 7th District (mep)
J. Czapor, EPA
G. Zachos, EPA
B. Sprague, EPA
P. Gelabert, EPA
T. Taccone, EPA
A. Smith, DPNR
J. Lee, DOI
J. Zack, USGS
B. Nelson, ATSDR
TAT

POLREP NO.	Six (6)
INCIDENT/SITE NO.:	Tutu Well Site
POLLUTANT:	Gasoline, Solvents, Volatile Organics
CLASSIFICATION:	Major
SOURCE:	Underground gasoline storage tank
LOCATION:	Wheymouth-Rhymer Highway, Tutu St. Thomas, U.S. Virgin Islands
AMOUNT:	Unknown, greater than 100 gallons
WATER BODY:	Caribbean Sea, Atlantic Ocean and Groundwater

1. SITUATION:

A. See previous POLREP.

2. ACTION TAKEN:

Monday, August 24, 1987

A. EPA/TAT sampling continues; 16 samples collected from cisterns in the Tutu area for photovac analysis for VOA compounds.

B. DPNR Commiss[illegible]er A. Smith held a heari[illegible]ith ESSO Standard Oil Co., Ltd. regarding the order issued to Tutu ESSO Service Station not to remove underground storage tank without a previously approved action plan. ESSO explained their plan at the hearing. The plan involved visual inspection of tanks by physically entering the tanks followed by cleaning of the tanks by sandblasting. Tanks found to be in condition will be repaired and placed back into service. If leaks are detected in the tanks, additional studies of the area will be conducted to determine the extent of the release. B-2

Tuesday, August 25, 1987

A. EPA/TAT sampling continues; 9 samples collected from cisterns in the Tutu area for photovac analysis for VOA compounds.

B. EPA and DPNR staff met to discuss Texaco's work plan for soil sampling and removal of underground tanks.

C. EPA met with Commissioner Smith of DPNR to discuss well water results and to brief the Commissioner about EPA's removal program. The 175 ppb action level for tetrachloroethylene (PCE) was discussed. This action level was found to be exceeded in three (3) of twenty-four (24) wells sampled in the Tutu area. Commissioner Smith notified EPA that he will adopt the 50/100 ppb criteria (50 ppb for any single VOC or 100 ppb for total VOC's) for drinking water. EPA provided a copy of Puerto Rico's regulations to assist in drafting regulations for the U.S. Virgin Islands.

Wednesday, August 26, 1987

A. EPA and DPNR met with Texaco Caribbean, Inc. to discuss EPA/DPNR comments on Texaco's proposed work plan for soil sampling and underground tank removal at their Tutu service station. The work plan was found to be deficient in several items. A follow-up letter from EPA with both EPA and DPNR comments will be sent to Texaco. Texaco was requested to amend their work plan according to EPA/DPNR comments.

Thursday, August 27, 1987

A. EPA/TAT sampling continues; 6 samples collected from 4 cisterns, one well and one water hauler truck in the Tutu area for photovac analysis for VOA compounds.

B. EPA met with Commissioner A. Smith to develop an action plan using his personnel to assist EPA in all phases of the project (i.e. Research for well information, data entry and management, field inspections and well/cistern surveys, community notification and outreach.

B-21

A. EPA/TAT conduct well and cistern inventory questionaire for those private wells targeted for closure.

B. Photovac sampling status to date:

samples taken for photovac analysis = 135

samples analyzed by photovac as of 08/18/87 = 68

samples tested positive for the five compounds (TCE, DCE, PCE, TOL,& BEN) above the detection limit of 1 ppb = 1

samples tested positive for unknown compounds = 19

samples for GCMS confirmation = 17

C. DPNR met with private well home owners to disclose the sampling information. DPNR recommended to the home owners not to drink the well water and to keep alert of the DPNR bulletins.

D. Upon adoption of the interim regulations for VOC's in drinking water, DPNR is planning to close wells that exceed 50 ppb of any single volatile organic compound or 100 ppb for total VOC's.

E. EPA issued a news release concerning final test results for the 24 Tutu wells sampled on August 10 and 11, 1987.

3. FUTURE PLANS AND RECOMENTATIONS:

A. DPNR will adopt drinking water standards for VOC's for well water.

B. EPA will sample wells in the affected area for a complete scan (HSL+40).

C. EPA will continue sampling cisterns in the affected area for photovac analysis.

D. EPA will initiate a well monitoring program of wells in the Tutu area on a weekly basis. Samples will be analyzed using the photovac.

E. EPA is considering initiating a CERCLA action to provide water to those private well home owners with contaminated well water, if the Commissioner closes these wells.

FINAL POLREP FORTHCOMING FURTHER POLREPS

SUMITTED BY: Carlos E. O'Neill, PE

Carlos O'Neill, OSC
Response and Prevention Branch

TUT 001 1846

B-22

U.S. ENVIRONMENTAL PROTECTION AGENCY

POLLUTION REPORT

DATE: September 2, 1987

Region II
Response and Prevention Branch
Edison, New Jersey 08837

TO: C. Daggett, EPA
S. Luftig, EPA
J. Marshall, EPA
R. Salkie, EPA
F. Rubel, EPA
J. Marshall, EPA
ERD Washington
(E-Mail)
W. Sawyer, EPA
USCG 7th District (mep)
J. Czapor, EPA
G. Zachos, EPA
B. Sprague, EPA
P. Gelabert, EPA
T. Taccone, EPA
A. Smith, DPNR
J. Lee, DOI
J. Zack, USGS
B. Nelson, ATSDR
TAT

POLREP NO.	Seven (7)
INCIDENT/SITE NO.:	Tutu Well Site (1D)
POLLUTANT:	Solvents, Volatile Organics
CLASSIFICATION:	Major
SOURCE:	Dry Cleaner
LOCATION:	Wheymouth-Rhymer Highway, Tutu St. Thomas, U.S. Virgin Islands
AMOUNT:	Unknown, greater than 100 gallons
WATER BODY:	Caribbean Sea, Atlantic Ocean and Groundwater

1. SITUATION:

A. See previous POLREP.

2. ACTION TAKEN:

Monday, August 31, 1987

A. EPA/TAT sampling continues; 3 samples collected from water haulers in the Tutu area for photovac analysis for VOA compounds.

B-23

B. EPA/TAT continue making arrangements for moving the office to the VITEMA Fort Christian office in Charlotte Amalie.

C. EPA discussed well/cistern questionnaire results with Commissioner of DPNR to decide on advisory letters to be sent to well owners. Also discussed were the drinking water standards to be adopted by DPNR. A standard of 50 ppb for a single volatile organic compound and a standard of 100 ppb for total volatile organic compounds will be adopted by DPNR. This standard will be applied to the Turpentine Run Aquifer and will be effective until December 31, 1988.

D. DPNR Commissioner A. Smith decided to close 5 additional wells. These wells exceeded the proposed V.O.C. levels for drinking water to be adopted.

Tuesday, September 1, 1987

A. At 10:20 hours EPA - OSC received a verbal approval from S. Luftig and Bruce Sprague for a $100,000 removal action at Tutu Well site for:

i) Cisterns cleaning and decontamination.

ii) Disposal of contaminated water.

iii) Rearrangement of cistern plumbing.

iv) Supply water on a regular basis.

v) Establish a well montoring program.

The breakdown of total project cost is as follows:

Mitigation Cost(ERCS)-	$40,000
TAT Cost-	$45,000
EPA Cost-	$15,000
TOTAL PROJECT COST	$100,000

B. Photovac sampling status to date:

samples taken for photovac analysis = 158

samples analyzed by photovac as of 09/01/87 = 151

samples tested positive for any of the five compounds (TCE, DCE, PCE, TOL, & BEN) above the detection limit of 1 ppb = 5

B-24

samples tested positive for unknown compounds = 26

samples for GCMS confirmation = 15

C. Monitoring of the 24 wells in the Turpentine Run Aquifer was initiated and will continue on a monthly basis. Samples were collected from ten wells and will be analyzed by the photovac to determine changes in the concentrations of contaminants in the groundwater.

D. Samples were collected from four(4) cisterns that had previously received water from contaminated wells.

E. At 12:45 hours ERCS was activated to provide services and equipment as specified by the OSC concerning the decontamination of the cisterns and the supply of temporary alternate water sources.

F. DPNR Commissioner A. Smith signed an administrative order adopting drinking water contaminat levels to be applied to the Turpentine Run aquifer.

Wednesday, September 2, 1987

A. At 8:00 hours ERCS subcontractor representative, Clear Ambient arrived at DPNR. EPA required Clear Ambient to be on site to inspect the cisterns to be cleaned.

B. EPA/TAT attended a meeting with the Task Force Committee on the Tutu Well Site. The task force committee members present at this meeting were from EPA, DPNR, University of Virgin Islands, Department of Public Works, VITEMA, VI Housing Authority, Department of Health & Office of the Governor. The meeting addressed the closing of contaminated water wells, the resources needed to clean the cisterns and a means of providing clean water to these residents. Task Force identified Fire Service and the Department of Public Works as those that may provide assistance and/or resources to clean the targeted cisterns. EPA will met with Fire Service and Dept. of Public Works to determine availability of equipment and resources.

C. TAT/DPNR continue to conduct sampling of the 24 wells under the well monitoring program established by EPA during the week of August 24, 1987.

D. EPA/DPNR and the subcontractor hired by ERCS, conducted inspections of the cisterns that will require decontamination.

3. FUTURE PLANS AND RECOMENTATIONS:

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A. EPA/TAT will sample wells in the affected area for a complete scan (HSL+40).

B. EPA/TAT will continue sampling cisterns in the affected area for photovac analysis using water haulers clients list.

C. EPA/TAT will continue a well monitoring program of wells in the Tutu area on a monthly basis. Samples will be analyzed using the photovac.

D. EPA will initiate the cleaning of contaminated cisterns and will provide clean water by tank trucks on a regular basis.

4. FINANCIAL ACCOUNTING:

A.	Total Project Ceiling Authorized	$ 100,000
B.	Total Funds Authorized for Mitigation for Mitigation Contracts 68-01-7445	$ 40,000
C.	Expenditures for Mitigation Contracts	
	1.a. Amount Obligated to DCN KCS 112	$ 30,000
	1.b. Estimated Expenditures as of 02/09/87	$_____
	1.c. Balance remaining	$_____
D.	Unobligated Balance Remaining	$_____
E.	Estimate of Total Exenditures to Date for all Mitigation Contracts	$_____
F.	Other Extramural Costs	
	1.a. TAT Salary/travel/expenses	$_____
G.	Intramural Removal Costs	
	1.a. EPA travel and salaries	$_____
H.	Total Expenditures % of $2 Million	$_____ _____%
I.	Percentage of Total Project Ceiling	_____%

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FINAL POLREP____ FURTHER POLREPS FORTHCOMING X SUBMITTED BY: Carlos E O'Neill

Carlos O'Neill, OSC
Response and Prevention
Branch

DATE RELEASED: Sept. 2, 1987

B-27

U.S. E[illegible]ONMENTAL PROTECTION AGEN

POLLUTION REPORT

DATE: September 4, 1987

Region II
Response and Prevention Branch
Edison, New Jersey 08837

TO: C. Daggett, EPA
S. Luftig, EPA
J. Marshall, EPA
R. Salkie, EPA
F. Rubel, EPA
J. Marshall, EPA
ERD Washington
(E-Mail)
W. Sawyer, EPA
USCG 7th District (mep)
J. Czapor, EPA
G. Zachos, EPA
B. Sprague, EPA
P. Gelabert, EPA
T. Taccone, EPA
A. Smith, DPNR
J. Lee, DOI
J. Zack, USGS
B. Nelson, ATSDR
TAT

POLREP NO.	Eight (8)
INCIDENT/SITE NO.:	Tutu Well Site (1D)
POLLUTANT:	Solvents, Volatile Organics
CLASSIFICATION:	Major
SOURCE:	Dry Cleaners, Auto Repair Shops
LOCATION:	Wheymouth-Rhymer Highway, Tutu St. Thomas, U.S. Virgin Islands
AMOUNT:	Unknown, greater than 100 gallons
WATER BODY:	Caribbean Sea, Atlantic Ocean and Groundwater

1. SITUATION:

A. See previous POLREP.

2. ACTION TAKEN:

Thursday, September 3, 1987

A. EPA/TAT continues photovac analysis for VOA on well samples collected Wednesday, September 2, 1987.

B. EPA has projected to complete the removal action at the Tutu Well Site by Friday, September 11, 1987. This includes:

i) cleaning and decontamination of the cisterns;

ii) disposal of the contaminated water;

iii) rearrangement of cistern plumbing where necessary;

iv) supplying water on a regular basis; and

v) establishing a well montoring program.

The breakdown of total monies allocated for this removal is as follows:

Mitigation Cost(ERCS)-	$40,000
TAT Cost-	$45,000
EPA Cost-	$15,000
TOTAL PROJECT ALLOCATION	$100,000

C. Photovac sampling status to date:

# samples taken for photovac analysis	= 183
# samples analyzed by photovac as of 09/04/87	= 183
# samples tested positive for any of the five compounds (TCE, DCE, PCE, TOL, & BEN) above the detection limit of 1 ppb	= 10
# samples tested positive for unknown compounds	= 26
# samples for GCMS confirmation	= 15

D. EPA/TAT completes initial phase of well monitoring program which includes collection of samples from 24 wells.

E. EPA and ERCS subcontractor inspected all cisterns to be cleaned and decontaminated during the week of September 8, 1987.

F. DPNR, Department of Health and EPA conducted a meeting with the owners of the contaminated wells and their tenants. DPNR announced that a total of five wells

would be closed. Three owners received orders to close their wells and two received advisory letters to close their wells effective Friday, September 4, 1987.

The tenants and well owners had the opportunity to discuss any health related issues with representatives from the Department of Health.

Friday, September 4, 1987

A. EPA/TAT has complete the cistern sampling effort for photovac analysis for VOA.

B. EPA/TAT has completed photovac analysis on all samples collected as of this date, Friday, September 4, 1987.

C. EPA met Commissioner A. Smith to discuss the removal activities to be carried out during the week of September 8, 1987.

D. EPA released a news bulletin to the press regarding its removal activities in the Tutu Well Site.

E. EPA and ERCS Subcontractor developed a work schedule to initiate cisterns clean up activities by Tuesday, September 8, 1987.

3. FUTURE PLANS AND RECOMENTATIONS:

A. EPA/TAT will sample wells in the affected area for a complete scan (HSL+40).

B. EPA/TAT will continue a well monitoring program of wells in the Tutu area on a monthly basis. Samples will be shipped to Edison, N.J. and analyzed using the photovac.

C. The subcontractor hired by ERCS will initiate the cleaning of the contaminated cisterns following the procedure outlined by EPA/TAT and will provide clean water by tank trucks on a regular basis.

D. DPNR will compile background information on all wells in the Turpentine Run Area before EPA conducts further action.

E. DPNR will complete report on potential sources of contamination in the Turpentine Run Aquifer.

4. FINANCIAL ACCOUNTING:

A.	Total Project Ceiling Authorized	$	100,000.00
B.	Total Funds Authorized for Mitigation for Mitigation Contracts 68-01-7445	$	40,000.00
C.	Expenditures for Mitigation Contracts		
	1.a. Amount Obligated to DCN KCS 112	$	30,000.00
	1.b. Estimated Expenditures as of 09/03/87	$	935.05
	1.c. Balance remaining	$	29,064.95
D.	Unobligated Balance Remaining	$	10,000.00
E.	Estimate of Total Exenditures to Date for all Mitigation Contracts	$	935.05
F.	Other Extramural Costs		
	1.a. TAT Salary/travel/expenses	$	2,015.00
G.	Intramural Removal Costs		
	1.a. EPA travel and salaries	$	940.00
H.	Total Expenditures	$	3890.05
	% of $2 Million		0.02 %
I.	Percentage of Total Project Ceiling		3.90 %

FINAL POLREP_____ FURTHER POLREPS FORTHCOMING X SUBMITTED BY: Carlos E. O'Neill

Carlos O'Neill, OSC
Response and Prevention
Branch

DATE RELEASED: Sept. 8, 1987

B.3

U.S. ENVIRONMENTAL PROTECTION AGENCY

POLLUTION REPORT

DATE: September 18, 1987

Region II
Response and Prevention Branch
Edison, New Jersey 08837

TO: C. Daggett, EPA
S. Luftig, EPA
J. Marshall, EPA
R. Salkie, EPA
F. Rubel, EPA
ERD Washington (E-Mail)
W. Sawyer, EPA
USCG 7th District
J. Czapor, EPA
G. Zachos, EPA
B. Sprague, EPA
P. Gelabert, EPA
T. Taccone, EPA
A. Smith, DPNR
J. Lee, DOI
J. Zack, USGS
B. Nelson, ATSDR
TAT
A. PRASCHAK, EPA

POLREP NO.:	Nine (9)
INCIDENT/SITE NO.:	Tutu Well Site
POLLUTANT:	Solvents, Volatile Organics
CLASSIFICATION:	Major
SOURCE:	Dry Cleaners
LOCATION:	Wheymouth-Rhymer Highway, Tutu St. Thomas, U.S. Virgin Islands
AMOUNT:	Unknown, greater than 100 gallons
WATER BODY:	Caribbean Sea, Atlantic Ocean and Groundwater

1. SITUATION:

A. See previous POLREP

2. ACTION TAKEN:

Tuesday, September 8, 1987

A. ERCS subcontractor starts cleanup of contaminated cisterns. Cleanup procedure is as follows: cistern is drained, washed with a pressure hose, disinfected with a chlorine solution and filled with drinking water from the desalt plant.

B 32

B. Equipment breakdown slows cistern cleanup activity. ERCS subcontractor completes the cleanup of two chambers of a five chamber cistern at Steele apartments.

C. A report on water haulers was prepared.

D. Database on photovac sampling results finished.

E. EPA/ERCS Met with Chuck Klim, a water hauler selected by Clear Ambient, to discuss the water delivery procedure.

Wednesday September 9, 1987

A. ERCS subcontractor finished cleaning the three remaining chambers of Steeles cistern and cleaned Harvey's cistern.

B. A map showing wells locations and possible responsible parties in the Turpentine Run aquifer area was prepared.

C. DPNR continues preparing a report on potential sources of contamination in the Turpentine Run aquifer area.

D. Data entry on well inventory data base continues.

Thursday September 10, 1987

A. ERCS subcontractor finished the cleanup of the two remaining cisterns at Steele's apartments.

B. A sampling plan for HSL was prepared.

Friday September 11, 1987

A. ERCS subcontractor finished cleaning the two chambers at Smith's cisterns.

B. DPNR finishes report on potential responsible parties (PRP).

C. Databases on wells, PRP's and photovac final results finished.

D. EPA met with Commissioner A. Smith to report all accomplishments so far and to brief him on EPA's future activities.

B 23

E. EPA developed a procedure and written instructions for well owners on how to request water for their cisterns.

Saturday, September 12, 1987

A. EPA/ERCS met with Chuck Klim to discuss the procedures on how to provide and deliver water to qualified well owners.

B. EPA met with each well owner to give them written instructions on how to request water. Each owner received a package of instructions and their questions were answered.

3. FUTURE PLANS AND RECOMMENDATIONS

A. EPA/TAT/DPNR will sample wells in the affected area for a complete scan (HSL+40).

B. EPA/TAT/DPNR will continue a well monitoring program of wells in the Tutu area on a monthly basis. Samples will be shipped to Edison, N.J. and analysed for VOC's using the photovac.

C. EPA will continue enforcement activities to identify potential responsible parties.

4. FINANCIAL ACCOUNTING

A.	Total Project Ceiling Authorized	$100,000.00
B.	Total Funds Authorized for Mitigation for Mitigation Contracts 68-01-7445	$ 30,000.00
C.	Expenditures for Mitigation Contracts	
	1.a Amount obligated to DCN KCS 112	$ 30,000.00
	1.b Estimated Expenditures as of 09/12/87	$ 13,283.25
	1.c Balance Remaining	$ 16,716.75
D.	Unobligated Balance Remaining	$ 10,000.00
E.	Estimate of Total Expenditures to Date for all Mitigation Contracts	$ 13,283.25

Caroline

B 34

E-1

U.S. ENVIRONMENTAL PROTECTION AGENCY

POLLUTION REPORT

DATE: August 15, 1988

Region II
Caribbean Field Office
Santurce, Puerto Rico 00910
and
Response and Prevention Branch
Edison, New Jersey 08837

TO: W. Muszynski, EPA
S. Luftig, EPA
R. Salkie, EPA
J. Marshall, EPA
M. Randall, EPA
C. Simon, EPA
R. Caspe, EPA
P. Gelabert, EPA
B. Sprague, EPA
G. Zachos, EPA
J. Czapor, EPA
W. Sawyer, EPA
E. Schaaf, EPA
T. Taccone, EPA
C. Kwan, EPA
ERD Washington
(E-Mail)
USCG 7th District
(mep)
J. Lee, DOI
J. Zack, USGS
B. Nelson, ATSDR
K. Silver, FDA
K. Mannion, OSHA
S. Gray, FEMA
A. Smith, DPNR
TAT

POLREP NO.	Twelve (12)
INCIDENT/SITE NO.:	Tutu Well Site
POLLUTANT:	Volatile organic compounds
CLASSIFICATION:	Major
SOURCE:	Unknown
LOCATION:	Wheymouth-Rhymer Highway, Tutu St. Thomas, U.S. Virgin Islands
AMOUNT:	Unknown, greater than 100 gallons
WATER BODY:	Caribbean Sea, Atlantic Ocean and Groundwater

1. SITUATION:

A. See previous POLREP.

2. ACTION TAKEN:

JULY, 1988:

A. EPA continues to provide water to the residents of the Steele's, Harvey's and Smith's apartments via tank trucks.

AUGUST, 1988

A. EPA continues to provide water to the residents of the Steele's, Harvey's and Smith's apartments via tank trucks.

B. On August 1-2, 1988 samples from 23 of the 24 wells located in the Turpentine run basin were collected under the quarterly sampling program. Samples were sent to the Edison TAT office for analysis using the Photovac field chromatograph.

C. Wellwater samples were analyzed on August 5-12, 1988. VOC results rceived from TAT for the August 1988 sampling period show the following:

i) Perchloroethylene (PCE) levels in the affected wells ranged from less than 1 part per billion (ppb) to greater than 1000 ppb at Harvey's well. No new wells are affected.

ii) Trichloroethylene (TCE) levels in the wells ranged from less than one ppb to 40 ppb in Francois well.

iii) Benzene ranged from less than 1 ppb to greater than 1000 ppb in Tillet's well.

iv) Toluene ranged from less than one ppb to 110 ppb in Tillet's well.

3. FUTURE ACTIONS AND RECOMENDATIONS

A. EPA will continue its enforcement investigation and negotiation with responsible parties.

B. The OSC will request a time exemption to allow EPA to continue to provide water to the residents of the Steele's, Harvey's and Smith's apartments. The OSC will request additional trust funds for the continuation of this removal activity. An estimated additional $100,000.00 will be requested.

C. EPA will continue to search for a permanent alternative for drinking water supply to the affected well owners. A draft report dated May, 1988 proposes as a permanent alternative the extension of a water main to the affected area. The total project cost is estimated to be $625,000.00 for which $426,000.00 would be for mitigation contracting.

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4. FINANCIAL ACCOUNTING

A.	Total Project Ceiling Authorized	$100,000.00
B.	Total Funds Authorized for Mitigation for Mitigation Contracts 68-01-7445	$40,000
C.	Expenditures for Mitigation Contracts	
	1.a Amount obligated DCN KCS 112 (09/87)	$30,000
	DCN KE0 081 (05/88)	$10,000
	1.b Estimated Expenditures as of 06/88	$25,438.01
	1.c Balance Remaining	$15,561.99
D.	Unobligated Balance Remaining	$0
E.	Estimate of Total Expenditures to Date for all Mitigation Contracts	$25,438.01
F.	Other Extramural Costs	
	1.a. TAT Salary/travel/expenses for TDD 8710-07 as of 07/29/88	$37,382.89
G.	Intramural Removal Costs	
	1.a. EPA travel and salaries 06/88	$7,285.00
H.	Total Expenditures	$70,105.90
	% of $2 Million	0.035%
I.	Percentage of Total Project Ceiling	70.1%

FINAL POLREP: _____

FURTHER POLREPS FORTHCOMING: X

SUBMITTED BY: Carlos E. O'Neill, P.E.

Carlos E. O'Neill, OSC
Caribbean Field Office
and
Response and Prevention
Branch

DATE RELEASED: AUG 26 1988

B-39

U.S. ENVIRONMENTAL PROTECTION AGENCY

POLLUTION REPORT

DATE: December 21, 1988

Region II
Caribbean Field Office
Santurce, Puerto Rico 00910
and
Response and Prevention Branch
Edison, New Jersey 08837

TO: W. Muszynski, EPA
S. Luftig, EPA
R. Salkie, EPA
M. Randall, EPA
C. Simon, EPA
R. Caspe, EPA
P. Gelabert, EPA
B. Sprague, EPA
G. Zachos, EPA
R. Basso, EPA
W. Sawyer, EPA
E. Schaaf, EPA
T. Taccone, EPA
C. Kwan, EPA
ERD Washington
(E-Mail)
USCG 7th District
(mep)
NRC
J. Lee, DOI
J. Zack, USGS
B. Nelson, ATSDR
K. Silver, FDA
K. Mannion, OSHA
L. Testa, FEMA
A. Smith, DPNR
TAT

POLREP NO.	Thirteen (13)
INCIDENT/SITE NO.:	Tutu Well Site
POLLUTANT:	Volatile organic compounds
CLASSIFICATION:	Major
SOURCE:	Unknown
LOCATION:	Wheymouth-Rhymer Highway, Tutu St. Thomas, U.S. Virgin Islands
AMOUNT:	Unknown, greater than 100 gallons
WATER BODY:	Caribbean Sea, Atlantic Ocean and Groundwater

1. SITUATION:

A. See previous POLREP.

2. ACTION TAKEN:

SEPTEMBER, 1988:

A. EPA continues to provide water to the residents of the Steele's, Harvey's and Smith's apartments via tank trucks.

OCTOBER, 1988

A. EPA continues to provide water to the residents of the Steele's, Harvey's and Smith's apartments via tank trucks.

NOVEMBER, 1988

A. On November 14 - 16, 1988, samples from 18 of the 24 wells located in the Turpentine run basin were collected under the quarterly sampling program. Samples were sent to a private laboratory for TCL analysis for volatile organics and metals. Samples were also sent to the Edison TAT office for analysis using the Photovac field chromatograph.

B. Wellwater samples analysis results should be available in six weeks.

C. EPA continues to provide water to the residents of the Steele's, Harvey's and Smith's apartments via tank trucks.

DECEMBER

A. EPA continues to provide water to the residents of the Steele's, Harvey's and Smith's apartments via tank trucks.

3. FUTURE ACTIONS AND RECOMENDATIONS

A. EPA will continue its quarterly monitoring program.

B. EPA will continue its enforcement investigation and negotiation with responsible parties.

C. EPA will continue to search for a permanent alternative for drinking water supply to the affected well owners. A draft report dated May, 1988 proposes as a permanent alternative the extension of a water main to the affected area. The total project cost is estimated to be $625,000.00 for which $426,000.00 would be for mitigation contracting.

D. EPA will continue to provide water to the residents of the Steele's, Harvey's and Smith's apartments.

U.S. ENVIRONMENTAL PROTECTION AGENCY Caribe

POLLUTION REPORT

DATE: January 10, 1990

Region II
Caribbean Field Office
Sanjuce, Puerto Rico 00910
and
Response and Prevention Branch
Edison, New Jersey 08837

TO S. Luftig, EPA
R. Salkie, EPA
M. Randol, EPA
W. Mugdan, EPA
G. Pavlou, EPA
W. Sawyer, EPA
E. Schaaf, EPA
J. Frisco, EPA
W. Andrews, EPA
R. Caspe, EPA
B. Sprague, EPA
P. Gelabert, EPA
S. Rohena, EQB
ERD Washington
(E mail)
USCG 7th District
(mep)
J. Anderson, HHS
C. Mannion, OSHA
J. Lee, DOI
M. Chivinski, FEMA
J. Zack, USGS
E. Nelson, ATSDR
K. Silver, FDA
A. Smith, DPNR
Caribbean RRT
TAT

POLREP NO.	Fifteen (15)
INCIDENT/SITE NO.:	Tutu Well Site
POLLUTANT:	Volatile organic compounds
CLASSIFICATION:	Major
SOURCE:	Unknown
LOCATION:	Wheymouth-Rhymer Highway, Tutu St. Thomas, U.S. Virgin Islands
AMOUNT:	Unknown, greater than 100 gallons
WATER BODY:	Caribbean Sea, Atlantic Ocean and Groundwater

1. SITUATION:

A. See previous POLREP.

TUT 001 1864

C. ACTION TAKEN:

April, 1989:

A. EPA continued to provide water to the residents of the Steele's, Harvey's and Smith's apartments via tank trucks.

May, 1989

A. On May 8-10, 1989, samples from 18 of the 24 wells located in the Turpentine Run basin were collected under the quarterly sampling program. Samples were sent to the Edison TAT office for analysis using the Photovac field gas chromatograph.

B. EPA continues to provide water to the residents of the Steele's, Harvey's and Smith's apartments via tank trucks.

June, 1989

A. Results of the analyses of the samples collected during May 8-10, 1989, were delivered to EPA. Results were as follows:

1. TCE was detected in 12 wells in concentrations ranging from 93 to 3 ug/l.

2. PCE was detected in 10 wells in concentrations ranging from 967 to 7 ug/l.

3. DCE was detected in 6 wells in concentrations ranging from 87 to 2 ug/l.

4. Benzene was detected in one well, Tillet, at a concentration of 680 ug/l.

5. Toluene was detected in 2 wells, Tillet and Dench, with concetrations of 24 ug/l and 41 ug/l respectively.

B. DCE was again detected in the Dench well at a concentration of 3 ug/l. This well did not show the presence of any contaminants when the removal action began. But, during the past three sampling periods, DCE sometimes showed up in trace amounts. This may indicate movement of the contaminant plume.

C. EPA continues to provide water to the residents of the Steele's, Harvey's and Smith's apartments via tank trucks.

July, 1989

A. EPA continues to provide water to the residents of the Steele's, Harvey's and Smith's apartments via tank trucks.

August, 1989

A. On August 1-2, 1989, samples from 14 of the 24 wells located in the Turpentine Run basin were collected under the

TUT 001 1865

monthly sampling program. Samples were sent to the Edison TAT office for analysis using the Photovac field gas chromatograph.

2. EPA continues to provide water to the residents of the Steele's, Harvey's and Smith's apartments via tank trucks.

September, 1989

A. Results of the analyses of the samples collected during August 1-2, 1989, were delivered to EPA. Results were as follows:

1. TCE was detected in the 14 wells in concentrations ranging from 280 to <1 ug/l.

2. PCE was detected in 6 wells in concentrations ranging from >1000 to 13 ug/l.

3. DCE was detected in 8 wells in concentrations ranging from 2 to <1 ug/l.

4. Benzene was detected in 3 wells in concentrations ranging from >1000 to 3 ug/l.

5. Toluene was detected in one well, Dench, at a concetration of <1 ug/l.

B. Results of the August sampling again show the presence of one or more of the tested compounds (TCE, DCE, PCE, benzene and toluene) in the Dench, Devcon and Dede wells. This situation may be due to migration of the contaminant plume. These wells did not show any trace of the mentioned chemicals when the removal action began. The highest concentration was found in Dench well with 15 ug/l of benzene.

C. EPA continues to provide water to the residents of the Steele's, Harvey's and Smith's apartments via tank trucks.

D. Hurricane Hugo struck the Virgin Islands on September 18, 1989. The hurricane affected various wells. Harvey well suffered major damages and cannot be sampled. Bryan well suffered slight damages to its control equipment. It is expected to be back in service for the february 1990 sampling. The status of the Demitris well after the hurricane is unknown.

October, 1989

A. EPA continues to provide water to the residents of the Steele's, Harvey's and Smith's apartments via tank trucks.

November, 1989

A. EPA continues to provide water to the residents of the Steele's, Harvey's and Smith's apartments via tank trucks.

December, 1989

A. EPA continues to provide water to the residents of the Steele's, Harvey's and Smith's apartments via tank trucks.

B. On December 4-5, 1989, samples from 14 of the 24 wells located in the Turpentine Run basin were collected under the quarterly sampling program. Samples were sent to the Edison TAT office for analysis using the Photovac field gas chromatograph.

3. FUTURE ACTIONS AND RECOMMENDATIONS

A. EPA will continue its quarterly monitoring program.

B. EPA will continue its enforcement investigation and negotiation with responsible parties.

C. EPA will continue the evaluation of the feasibility report on the installation of the water main to the affected parties.

D. EPA will continue to provide water to the residents of the Steele's, Harvey's and Smith's apartments.

4. FINANCIAL ACCOUNTING

A. Total Project Ceiling Authorized		$135,000.00
B. Total Funds Authorized for Mitigation Contracts 68-01-7445		$ 80,000
C. Expenditures for Mitigation Contracts		
1.a Amount obligated DCN KCS 112 (09/87)		$ 30,000
DCN KEC 091 (05/88)		$ 10,000
DCN KEC 164 (09/89)		$ 40,000
SUBTOTAL		$ 80,000
1.b Estimated Expenditures as of 1/90		$ 34,089.21
1.c Balance Remaining		$ 45,910.79
D. Unobligated Balance Remaining		$0
E. Estimate of Total Expenditures to Date for all Mitigation Contracts		$ 34,089.21

TUT 001 1867

F. Other Extramural Costs

1.a. TAT Salary/travel/expenses	
for TDD 8709-10	$ [illegible]
for TDD 8710-07	$ [illegible]
for TDD 8810-63	$ 29,762.87
for TDD 8810-63A	$ [illegible]
for TDD 8909-07 as of 01/05/90	$ [illegible]
SUB TOTAL	$[illegible]

G. Intramural Removal Costs

1.a. EPA travel and salaries 3/89	$ 10,425.00

H. Total Expenditures	$165,474.00
% of $2 Millions	8.3%

I. Percentage of Total Project Ceiling	84.9%

FINAL POLREP: _____, FURTHER POLREPS FORTHCOMING: ✓

SUBMITTED BY: Luis E. Santos
Luis E. Santos, OSC
Caribbean Field Office &
Response and Prevention
Branch

DATE RELEASED: Jan 23, 1990.

TUT 001 1868

REFERENCE NO. 48

CDM FEDERAL PROGRAMS CORPORATION

April 20, 1990

Ms. Caroline Kwan
EPA Primary Contact
U.S. Environmental Protection Agency
26 Federal Plaza
New York, New York 10278

Project: TES V, EPA contract No. 68-W9-0002

Work Assignment: C02048 Tutu Wellfield

Subject: Chronology of Events and FPC Oversight through March, 1990
Tutu Wellfield, St. Thomas,
U.S. Virgin Islands

Dear Ms. Kwan:

Enclosed is a chronological summary of significant events and FPC oversight at the Tutu Wellfield Site. Because this work assignment encompasses so many different investigations occurring over several years and involving different PRPs, we felt it was appropriate to take inventory of the project status before this year's activities are in full swing.

If you have any questions regarding this information or additional events that you wish to insert, please do not hesitate to call me.

Very truly yours,

CDM Federal Programs Corporation

Scott Graber
TES V Regional Manager

SG/so

cc: S. Odland, FPC NY
NYC File

TUT 001 1870

CHRONOLOGY OF EVENTS AND FPC OVERSIGHT THROUGH MARCH, 1990 AT THE TUTU WELLFIELD SITE ST. THOMAS, U.S. VIRGIN ISLANDS

INTRODUCTION

In the summer of 1987, volatile and chlorinated hydrocarbons were discovered in a number of water wells in the Tutu area of St. Thomas, Virgin Islands, indicating contamination of the upper Turpentine Run Basin aquifer. Under TES III (CERCLA), the EPA contracted FPC to oversee sampling by potentially responsible parties (PRPs) and to review their work plans and final reports. The initial PRPs have since been determined and, under TES V, FPC is continuing to review PRP documents and oversee PRP investigations of the extent of contamination.

CHRONOLOGY

1983

June — In a water quality survey undertaken for the Virgin Islands Department of Conservation and Cultural Affairs (DCCA), Geraghty and Miller discovered high levels of PCE in a Virgin Islands Housing Authority (VIHA) well in the Tutu area. They recommended a water sampling program in the area to determine the extent of contamination.

1987

Jul 15 — The Virgin Islands Department of Planning and Natural Resources (DPNR) requested EPA assistance in sampling a commercial water supply well (the Tillet well) in the Tutu area, where a strong petroleum odor had been noted.

July — 2 of 3 USTs at the Texaco Tutu station failed Petro-tite leak-detection tests.

Jul 23 — DPNR EPA issued Administrative Order on Consent to Texaco to investigate the release of petroleum and refrain from disturbing the area.

Jul 27 — DPNR EPA ordered Texaco to cease tank removal activity.

Jul 31 — DPNR ordered the Tillet well closed. EPA became the lead agency on the site.

Jul-Sep — Weston sampled over 100 water wells in the Tutu area for the DPNR. Hydrocarbons and volatile organic compounds (including DCE, TCE, PCE, toluene and benzene) as well as zinc and lesser amounts of arsenic and selenium metals were found in the subsequent analyses. Contaminated wells were closed and water delivered to the residents. Monitoring continued on 24 wells.

TUT 001 1871

Aug 5 EPA issued Amended Administrative Order on Consent to Texaco ordering them to submit a Sampling/Contingency Plan prior to tank excavation.

Aug 8 DPNR identified 10 potential and/or actual sources of contamination (including Tutu Texaco, Tutu Esso, Consolidated Auto Parts, Ramsay Motors, VI Housing Authority, O'Henry Cleaners, and the Department of Education - formerly LAGA - building).

Aug 19 Original Action Plan for Texaco Tank Removal and Soil Sampling submitted to EPA by Lebron Associates.

Sep 1 EPA received approval to use $100,000 in CERCLA funds for mitigation of Tutu contamination.

Sep 14 CDM Federal Programs Corporation (FPC) received an EPA contract for work assignment 648, oversight of PRP activities in the Tutu Wellfield.

Sep 17 EPA issued Administrative Order on Consent to Esso to investigate the release of petroleum and refrain from disturbing the area.

Oct 14 Texaco submitted Work Plan for Soil Gas Survey at the Tutu Texaco Station.

Oct 20 Esso submitted Proposed Investigation Plan, QA/QC and Health and Safety Plan for soil gas sampling at the Esso Tutu Car Care Center.

Oct 30 FPC submitted a Health and Safety Plan for the Tutu Wellfield Site.

Nov 4-17 FPC Field Oversight of Texaco station soil gas survey conducted by Geosciences Consultants Ltd.

Nov 16 FPC submitted Review of Esso Soil Gas Sampling Plan.

Nov 25 FPC reviewed Texaco Tank Excavation/Soil Sampling Phase of the Revised Action Plans for the Tutu Wellfield Site.

Nov 25 FPC submitted Oversight Report of Texaco Soil Gas Survey to EPA.

Dec 9 FPC reviewed Texaco Monitoring Well Installation/Ground Water Sampling -- Revised Action Plan.

Dec 18 Texaco Final Report on Results of Soil Gas Survey (prepared by Geoscience Consultants, Ltd) submitted to EPA.

1988

Jan 20 Esso submitted Final Soil Gas Investigation Plans and QA/QC plans (2nd revision, dated Jan. 11) to DPNR and EPA.

TUT 001 1872

Jan 25 Texaco submitted Final Soil Gas Investigation Report to EPA.

Feb 1 Texaco submitted Revised Action Plan for tank excavation.

Feb 3,5 FPC comments on Esso's 2nd revised Soil Gas Vapor Investigation and QA/QC Plan (the 3rd FPC review of this document).

Feb 4 Texaco submitted final revisions to the Final Report on Results of Soil Gas Survey.

Feb 11 FPC Technical Review of six CERCLA 104(e) Responses (O'Henry Cleaners, Ramsay Motor Co., Consolidated Auto Parts, Rodriguez Auto Parts, Esso Tutu station, Texaco Tutu station.)

Mar 22 FPC submitted Revised Workplan (for additional tasks and new budget) for work assignment 648 to EPA.

Mar 24 NUS submitted Final Drafts of Preliminary Assessments of Gassett Motors(formerly Consolidated Auto Parts), Esso Tutu station, Department of Education building (formerly LAGA) and Ramsay Motors, St. Thomas, U.S. Virgin Islands to EPA.

Mar 31 NUS submitted Final Draft of Preliminary Assessment of Tutu Texaco, St. Thomas, U.S. Virgin Islands to EPA.

Apr 5-23 FPC Field Oversight of Esso Soil Gas Survey, conducted by Belgodere and Associates.

April FPC informal review and comments on NUS reports.

May 9 FPC sent comments to EPA on Revised Action, QA/QC Plan for Soils and Pile Sampling, Plan for Tank Removal for Texaco Tutu station.

May 27 Texaco (via LeBron Associates) submitted Revised Supplement to Revised Action Plan for Tank Removal.

Jun 14 Esso submitted Belgodere and Associates's Soil Gas Vapor Screening Survey Report to EPA.

Jun 29 FPC submitted Review of Esso Soil Gas Survey Report to EPA.

Jun 30 FPC submitted Brossman Shortform "Technical Oversight of the Texaco Tank Excavation and 104(e) Letter Response Sampling, Tutu Wellfield.

Jul 5 FPC submitted Oversight Report on Esso Soil Gas Survey field activities.

Aug Esso (via Belgodere and Associates) revised their Soil Gas Vapor Screening Report.

Aug 31 Texaco submitted Final Supplement to Revised Action Plan for Tanks Removal (by Lebron and Associates).

TUT 001 1873

Sep 7-16 FPC Field Oversight of Texaco Tank Excavation and Sampling. Tank removal completed Sept 9. Excavation pit sampling conducted Sept 12-15.

Sep 8-15 FPC sampled soil and water at 104(e) Letter Response sites (O'Henry Cleaners, Ramsay Motor Co., Consolidated Auto Parts (Gassett), Tillett Gardens, Esso Tutu station and Texaco Tutu station).

Sep 19 FPC submitted Revised Technical Review of 9 CERCLA 104(e) responses. (O'Henry Cleaners, Ramsay Motor Co., Consolidated Auto Parts (Gassett), Rodriguez Auto Parts, Esso Tutu station, Texaco Tutu station, Jim Tillet, Inc., Caribbean Jeep Rental - Supercat Area, and Virgin Islands Housing Authority).

Sep 19 FPC received letter from Groundwater Technologies, Inc, describing proposed soil venting treatment for Texaco station.

Sep 29 FPC submitted Field Report on 104(e) Letter Response site sampling.

Oct 17 FPC assisted EPA in writing Administrative Order on Consent for Tutu Wellfield.

Oct 31 FPC submitted Overview Report of Tutu Texaco Service Station Tank Removal.

Dec Esso submitted Workplan for the Removal and Installation of Two Underground Storage Tanks.

1989

Jan 4 FPC submitted comments on Soil Pile Ventilation Monitoring at Texaco station.

Jan 12 FPC submitted Review of Workplan for Removal and Installation of 2 Underground Storage tanks at the Esso Tutu station to EPA.

Jan 16 Esso Submitted Revised Workplan for Removal and Installation of 2 USTs to EPA.

Jan 30 EPA issued Administrative Order on Consent to PRPs Esso, Texaco and L'Henry d.b.a. O'Henry Cleaners.

Feb 1 Texaco submitted documentation of soil pile monitoring to EPA.

Mar 6 FPC sent Sample Analysis Data Summary to EPA for select volatile organics and pesticides found in oils from 104(e) sites.

Mar 7 FPC submitted comments on Texaco's plans to sample soil piles after venting is completed.

TUT 001 1974

Mar 29 Esso submitted Revised Plan for Removal and Installation of 2 USTs at Esso Tutu Car Care Center.

Mar 31 FPC sent Sample Analysis Data Summary to EPA for select volatile organics and pesticides found in soils from the Texaco tank excavation.

Mar 31 FPC sent Sample Analysis Data Summary to EPA for select volatile organics and pesticides found in samples from 104(e) Letter Response sites.

Apr 14 FPC sent Sample Analysis Data Summary to EPA for TPH and EP-Toxicity found in samples from 104(e) sites.

May 5 FPC submitted Brossman Short Form for the Field Oversight of Tank Excavation at the Esso Station.

May 5 FPC submitted Brossman Short Form for the Field Oversight of Texaco Soil Pile Sampling and second round of 104(e) Letter Response Sampling.

May18,23 Esso submitted Addendum and Revised Addendum to Workplan for Removal and Installation of 2 USTs.

Jun 5-9 FPC conducted 2nd round of sampling at 104(e) Letter Response sites (O'Henry Cleaners, Ramsay Motors, Consolidated Auto Parts (Gassett), Department of Education (LAGA), Esso Tutu station and Texaco Tutu station). Also conducted Field Oversight of LeBron's soil pile sampling at Texaco.

Jun 5-10 FPC Field Oversight of Esso Tank Excavation and sampling of pit and soil piles.

Jun 27 FPC submitted Overview Report of second round 104(e) Letter Response Sampling in Tutu Wellfield (Supercat site included in same report).

Jun 29 TES III contract expired. FPC went under Stop Work Order.

Jul 21 FPC received rollover to TES V contract, assigning continuing FPC oversight of Responsible Parties. Work resumed.

Sep 14 FPC submitted Field Summary Report - Texaco Soil Pile Remediation to EPA.

Sep 22 FPC submitted Workplan for TES V Work Assignment C02048, Tutu Wellfield, to EPA.

Oct 3 FPC went under Stop Work Order pending EPA approval of Tutu Workplan.

Nov 14 EPA approved FPC Workplan. Work resumed.

Nov 21 FPC attended meeting with EPA, Texaco, Esso, O'Henry, the PRP

contractors and lawyers representing all parties to discuss liability issues and the proposed scope of future work for the Tutu Wellfield site.

Dec 21 L'Henry, d.b.a. O'Henry Cleaners, responded to Administrative Order claiming not guilty, but agreeing to investigate extent of contamination and demanding the Department of Education (formerly LAGA) site be investigated as a potential source of PCBs.

Dec 22 Esso and Texaco responded to Administrative Order claiming not guilty, but agreeing to investigate extent of contamination.

1990

Jan 31 FPC sent Data Analysis Summary on VOAs found in oils at Tutu Texaco and Esso stations, Ramsay Motor Co. and Consolidated Auto Parts (now Gassett) from second round of sampling, June, 1989.

Feb 28 FPC submitted Revised Oversight Report on Esso Tank Excavation and Soil Pile Sampling to EPA.

March 23 EPA issued Unilateral Administrative Order to ESSO, TEXACO, L'Henri, Inc to Connect the Tutu Wellfield to Rhino Road Area, and Continue 24 wells monitoring.

TUT 001 1876

REFERENCE NO. 49

DEPARTMENT OF PLANNING AND NATURAL RESOURCES

In The Matter of Texaco Caribbean, Inc.

St. Thomas

FIRST AMENDED ORDER

Pursuant to my authority under Chapter 7, Title 12 of the Virgin Islands Code and having found in accordance with Title 12, VIC, Sec. 188(d) that an emergency exists, to wit: a pollutant source or combination of sources presenting an imminent and substantial endangerment to the health of persons, or to the welfare of persons where such endangerment is to the livelihood of such persons has been discharged into one or more acquifers in the Tutu area of St. Thomas and; having reason to believe that the source of said pollutant are underground storage tanks (USTs) located at the Texaco gasoline station at Tutu, St. Thomas (the facility) and; having met with representatives of Texaco Caribbean, Inc. (Texaco) who have the apparent control of said tanks and; said representatives of Texaco Caribbean, Inc. having admitted that the tanks at the above-mentioned Tutu Texaco gasoline station failed a tank test and; having previously issued an Order dated July 27, 1987, directing Texaco to refrain from and undertake certain named activities at the facility, it is hereby

ORDERED that the Order of July 27, 1987 be modified to include the following requirements:

TUT 001 1878

1. That neither the installation of new tanks(s) nor the removal of existing tank(s) commence until the conditions set forth herein are met.

2. The sampling plan developed by Texaco pursuant to paragraph 5 of the original Order shall apply to the installation of new tanks as well as the removal of existing tanks and is to be submitted to DPNR for approval no later than fourteen (14) days after the effective date of this First Amended Order and must, at a minimum, include the following:

   A. Sample Plan

      A detailed sample plan designed to detect the extent and type of contaminants present in the soils at the facility. This plan must describe the methodology and parameters of the sampling and the location of each sample taken, pursuant to all relevant EPA guidance, including but not limited to EPA Publication SW-846 (Second Edition). The plan should include but not be limited to the level of detection at which soil sampling activities would commence, equipment to be used, personal protection action levels, and the procedures for providing split samples to representatives of U.S. EPA and DPNR.

   B. Site Safety/Contingency Plan

      A Contingency Plan designed to protect workers, the public, and the environment from any harm at the facility, including but not limited to plans to suspend operation in the case of the existence of hazardous conditions. This plan should also limit access to the site to only

3.68

those person(s) who are performing necessary functions on the job site and Virgin Islands and federal representatives.

C. Personnel Qualifications

A description of the qualifications of all personnel involved in work at the facility including, but not limited to a description of the experience and training of each in the areas of calibration, photo ionization detector, oxygen meter and explosimeter.

D. Compliance With Applicable Laws

A description of all local and federal laws and regulations which may be applicable to this facility and the manner in which they will be adhered to. Such laws, specifically include but are not limited to Virgin Islands statutes and regulations; federal regulations governing the generation, treatment and disposal of hazardous waste found at 40 CFR Part 260 et. seq.; and all applicable regulations of the Occupational Safety and Health Administration (OSHA).

E. Preservation of Data

A plan to include the logging of data and preservation of all data collected at the site including all documents, sampling reports and daily logs of the sampling effort at the site.

F. Quality Assurance/Quality Control (QA/QC)

A Quality Assurance/Quality Control Plan (QA/QC) for all sampling conducted at the site, pursuant to EPA Guidance Publication SW-846 (Second Edition).

3. Prior to removal of any underground storage tanks at the facility, Texaco must undertake the following:

   A. Provide EPA and DPNR with at least five days' written notice prior to the date of removal of the tanks;

   B. Ensure the presence of representatives of EPA and DPNR during the removal;

   C. Obtain EPA and DPNR approval for the proposed methods of transportation, treatment or disposal of all materials removed from the facility;

   D. Obtain EPA and DPNR approval of the results of the sampling plan undertaken pursuant to paragraph 1 of this First Amended Order;

   E. Obtain EPA and DPNR approval of the HNU, explosimeter and oxygen meter procedures which will be conducted during the entire removal period;

   F. Obtain EPA and DPNR approval of the Site Safety Plan to be conducted throughout the removal period;

   G. Obtain EPA and DPNR approval of the Site Cleanup Plan to be implemented prior and subsequent to the removal period;

   H. Obtain EPA and DPNR approval of the Emergency Contingency Plan to be implemented during the removal period in the event hazards to health or the environment are detected; and

   I. Obtain EPA and DPNR approval of the proposed method for compliance with all applicable federal and local laws and regulations.

5 of 6

AND IT IS FURTHER ORDERED that, within five (5) days of the effective date of this Order, Texaco submit to DPNR the name and qualifications of a Project Officer who will be responsible for supervision of all work conducted pursuant to this Order. At a minimum, the experience of such Project Officer must include familiarity with the federal and local regulations for management of hazardous waste found at 40 CFR Part 260 et seq. and OSHA requirements, as well as a thorough knowledge of the type of work which will be conducted pursuant to this Order. The DPNR may request nomination of alternate Project Officers should it, for any reason, disapprove the Project Officer submitted by Texaco.

SO ORDERED:

8/5/87
Date

Alan D. Smith, Commissioner

DEPARTMENT OF PLANNING AND NATURAL RESOURCES

In The Matter of Texaco Caribbean, Inc.

St. Thomas

ORDER

Pursuant to my authority under Chapter 7, Title 12 of the Virgin Islands Code and having found in accordance with Title 12, VIC, Sec. 188(d) that an emergency exists, to wit: a pollutant source or combination of sources presenting an imminent and substantial endangerment to the health of persons, or to the welfare of persons where such endangerment is to the livelihood of such persons has been discharged into the Tutu acquifer and; having reason to believe that the source of said pollutant are underground storage tanks (UST) located at the Texaco gasoline station at Tutu, St. Thomas and; having met with representatives of Texaco Caribbean, Inc. who have the apparent control of said tanks and; said representatives of Texaco Caribbean, Inc. having admitted that the tanks at the above-mentioned Tutu Texaco gasoline station failed a tank test, it is hereby

ORDERED that Texaco Caribbean, Inc. refrain from taking any of the following actions:

1. Removing any tanks located at the Tutu Texaco station which failed the tank test or have not been tested.
2. Removing of any soil or substrait from the area surrounding any tanks which failed the tank test or have not been tested.
3. Conducting any activity which would in any way disturb the immediate area of said tanks.

IT IS FURTHER ORDERED that Texaco Caribbean, Inc.

4. Establish and maintain records of all actions undertaken in the course of investigating and testing the tanks at the Tutu Texaco station.
5. Develop a sampling plan and test all the soil surrounding the underground storage tanks at the Tutu station pursuant to said plan and in accordance with EPA's approved methods.
6. Provide certified reports of its sampling and testing activities at the Tutu Texaco gasoline station as requested by the Department of Planning and Natural Resources (DPNR) or Environmental Protection Agency (EPA).

AND IT IS FURTHER ORDERED that Texaco Caribbean, Inc. allow entry and inspection by representatives of the DPNR and EPA and any other authorized representatives of the Commissioner of the DPNR upon the premises of the Texaco station in Tutu for the purpose of carrying

out any monitoring, sampling or testing required pursuant to 12 VIC, Sec. 189(c).

AND IT IS FURTHER ORDERED that Texaco Caribbean, Inc. be permitted to install underground storage tanks as described in its July 23, 1987 letter and the attached drawings provided, however, that such installation is monitored with a photo ionization detector and not disturb or result in the removal of the underground storage tanks which failed the tank test or have not yet been tested or the surrounding soil and substrait and; to remove the underground storage tanks which failed the tank test or have not yet been tested on or after July 29, 1987 in accordance with the work plan outlined in its letter of July 23, 1987 and the requirements of DPNR and EPA.

AND IT IS FURTHER ORDERED that a hearing on this matter is set for ~~Tuesday~~ Wednesday, July 29, at 10:00 a.m. in the Conference Room of the Department of Planning and Natural Resources.

July 27, 1987

Alan D. Smith, Commissioner

REFERENCE NO. 50

DRAFT

February 1989

Request for Additional Authorization of CERCLA Removal Funding for an Alternate Water Supply for the TuTu Well Site, Anna's Retreat, Saint Thomas, U.S. Virgin Islands - ACTION MEMORANDUM

Luis E. Santos
On Scene Coordinator

William J. Muszynski, P.E.
Acting Regional Administrator

THRU: Stephen D. Luftig, Director
Emergency and Remedial Response Division

I. EXECUTIVE SUMMARY

On July 16, 1987, Mr. Allan Smith, Commissioner of the Department of Planning and Natural Resources (DPNR), U.S. Virgin Islands, verbally requested from the U.S. Environmental Protection Agency (EPA) to provide analytical support in the sampling of one well which was reported to exhibit a strong unpleasant odor. This well is a major source of commercially provided potable water supply for the eastern portion of St. Thomas. The well is located on the eastern part of the island in the Tutu Section of Anna's Retreat. This verbal request was followed by an additional request for EPA to assume the role of Lead Agency after sampling results indicated that several commercial wells in the area were found to be contaminated with hazardous substances. This verbal request was followed by a formal request in writing by DPNR on August 10, 1987.

In July, August and October of 1987, EPA confirmed by sampling and analysis the contamination of groundwater with volatile organic compounds (VOCs). Major contaminants in groundwater are tetrachloroethylene (PCE), trans 1-2 dichloroethylene (DCE) and benzene. The EPA's Removal Action Level (RAL) of 66 ppb for PCE was exceeded in seven (7) wells, the RAL of 175 ppb for DCE was exceeded in three (3) wells, the RAL of 120 ppb for benzene was exceeded in one (1) well. There was one (1) additional well below the EPA Removal Action Level, but above the U.S. Virgin Island's interim maximum permissible concentration levels set on September 1, 1987, by DPNR for volatile organics in drinking water in the Turpentine Run Aquifer (50 ppb for a single compound or 100 ppb for total volatile organic compounds). Five of the previously mentioned seven wells were residential wells.

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This Action Memorandum recommends that the scope of this removal action under CERCLA be expanded to extend the nearby water main to service the houses and commercial establishments identified as being in the risk area (Appendix , Page). The previously authorized ceilings on the project were as follows:

Mitigation Ceilings	80,000
TAT Cost	85,000
Intramural Costs (EPA)	30,000
Total Project Ceiling	$195,000

Said monies were approved on January 6, 1988 and September 28, 1988, to provide water truck deliveries to fill three (3) cisterns which serve approximately 50 persons.

The proposed increase for the extension of the nearby water main based on project cost shown on Pages __ and 47 as follows:

Mitigation Cost	379,000
TAT Cost	102,000
Intramural Cost (EPA)	58,000
Total Proposed Increase	$539,000

The new projected ceiling are proposed to be modified based on these projections is as follows:

Mi[redacted]ion Ceilings	459,100
T[redacted]	187,000
In[redacted]ral Cost (EPA)	88,000
Total Project Ceiling	$734,000

II. BACKGROUND

A. Historical Information

A request for EPA analytical support for one well in the Tutu Section of St. Thomas was made verbally on July 16, 1987 by DPNR. On July 31, 1987, a verbal request for EPA to assume the role of Lead Agency was made, and this was followed by a written confirmation of the request, dated August 10, 1987 (received by the Emergency and Remedial Response Division on August 19, 1987). The initial request was based on a report that one well was reported to have a strong oder, characteri of a petroleum product. This well is a major source of commercially available potable water for the eastern portion of the island. EPA's preliminary investigation commenced on July 21, 1987, with a field reconnaissance and sampling of this well plus six addditional wells identified in the immediate area. Several of these wells are also major water suppliers of public drinking water for the [redacted]

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Laboratory results from this survey indicated that the initial well was highly contaminated with gasoline and chlorinated organics, and the additional six wells contained elevated levels of chlorinated volatile organic compounds. Based on these results, DPNR declared that an imminent health threat existed, which could be affecting approximately 20,000 people living in St. Thomas.

In addition, an indefinite number of tourists who vacation in St. Thomas were at risk, since these commercial wells supplied water to major hotels and restaurants. DPNR issued orders to close these seven commercial wells to protect public health.

Subsequent to this action, EPA expanded their sampling plan due to the threat of greater contamination to drinking water wells in the area. EPA along with DPNR, identified other wells within the Tutu Water/Turpentine Run Aquifer which may be impacted by the hazardous substances identified to be present in the groundwater. A second round of groundwater well sampling took place on August 10 and 11, 1987, which included a total of twenty-four (24) wells identified in the Tutu Section of Anna's Retreat. All twenty-four wells were sampled and analyzed for volatile organic compounds. Following these results, DPNR closed five private wells which service two three-family homes and one apartment building housing of twelve studio units.

A third round of groundwater well sampling took place on October [redacted] 6, 1987, which included twenty-four (24) wells previously identified in the Turpentine Run Aquifer. All twenty-four wells were sampled and analyzed for the full Hazardous Substance List (HSL) compounds. Following these results, EPA once again confirmed the contamination of the groundwater wells.

B. Site Setting/Description

The contaminated wells are located in the Tutu Section of Anna's Retreat, St. Thomas, U.S. Virgin Islands. The five (5) private wells ordered closed are located in the Tutu residential area. At the present time, the affected area is not serviced by any public water supply. EPA sampled a total of twenty-four (24) wells in the Tutu area and found five private wells and eight (8) commercial wells seriously contaminated with up to 7,600 ppb of PCE, 2,600 ppb of DCE, 1,400 ppb of benzene and 120,000 ppb of methylene chloride. (See map attached.

C. Quantity and Type of Substance Present

EPA sampled and analyzed for suspected volatile organic compounds on July 22, August 10, and October 5, 1987. Listed below are the maximum concentrations of the hazardous substances identified in the drinking water wells:

Contaminant	Wells Number	Maximum Concentration Found (ppb)	Removal Action Level (ppb)	Statutory Source of Hazardous Substances Designation under CERCLA
Tetrachloro-ethylene (PCE)	11	7,600	66	Clean Water Act Section 307(a)
Trichloro-ethylene (TCE)	10	711	128	Clean Water Act Section 311(b)(4)
Trans 1-2 dichloro-ethylene (DCE)		620	175	Clean Water Act Section 307(a)
Benzene	1	6,950	120	Clean Water Act Section 307(a)
Methylene Chloride	2	120,000	48	Clean Water Act Section 307(a)
Selenium	5	15,000	10	Clean Water Act Section 307(a)

The results of the sampling are contained in Appendix, pages __. Sampling results adequately document 12 wells with contamination above EPA's removal action levels.

C. National Priority List Designation

This site is not included on the National Priority List.

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III. THREAT

A. Threat of Public Exposure

Direct contact with PCE and TCE may cause eye and nose irritation along with dry scaly and fissured dermatitis. Acute exposure through absorption, inhalation or ingestion, may cause central nervous system depression, hepatic injury and anesthetic death. Both PCE and TCE have been classified as a probable human carcinogen.

Direct contact with benzene may cause eye, skin and upper respiratory track irritation along with dry, scaly and fissured dermatitis. Acute exposure through absorption, inhalation, or ingestion, may cause central nervous system depression convulsions, coma and death. Benzene is a myelotoxic agent causing changes in the activity of the bone marrow and blood cells. Benzene has been classified as a human carcinogen.

Direct contact with methylene chloride may cause dry, scaly and fissured dermatitis. Acute exposure through absorption, inhalation or ingestion may cause toxic encephalopathy with hallucinations, pulmonary edema, coma and death.

This is a case of actual well water contamination in excess of the EPA's 66 ppb removal action levels (RAL) for PCE, 175 ppb RAL for TCE, 120 ppb RAL for benzene and 48 ppb RAL for methylene chloride affecting two multi-family dwellings and an apartment complex housing twelve studio units. In addition to the exposure via consumption of water, or eating food prepared with this water, showering with water contaminated with volatile organics contaminate the air. This causes an elevation in household air contaminant concentrations and exposes residents through inhalation and adsorption by the skin. Contaminated water supplies, therefore, pose a serious threat not only through drinking and cooking, but also through showering, bathing, dishwashing and cloth laundering.

On September 2, 1987, DPHR issued three(3) orders to close wells and also issued two(2) advisory letters to owners not to use well water for drinking, bathing and washing.

B. Evidence of Extent of Release

Investigation, sampling, and analyses by EPA have identified contaminated groundwater as described above, and containing contaminants as described in Appendix. (Page _____).

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The contamination has been encountered in 5 private wells and 11 commercial wells in what appears to be a widespread plume at the northern portion of the Turpentine Run aquifer moving in a southernly direction. Appendix _____ (page _____) shows the current extention of the contamination and those areas which may be threatened in the future.

The variables that govern the spread of the contamination within any contaminant plume are dynamic and may be divided into four interrelated categories. First there are hydrological effects which include fluctuations in the water table, rates of well pumping and hydraulic conductivity. Second there are geological characteristics which may be described in terms of lithology, depth of water table, heterogeneity of the aquifer, permeability and topography. Third there are geochemical qualities of the contaminants themselves which are characterized by density, viscosity, biodegradation, solubility, adsorptivity, hydrolysis, and mixing of contaminants. Finally the source of the contamination is a factor, including the elapsed time since the initial discharge, the presence of any secondary or intermittent sources, or discharges, and the concentrations and rates of discharges. Expending funds to quantify these variables, and hence rigorously defining the plume, is not cost effective for the immediate purpose of providing safe water to residents.

C. Previous Actions to Abate Threat

No mitigative action was taken by any potentially responsible party prior to EPA's activities.

D. Current Actions to Abate Threat

EPA has commenced an investigation of the Tutu Water/Turpentine Run Aquifer by establishing a cooperative agreement with the U.S. Geological Survey to define the characteristics of this aquifer and to determine the extent of the contamination. EPA and DPNR have initiated a monthly/quarterly well monitoring program.

DPNR has issued a total of ten(10) orders/advisories to well owners for the closure of sixteen (16) wells.

A local dry-cleaner has been identified as using and storing PCE. Handling, storage and disposal practices from this facility are presently unknown. DPNR has proposed to issue an advisory to local dry-cleaning establishments then to

properly store and hold all waste for proper disposal by an industrial waste hauler. DPNR with the assistance of EPA, is conducting an assessment of at least nine(9) facilities identified to be potential sources of hazardous substance releases in the Tutu area.

EPA has cleaned the homeowners' cisterns that have been contaminated by hazardous substances from the groundwater, modified the existing home plumbing to terminate well connections, is delivering clean water via tank trucks on a regular basis, and established a surveillance program for all wells in the area by a monthly/quaterly groundwater monitoring program. This Phase I, short-term removal action has mitigated the threat to public health by providing a temporary alternate source of water for affected consumers.

IV. ENFORCEMENT

The contaminant plume is generally believed by both DPNR and EPA, to have its source from past and present improper handling and disposal practices of organic solvents, possibly from dry cleaners, gasoline service stations and auto repair shops operating in the area. This site has been referred to the Site Compliance Branch for enforcement action. An attorney and enforcement project officer have been assigned to this case. [redacted]ued Request for Information letters to all Potenti[redacted]onsible Parties.

Should a responsible party or parties be identified and be willing to undertake corrective action, all or part of the funds requested herein may not be spent, assuming that the responsible party or parties is/are willing to act promptly.

Referral of all sampling data and findings has been made to the Site Compliance Branch (SCB) to support ongoing enforcement efforts. The SCB has also been advised of this project.

V. Proposed Project And Cost

The objective of the proposed action is to provide a reliable alternate water supply in order to remove the existing threat to public health posed by hazardous substances found in the water supply of the residences in the vicinity of Tutu/Anne's

Retreat, US Virgin Island. In order to accomplish this objective, we propose to extend the existing water main, and connect the two(2) residential dwellings and one(1) apartment complex in the risk area to the public water supply main (See Appendix ___, page _____).

Truck water shall be provided in a continued basis to the house cisterns in the risk area as a temporary measure pending the provision of a reliable alternate water supply. Truck water has been delivered to two residential dwellings and one apartment complex since September 9, 1987. EPA has been delivering an average of 10 truck loads per month at an average monthly cost of $2,100.

Consideration were given to other alternatives that required treatment instead of a water main distribution system. These alternatives were as follows: a centralized groundwater treatment unit/storage tank/distribution mains and individual reverse osmosis units at each location. However, the State has not agreed to monitor, maintain, or operate these units; thus, it is likely that, over an extended period of time, some or all of the homes might again suffer unacceptable contamination at the tap. Prior experience with long-term state maintenance and operation of such systems has been unsatisfactory. In addition, the cost of associated monitoring programs, together with the cost of the treatment units, will eventually exceed the cost of the connection to public water supply. It has been determined, therefore, that treatment units are not cost effective for this site and would not provide a long-term, adequate degree of health and safety protection to the affected residents.

This site is not on the NPL and no long-term remedial action is currently planned. Nevertheless, because the action proposed herein will ensure that residents in the risk area have a permanent safe drinking water supply, and because the action will not interfere with any subsequent effort to clean up the contaminated aquifer and/or address the source of the contamination, the proposed action is consistent with the requirement of Section 104(a)(2) of CERCLA which states that "any removal action undertaken... should, to the extent... practicable, contribute to the efficient performance of any long-term remedial action with respect to the release or threatened release concerned".

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A. Project Estimated Costs

I. Immediate Threat Mitigation - Trucked Water

The estimated quantity and consequent cost of providing trucked water to residents as discussed above, is based upon actual experience of delivering 10 truck loads per month for approximately 6 months (time needed to extend water main and connect the affected homes to a safe potable water system).

Estimated project cost for provision of trucked water in the risk area is the following:

PROJECT COST USING A LOCAL CONTRACTOR WITH MINIMAL BRCS SUPERVISION

The following costs are based on a 12 hours day, 5 days per week (60 hours/week). Length of pipe installed per 12 hour day: 62 linear feet (L.F.) per day of 12" dia. DIP and 106 L.F. per day of 6" dia. DIP.

a) Engineering

Survey, Profile drawings, Specifications	$ 22,000

b) [redacted] Material

2232 L.F. 12" dia. DIP $70 L.F.	$ 156,240
950 L.F. 6" dia. DIP $50 L.F.	47,500
1000 L.F. 2" dia. PVCP $5.00 L.F.	5,000
3 hydrants $1,700 each	5,100
3 Valves $500 each	1,500
Check existing 16" dia. DIP and repair	18,000
Connection to existing 16" DIP	8,000
House connections 3 $500	1,500
SUBTOTAL	$ 264,840

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c) **ERCS Personnel**

Response Manager (Level 3)	
29 days at 12 hours days x $55/hr =	$ 19,140
29 days per diem at $180/day =	5,220
Rental car 29 days at $55/day =	1,595
Five (5) airfare Newark-St.Thomas at $500/each	2,500
Field Clerk/Typist (N.J.) 120 hr. x 29/hr. =	3,480
Equipment	1,330
Office Trailer, 1,300/mo. x 3mo.	3,900
Subtotal	$ 37,965
Subtotal of all Mitigation Costs (a + b + c)	302,805
*Contingency 25%	75,702
Total Mitigation Costs	$ 378,507

*Modified Contingency percentage from 15% to 25% due to unknown labor costs in V.I.

B. [redacted] Costs

[redacted] x 12 hours x 71/hr	$ 68,160
[redacted] (3) airfare Newark - St. Thomas at $500/each	1,500
Five (5) airfare Puerto Rico - St.Thomas at $80/each	400
Office Support 75 hours x 55/hr	4,125
80 days per diem x 180/day	14,400
Subtotal	$ 88,585
Contingency (15%)	13,288
Total	101,873
Rounded to nearest thousand	$ 102,000

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II. Intramural Costs

960 hrs (Region) + 960 x .10 (HTQ) x 30/hr	$ 31,680
80 days per diem x $180/day	14,400
Rental car 80 days x $45/day	3,600
Eight airfare Puerto Rico-St. Thomas at $80/each	640
Subtotal	50,320
Contingency (15%)	7,548
Total	57,868
Rounded to Nearest Thousand	58,000
Total TAT and Intramural Costs	160,000
Total Extramural	378,000
Removal Project Ceiling	$ 539,000

C. Project Schedule

Potable [redacted] supply companies, approved by the U.S. Virgin Island[redacted] Agencies, will continue providing trucked water to the [redacted]ed houses. Trucked water will be provided until a water main connection is completed.

Water main construction to supply water will consist of components procured per water main design, receipt of materials, survey, excavation, placement of piping, backfill tapping, re-paving and surface restoration. Knowledge of equipment and materials and completion of the required surveys for the installation of the water main are expected to take from 7 to 8 weeks. Excavation, placement of piping, backfilling, water quality testing of the main and desinfection, road, lawn and other restoration work are estimated to be completec within three months.

VI. Recommendations

Conditions at the Tutu Well Site, Saint Thomas, U.S. Virgin Islands meet the criteria for a CERCLA/SARA removal action under 40 CFR 300.65(b)(2)(ii) of the National Oil and Hazardous Substances Pollution Contingency Plan (i.e., contamination of drinking water supply).

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The resident population currently relies on private wells as their sole source of potable water. Temporary provision of trucked water for drinking, cooking and bathing represents the initial step toward mitigation of this human health threat, to be followed by residential water-main connection as a reliable alternate water supply.

I recommend your approval of this CERCLA/SARA Removal Action request to supply trucked water and to extend the water main. The amount to be authorized for this project is $734,000 which (80,000 + 379,000) is estimated for mitigation contracting.

Your authority to authorize these funds is pursuant to the Administrator's September 13, 1987 Delegation 14-1-A.

Approval: _____ Date: _____

Disapproval: _____ Date: _____

cc: (after approval is obtained)

S. Luftig, 2ERR
R. Salkie, 2ERR-ADEEPP
G. Pavlov, 2ERR-ADEP
M. Randall, 20EP
P. [redacted], 2CFO
R. [redacted], 20PM-FIM
S. [redacted], PM-214F (Express Mail)
T. [redacted]
P. [redacted], 2IG
A. Smith, DPNR-USVI

REFERENCE NO. 51

Administrative Order on Consent
Tutu Wellfield Area
St. Thomas, U.S. Virgin Island

Prepared for

U.S. ENVIRONMENTAL PROTECTION AGENCY
Office of Waste Programs Enforcement
Washington, D.C. 20460

EPA Work Assignment No.	: 648
EPA Region	: II
Site No.	: ZPID
Contract No.	: 68-01-7331
CDM Federal Programs Corporation Document No.	: T648-C02-LR-CQEP-1
Prepared By	: CDM Federal Programs Corporaion
Work Assignment Project Manager	: Scott Graber
Telephone Number	: (212) 393-9634
Primary Contact	: Caroline Kwan
Telephone Number	: (212) 264-0151
Date Prepared	: 10/14/88

(WP1/32)

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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION II

In the Matter of

Respondent

ADMINISTRATIVE ORDER
ON CONSENT

Proceeding Under

I. JURISDICTION

II. STATEMENT OF PURPOSE

III. FINDINGS OF EPA

IV. DETERMINATION OF THE REGIONAL ADMINISTRATOR

V. ORDER

The Regional Administrator, EPA Region II, and Respondent hereby consent and agree to the findings and conclusions set forth above, based upon which the parties hereby agree, and the Regional Administrator of EPA hereby orders, that the Respondent shall undertake the tasks set forth in the Correction Action Program Plan (CAPP) at the site, which includes tasks set and which is attached hereto and made part hereof as Exhibits A, B, C, and D. For the purpose of this order, "site" will refer to the facility and any other area where the assessment will be carried out.

EXHIBIT A. CONTAMINATION ASSESSMENT PLAN

1. Within 45 days of the effective date of this order, Respondent shall submit to EPA a detailed written Contamination Assessment Plan (CAP) which is set forth below.

2. The objectives of the CAP shall be to 1) determine the vertical and horizontal nature and extent of soil and groundwater contamination and 2) determine or confirm the contaminant source(s), mechanisms of contaminant transport, and rate and direction of contaminant movement in the air, soils, surface water, and groundwater flow.

3. The Respondent shall conduct a hydrogeologic investigation designed to provide the following information:

(a) A description of the regional geologic characteristics in the vicinity, including:

1. regional stratigraphy: description of strata including lithologic and structural features such as bedding, strike and dip, and identification of stratigraphic contacts;

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2. structural geology: description of local and regional structural features (e.g., folding, faulting, tilting, jointing, solution cavities, etc.);

3. depositional history.

(b) A classification and description of the hydrogeologic properties of all the hydrogeologic units found at the site (i.e., the aquifers and any intervening saturated and unsaturated units), including:

1. hydraulic conductivity, effective porosity;

2. lithology;

3. an interpretation of hydraulic interconnections between saturated zones;

4. regional groundwater flow patterns; and

5. identification and characterization of areas of recharge and discharge.

(c) An analysis of any topographic features that might influence the groundwater flow system, including stereoscopic analysis of aerial photographs which will aid in conducting a fracture-trace analysis.

(d) Using a topographic map or aerial photograph as a base, maps of structural geology and hydrogeologic cross sections (derived from wells) showing the extent, depth, thickness, and lateral extent of all hydrogeologic units of the area of concern, identifying:

1. any and all unconsolidated deposits;

2. zones of fracturing or channeling in consolidated deposits;

3. zones of higher permeability or lower permeability that might direct or restrict the flow of contaminants;

4. perched aquifers; and

5. the uppermost aquifer (including all water-bearing zones above the first confining layer that may serve as a pathway for contaminant migration, such as perched zones of saturation).

(e) A description of water level or fluid pressure monitoring including all new wells for constructing the following:

1. water-level contour and/or potentiometric maps;

2. hydrologic cross sections;

3. an interpretation of the flow system, including the components of flow; and

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4. an interpretation of any change in hydraulic gradients due, for instance, to tidal or seasonal influences.

(f) A description of man-made influences that may affect the hydrogeology of the site and the region, identifying:

1. local water-supply and production wells, including an approximate schedule of pumping; and

2. man-made hydraulic structures (pipelines, french drains, ditches, etc.)

4. The CAP shall provide detailed information as to how the proposed tasks are to be carried out. The tasks must be within the scope of the contamination assessment, and may include but not be limited to the following.

(a) Use of piezometers

(b) Use of monitor wells to be installed upgradient and downgradient of contaminated areas, as defined by recent soil gas surveys conducted in the Tutu area by PRPs. The number, design, and location of all wells to be installed must meet EPA approval.

(c) Sampling of private wells.

(d) Aquifer testing for hydraulic conductivity, transmissivity, storativity, etc. A description of methods proposed to determine aquifer properties must be included (e.g. slug tests, pump tests, computer modeling);

(e) Use of geophysical equipment such as magnetometers and metal detectors to detect tanks, lines, etc. A description of geophysical methods proposed must be included.

5. Sampling and analysis shall be conducted in accordance with the Contract Laboratory Program (CLP) and ~~Target Compound List (TCL)~~, or currently accepted list of compounds. The number of contaminants to be analyzed may be reduced if Respondent can demonstrate to the Agency's satisfaction that the contaminants proposed to be deleted from the list cannot be attributed to any activities that have taken place at Respondent's facility. The agency shall submit written notification to the Respondent if the number can be reduced.

6. The dissolved and soluble product constituents to be analyzed for and the methods of analysis to be used are listed as (a) through (d) as follows. Petroleum products are defined in Section 9001(8) of SWDA. Other analytical methods may be used subject to EPA approval.

(a) petroleum products (motor gasoline, aviation gasoline, gasohol):

1,2-Dichloroethane	(EPA Method 601)

Benzene	(EPA Method 602)
Toluene	(EPA Method 602)
Xylene	(EPA Method 602)
Ethylbenzene	(EPA Method 602)
Total VOA (Volatile Organic Aromatics)	(All detectable compounds by Method 602)
Lead	(EPA Method 239.2 or Standard Methods 304)
1,2-Dibromoethane	(EPA Method 601 with ECD substituted for Hall detector, 2 column confirmation)
Methyl Tertiary Butyl Ether (MTBE)	(EPA Method 602)

Delete 1,2 dichloroethane, Lead, and EDB if unleaded gasoline.

(b) petroleum products (kerosene, diesel, JP-4 jet fuel, Jet A fuel):

PAH'S (Polynuclear Aromatic Hydrocarbons)	(EPA Method 610 - 16 listed Priority Pollutant constituents plus 2-methylnaphthalene, 1-methylnaphthalene, and others with peaks greater than 10 ppb)
Benzene	(EPA Method 602)
Toluene	(EPA Method 602)
Xylene	(EPA Method 602)
Ethylbenzene	(EPA Method 602)
n-Propylbenzene	(EPA Method 602)
1-methyl, 3-ethyl benzene	(EPA Method 602)
1,3,5-trimethyl benzene	(EPA Method 602)
1,2,4-trimethyl benzene	(EPA Method 602)
Other Volatile Aromatics with peaks greater than 5 ppb	(EPA Method 602)
EDB	(EPA method 601 with ECD substituted for Hall detector, 2 column confirmation)
Total VOA	(All detectable compounds by Method 602)

(c) petroleum products not included above or not limited to gasoline, diesel fuel, jet fuel and used oil. For petroleum products not listed above, Respondent shall determine the soluble and dissolved constituents through either:

(1) research (literature reviev, manufacturers data, material safety data sheets, etc.), if available, or

(2) analysis of a dissolved plume sample for the parameters of the ~~Target Compound List (TCL)~~ as defined in the most recent CLP Routine Analytical Service SOW. Hazardous Substances List (HSL)

(d) non-petroleum products such as solvents or cleaners. Parameters to be

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analyzed for are listed in the TCL as defined by the most recent CLP Routine Analytical Service SOW. This list of parameters may be expanded to include other parameters, if deemed necessary by the EPA as the contamination assessment proceeds.

7. The Respondent shall determine the amount of product lost and the time period during which it was lost. If the source of the contamination is unknown and the storage system is to remain in place and has not been tested, determine by means of a tightness test the structural integrity of all aboveground and underground storage systems which exist at the site. The tightness test must adequately account for variables such as vapor pockets, thermal expansion and contraction of product, temperature stratification, groundwater level, evaporation, pressure, and end deflection and must be performed with material normally dispensed from the storage system or with a product with equivalent surface tension.

8. The Respondent shall establish the vertical and horizontal extent of free product on the water table and dissolved product in the groundwater.

9. The Respondent shall determine whether interim remedial measures are necessary to abate any imminent hazard.

10. The Respondent shall obtain information sufficient to develop and support clean-up alternatives.

11. The CAP shall be written in consultation with recent soil gas surveys in the area which were conducted by PRPs.

12. The CAP shall include as a separate document a Quality Assurance/Quality Control Project Plan (QAPP) for all assessment investigations to be performed, which shall be completed in accordance with Section 10 of the publication TES Methods for Evaluation of Solid Waste (SW-846) and include the following items which shall ensure that within six weeks of completion of all the assessment investigation laboratory analyses, a QA/QC evaluation of laboratory data, sampling and analytical procedures is done for each sample.

(a) A description of the chain of custody procedures to be followed, which shall conform to those set forth in Section 1.3 of SW-846;

(b) A summary QA/QC report (the QA/QC "Brossman Short Form");

(c) The curriculum vitae of all professionals expected to participate in the corrective action study, and a description of the responsibilities and the levels of effort of each such professional.

13. The CAP shall include as a separate document a Health & Safety Plan (HSP). The HSP shall include but not be limited to, the following information:

(a) Objectives;
(b) Site Description;
(c) Hazard Evaluation;

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(JM6/14)

(d) Monitoring Requirements;
(e) Tasks;
(f) Levels of Protection;
(g) Work Limitations;
(h) Certified Authorized Personnel;
(i) Decontamination Procedure; and
(j) Emergency Information.

14. Within 14 days upon receipt of EPA comments on the CAP, QAPP, and the HSP, Respondent shall amend the CAP, QAPP, and the HSP as required by those comments or as otherwise approved by EPA and submit the modified documents to EPA.

15. EPA remains the final arbiter in any dispute regarding the sufficiency of the CAP, QAPP, and the HSP, and EPA may modify it unilaterally. At such time as EPA determines that the CAP, QAPP, and HSP are acceptable, EPA will transmit to Respondent a written statement to that effect.

16. Within 14 days upon receipt of EPA's approval of the CAP, QAPP, and HSP, Respondent shall proceed to perform the contamination assessment.

EXHIBIT B. CONTAMINATION ASSESSMENT REPORT

1. Following completion of the tasks of the CAP, the Respondent shall submit a written Contamination Assessment Report (CAR) to EPA. The CAR shall include but not be limited to:

(a) Site background, including previous investigations, geology, hydrogeology, demography and land use;

(b) Discussion of CAP objectives outlined in Exhibit A above;

(c) Summary of all CAP tasks;

(d) Nature and extent of contamination, presenting the results of the CAP;

(e) Summary of conclusions regarding CAP objectives; and

(f) Submission of all analytical data.

2. EPA will review and comment on the CAR. Within 14 days upon receipt of EPA comments, Respondent shall amend the CAR as required by those comments or as otherwised agreed upon by EPA, and submit the amended report to EPA. EPA may also require Respondent to perform additional studies as found necessary by EPA. If additional studies are found necessary, Respondent shall submit, within 21 days of being so notified by EPA, an Amendment to the Contamination Assessment Plan (ACAP) for the additional studies. Within 21 days upon completion of any additional necessary studies or revisions, a revised CAR shall be submitted.

3. EPA remains the final arbiter in any dispute regarding the sufficiency of this CAR (and the additional submissions referred to in the preceding paragraph) and EPA may modify them unilaterally. At such time as EPA

TUT 001 1906

determines that the CAR is acceptable, EPA will transmit to Respondent a written statement to that effect and the CAR will be deemed final.

EXHIBIT C. FEASIBILITY STUDY PLAN

1. Within 30 days of receipt of written approval of the CAR from EPA, Respondent shall prepare and submit a Feasibility Study Plan (FSP) to EPA for review and comment. The first objective of the FSP is to develop site rehabilitation levels (SRLs). The purpose of the development of SRLs is to determine levels at which the remedial action shall be deemed completed. SRLs shall be the Federal and St. Thomas, Virgin Islands water quality standards and other applicable or relevant and appropriate standards. The following factors should be considered during the development of SRLs. A baseline risk assessment shall be completed by the Respondent and will follow EPA 540/861060 and other applicable EPA guidance.

(a) The present and future uses of the affected aquifer and adjacent surface waters with particular consideration as to the probability that the contamination is substantially affecting or will migrate to and substantially affect a public or private source of potable water.

(b) The technical feasibility of achieving the water quality criteria based on a review of reasonable available technology and cost.

(c) Individual site characteristics, including natural rehabilitative processes.

(d) Applicable contaminant transport models to ensure that human health and environment risks from SRLs other than Water Quality Standards or Applicable or Relevant and Appropriate Requirements (ARARs) are acceptable.

2. The Respondent shall develop cleanup alternatives. The purpose of this task is to develop a detailed conceptual outline of the remedial alternative(s) which will be sufficient to clean the groundwater to meet Applicable or Relevant and Appropriate Requirements (ARARs) or the SRLs. The Respondent shall perform the following subtasks.

(a) Identify and review pertinent treatment, containment, removal, and disposal technologies;

(b) Develop criteria for evaluation of remedial alternatives for the site to reach the SRLs and ARARs, to include at a minimum, their long and short term environmental effects, implementability, capital costs, operations and maintenance costs, reliability, operation and maintenance requirements, feasibility, time required to achieve clean-up, and potential legal barriers to the implementation of any of the alternatives;

(c) Screen technologies to determine the most appropriate technologies and to eliminate those clearly not feasible or appropriate, such as those which would result in salt water encroachment;

(d) Identify the need to conduct pilot test or bench tests to evaluate the alternatives;

TUT 001 1907

(e) Review and select potential remedial alternatives using criteria established above;

(g) Select the best remedial alternatives;

(h) Develop a reasonable timetable for completion of the tasks;

(i) Identify other mitigative measures which are necessary to protect the public health if the SRLs cannot be achieved or if they are higher in concentration than the ARARs developed in the Risk Assessment.

3. Within 14 days upon EPA review of the FSP, Respondent shall modify the FSP according to EPA comment. EPA remains the final arbiter in any dispute regarding the efficiency of the FSP, and EPA many modify it unilaterally. At such time, as EPA determines that the FSP is acceptable, EPA will transmit to Respondent a written statement to that effect. This report shall be deemed the Final FSP.

4. Within 14 days upon submission of the final Feasibility Study Plan, Respondent shall initiate the Feasibility Study (FS) in conformance with the final FSP.

5. Within 3 and one half months after submittal of the FSP, Respondent shall submit to EPA for review a FS report (FSR) which shall include a recommended remedial alternative. EPA will review and comment on the FSR.

6. Within 14 days upon receipt of EPA comment to the FSR, Respondent shall modify the FSR as may be necessary to conform with such comment and submit the modified FSR to EPA for approval.

7. Following submittal of the FSR, EPA will announce the availability of both the CAR and the FSR to the public for review and comments. Following the public comment period (which may involve both written and oral comments), EPA will determine if the reports should be modified or accepted as submitted, and EPA will so notify Respondent in writing.

EXHIBIT D. REMEDIAL ACTION

1. Within 3 months of EPA's determination of selected remedial alternative, the Respondent shall submit Plans and Specifications (P&S) for the remedial design which shall include but not be limited to the following: engineering drawings, survey reports, and comprehensive specifications reports documenting all labor, materials, and equipment to be used in completing the remedial action in a manner satisfying all applicable Federal, State, and Local requirements; depending upon the selected clean up alternatives and additional reports, sampling, etc. may be needed.

2. EPA will review and comment on the Project Operations Plan (POP). Within 14 days of Respondent's receipt of EPA comments, Respondent shall modify the POP as required by those comments or as otherwise approved by EPA and resubmit the POP, as modified to EPA. At such time as EPA determines that the POP is acceptable, EPA will transmit to Respondent a written statement to that effect.

TUT 001 1908

3. Within thirty days of EPA's determination of the POP acceptability, and Respondent's receipt of EPA approval, Respondent shall initiate construction in conformance with the EPA accepted remediation.

4. Within sixty days following completion of construction and successful startup, Respondent and the contractor shall be available for a Final Inspection in conjunction with EPA and/or EPA's representatives. The Final Inspection shall include a walk-through of the entire project to determine project completeness and consistency with the final remedial design. During the Final Inspection all equipment shall be operational.

5. Following the Final Inspection, if EPA determines that the remedial action is acceptable, EPA will transmit to Respondent a written statement to that effect. Respondent may not continue operations if the project does not comply with substantive Federal and State health requirements. EPA shall advise Settling Defendants as to compliance with Federal health requirements. Respondent shall provide EPA with a copy of each such application upon preparation and submittal thereof, and each such authorization upon receipt.

V DISPUTE RESOLUTION

VII LIABILITY INSURANCE

VIII NOTIFICATION AND REPORTING REQUIREMENTS

IX RESPONDENT'S PROJECT COORDINATOR

1. No later than ten business days after the effective date of this Consent Order, Respondent shall select an individual to be known as the Project Coordinator and shall notify EPA in writing of the name, address, and qualifications, job title and telephone number of the Project Coordinator. The Project Coordinator shall be responsible for oversight of the implementation of this Consent Order. He or she shall have technical expertise sufficient to adequately oversee all aspects of the work contemplated by this Consent Order. If the Respondent vants to change the Project Coordinator, it must provide ten days written notice to EPA and receive EPA approval of the change.

2. All activities required of Respondent under the terms of this Consent Order shall be performed only by well-qualified persons possessing all necessary permits, licenses, and other authorizations must respond in a written statement to that effect.

TUT 001 1909

X ACCESS AND AVAILABLILITY OF DATA

1. Respondent shall be responsible for obtaining in a timely fashion such access to the Site as is necessary for Respondent to carry out the requirements of this Consent Order. In addition, Respondent shall use its best efforts to obtain, in a timely fashion, such access to any other premises where work under this Consent Order is to be performed as is necessary for Respondent to carry out the requirements of this Consent Order. This Consent Order does not convey any rights of access to Respondent. If Respondent is unable to obtain needed access, Respondent shall so notify EPA. In its discretion, EPA may then assist Respondent in obtaining access.

2. EPA and its designated representatives, including but not limited to their employees, agents, contractors, and consultants shall be permitted to enter onto premises to observe the work carried out pursuant to this Consent Order upon presentation of proper identification. Respondent shall provide EPA and its designated representatives with access to and freedom of movement at the site (and any other premises under the ownership or control of Respondent where work under this Consent Order is performed) at all reasonable times, including, but not limited to, any time that work under the Consent Order is being performed, for purposes of inspecting or observing Respondent's progress in implementing the requirements of this Consent Order, verifying the information submitted to EPA by Respondent, or for any other purpose reasonably related to EPA oversight of the implementation of this Consent Order. With respect to any other premises where work under this Consent Order is performed but which are not under the ownership or control of Respondent, Respondent shall not interfere with EPA access to such premises, and to the maximum extent practicable, shall support and assist EPA in obtaining access to such premises.

3. Respondent shall preserve any applicable documents, during the pendency of this Consent Order and for a minimum of six years after completion of all work required by this Consent Order. After this six-year period, respondent shall notify EPA at least thirty days prior to the destruction of any such documents.

4. Upon request by EPA, all data or information specified under Section 104(e)(7)(i) through (viii) of CERCLA, including rav sampling and monitoring data, generated pursuant to this Consent Order by or on behalf of Respondent shall immediately be made available to EPA, and EPA shall be permitted to copy such data. In addition, upon request, Respondent shall make available to EPA, without delay, all other documents created or maintained by or on behalf of Respondent in connection with the implementation of the work required by this Consent Order (except those documents that are privileged under law), and EPA shall be permitted to copy such documents.

5. Notwithstanding any other provision of this Consent Order, EPA hereby retains all of its information gathering, access, and inspection authority under CERCLA, the Resource Conservation and Recovery Act, 42 U.S.C. S6901 et seg. (RCRA) and any other applicable statute.

IUT 001 1990

REFERENCE NO. 52

TUT 001 1911

NUS CORPORATION AND SUBSIDIARIES — **TELECON NOTE**

CONTROL NO.:	DATE:	TIME:
[illegible]	5/23/91	1130

DISTRIBUTION:

BETWEEN:	OF:	PHONE:
Jeff Hiland	[illegible]	(212) [illegible]

AND: Rich Feinberg (NUS)

DISCUSSION:

I talked to Jeff of Caribbean Jeep and Car Rental was located at the Consolidated Auto Parts / Bryant Property Site. Said the Caribbean Jeep and Car Rental is not located ~~at~~ PRF IN the Toa Alta area, but near the Supercut Site on the Island. We agreed the Caribbean Jeep should be omitted as one of the PRPs for this report.

ACTION ITEMS:

Rich Feinberg 5/23/91

TUT 001 1912

REFERENCE NO. 53

GOVERNMENT OF THE VIRGIN ISLANDS OF THE UNITED STATES

DEPARTMENT OF PLANNING AND NATURAL RESOURCES

FAX TRANSMITTAL HEADER

NUMBER OF PAGES: (INCLUDING COVER SHEET) 3

TO:

NAME: Rich Tenberg

LOCATION: New Jersey

TELEPHONE: (908) 225-6160 FAX #. (908) 225-5490

FROM:

NAME: Ben Nazario

DATE: 4/30/91 TIME: 2:45

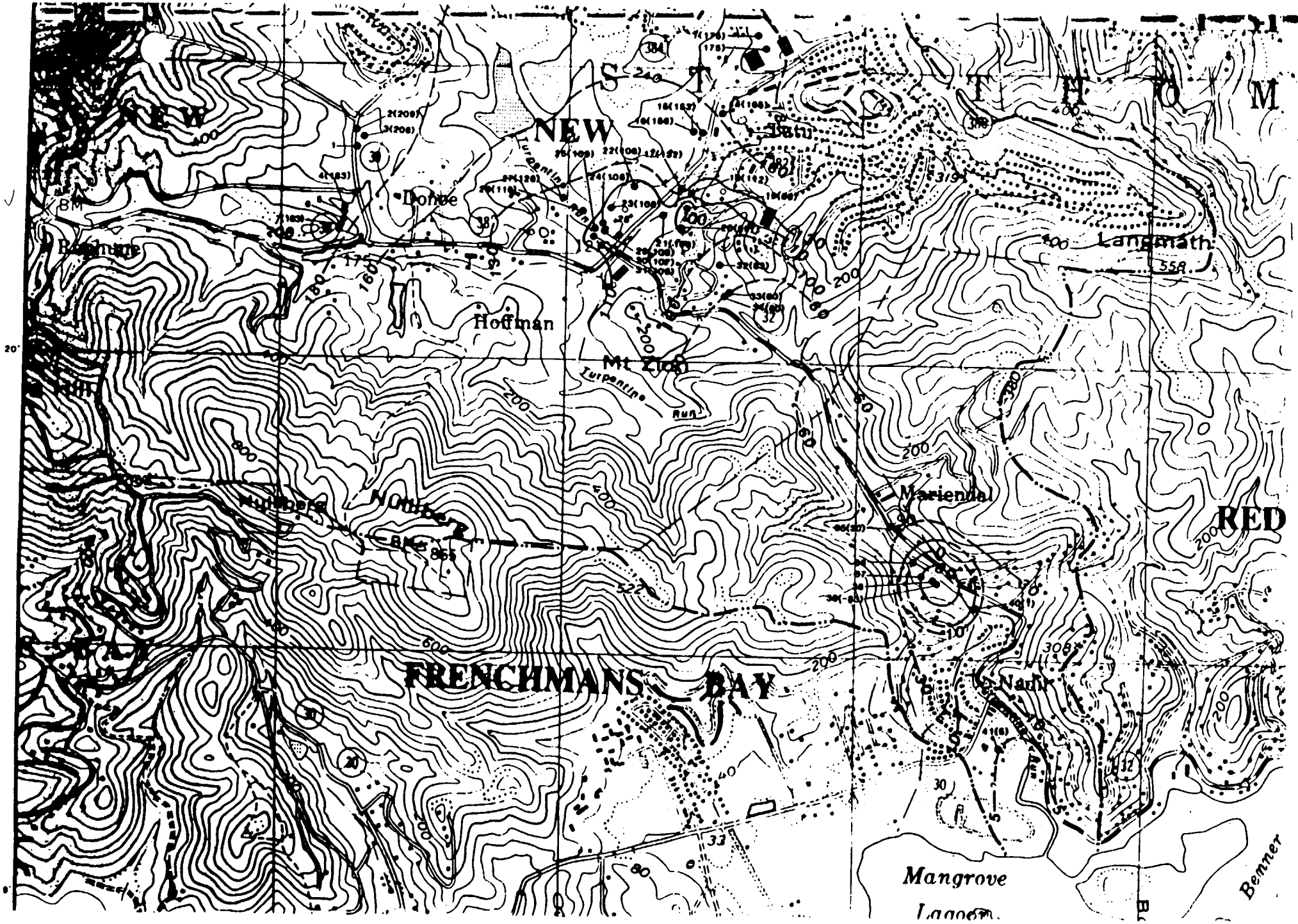
DIVISION/SECTION/PROGRAM (TO BE CHARGED) DEP

FAX #. (809) 775-5706 (809) 773-9310 OR (809) 773-3343

IF YOU HAVE ANY PROBLEMS WITH THIS TRANSMITTAL, PLEASE CONTACT OUR OFFICE AT (809) 774-3320 EXT.101

CONTACT NUMBER IF DIFFERENT FROM ABOVE

TUT 001 1914


NEW
Donee
Hoffman
Mt Zion
Turpentine Run
Mariendal
RED
FRENCHMANS BAY
Mangrove
Lagoon
Langmath
Benner

JUL 001 1915

DEPARTMENT OF PLANNING & NATURAL RESOURCES
DIVISION OF ENVIRONMENTAL PROTECTION
PUBLIC WATER SYSTEM SUPERVISION PROGRAM
TUTU TURPENTINE BASIN AQUIFER

WELL NAME	POPULATION SERVED	WELL USE
*LOCKHART # 4	50	NOT USED/DRINKING/LIVESTK
*LOCKHART #1	50	NOT USED/DRINKING/LIVESTK
*LOCKHART #2	50	NOT USED/DRINKING/LIVESTK
*LOCKHART #3	50	NOT USED/DRINKING/LIVESTK
*LOCKHART #5	50	NOT USED/DRINKING/LIVESTK
BAKERY/CREGOR/GASSETT	50	COMMERCIAL
BAKERY/CREGOR/GASSETT #1	100	COMMERCIAL
BAKERY/CREGOR/GASSETT #2	100	NOT USED/COMMERCIAL
BAKERY/CREGOR/GASSETT #3	100	NOY USED/COMMERCIAL
BAKERY/CREGOR/GASSETT #4	100	NOT USED/COMMERCIAL
BRYAN #1	300	PUBLIC WATER/VIHA
BRYAN #2	300	PUBLIC SUPPLY/VIHA
BRYAN #3		NOT USED-CAPED
CRUSHER	50	COMMERCIAL
DEDE	100	COMMERCIAL
DEMITREE	300	PUBLIC SUPPLY
DENCH	5	NOT USED/DOMESTIC
DEVCON #1	100	PUBLIC SUPPLY
DEVCON #2	100	PUBLIC SUPPLY
DEVCON #3	100	PUBLIC SUPPLY
DEVCON #4	200	PUBLIC SUPPLY
EGLIN #1	50	PUBLIC SUPPLY
EGLIN #2	50	PUBLIC SUPPLY
EGLIN #3	50	PUBLIC SUPPLY
FOUR WINDS #1	200	COMMERCIAL
FOUR WINDS #2	250	COMMERCIAL
FRANCOIS	5	DOMESTIC
HARVEY	4	DOMESTIC
LEONARD	3	DOMESTIC
MATTHIAS	5	DOMESTIC
RAMSAY	50	COMMERCIAL
RODRIQUEZ	50	COMMERCIAL
SMITH	8	DOMESTIC
STEELE	20	DOMESTIC
TILLET	200	NOT USED/PUBLIC SUPPLY
VIHA #1	200	PUBLIC SUPPLY
VIHA #2	200	PUBLIC SUPPLY
VIHA #3	200	PUBLIC WATER
VIHA #4	200	NOT USED/PUBLIC SUPPLY

****

A=AGRICULTURE C=COMMERCIAL D=DOMESTIC NT=NOT USED PS=PUBLIC SUPPLY

*=NOT BEING SAMPLED

TUT 001 1916

REFERENCE NO. 54

NUS CORPORATION AND SUBSIDIARIES — **TELECON NOTE**

CONTROL NO.:	DATE:	TIME:
02-9102-11	5/1/91	AM

DISTRIBUTION:

BETWEEN:	OF:	PHONE:
BEN NAZARIO/MS MONSANTO	VIDPNR/DEP	(809)774-3320

AND: RICHARD FEINBERG (NUS)

DISCUSSION:

CALLED BENN FOR FOLLOWUP INTERPRETATION OF FAX (EXPLAINING POPULATION SERVED BY GW) THAT I RECIEVED THE PREVIOUS DAY BEN N REFERRED ME TO MS MONSANTO.

I ASKED HER IF LOCKHART WELLS 1-5 SERVER 50 PEOPLE APIECE OR ALL TOGETHER. SHE SAID THAT THE 5 WELLS SERVE APROX. 50 PEOPLE A PIECE AND WAS PUMPED BY A WATER TO THESE PEOPLE IN THE VICINITY OF THE WELLS.

FIVE-BAKERY/CREGOR/GASSET WELLS ARE USED FOR CAR RUSHING AT AUTO SERVICE CENTERS.

THREE BRYAN WELLS (#1, #2, #3) - 2 OR 3 WELLS ARE PUMPED VIA MAIN AND TRUCK TO VIRGIN ISLAND HOUSING AUTHORITY (VIHA) THESE WELLS SERVE (300 APARTMENTS).

ACTION ITEMS:

HARTMAN CRUSHER WELL IS USED FOR TRUCK WATER COMMERCIALLY. IT SERVES 50 PEOPLE.

DEDE WELL WAS CLOSED THEN REOPEN BY NEW OWNER. THIS WELL NOW BELONGS TO PUBLIC WORKS. IT MAY HAVE BEEN USED FOR TRUCKING WATER TO THE PAST

TUT 001 1918

CONTINUED

NUS CORPORATION AND SUBSIDIARIES — **TELECON NOTE**

CONTROL NO.:	DATE:	TIME:
02-9102-01	5/1/91	

DISTRIBUTION:

BETWEEN:	OF:	PHONE:
NAZARIO / MONSANTO	VIDPNR	( )

AND: FEINBERG (NUS)

DISCUSSION:

DEMITREE WELL - SUPPLIES VIHA 300 APTS VIA WATER TO VIHA

BENCH WELL - NOT USED. DID SUPPLY 5 PEOPLE AT PRIVATE RESIDENCE

DEVCON 1-4 - 4 WELLS TRUCKED TO VARIOUS PARTS OF THE ISLAND SUPPLING 500 PEOPLE.

ELGIN 1-3 - 3 WELLS PUMPED TO LAUNDROMAT / MECHANIC SHOP / GROCERY. MAY HAVE SERVED 150 PEOPLE IN PAST VIA TRUCKING.

FOUR WINDS - MAY HAVE SERVED 450 PEOPLE IN PAST VIA TRUCKING.

FRANCOIS WELL - PRIVATE RESIDENCE, ~~MAY HAVE SERVED~~ SERVES 5 PEOPLE FOR FLUSING / SECONDARY USAGE PRESENTLY.

ACTION ITEMS:

HARVEY WELL-PRIVATE RESIDENCE, SERVES 4 PEOPLE FOR FLUSHING / SECONDARY USAGE PRESENTLY.

LEONARD WELL-PRIVATE RESIDENCE, SERVES 3 PEOPLE FOR FLUSHING / SECONDARY USAGE PRESENTLY.

OUT 001 1919

NUS 867 REVISED 0685

CONTINUED

3rd

NUS CORPORATION AND SUBSIDIARIES — **TELECON NOTE**

CONTROL NO.:	DATE:	TIME:
EA-0100-11	5/1/91	

DISTRIBUTION:

BETWEEN:	OF:	PHONE:
NIA-ARIC / MONSANTO	VIDPNR	( )

AND:

FENGERC (NUS)

DISCUSSION:

MATTHIAS WELL - PRIVATE RESIDENCE, SERVES 5 PEOPLE FOR FLUSHING/SECONDARY USAGE PRESENTLY.

RAMSAY WELL - MAY HAVE BEEN USED FOR COMMERCIAL PURPOSES IN THE PAST SERVING APPROX 50 PEOPLE VIA TRUCK

RODRIGUEZ WELL - MAY HAVE BEEN USED FOR COMMERCIAL PURPOSES IN THE PAST SERVING 50 PEOPLE VIA TRUCK.

SMITH WELL - PRIVATE RESIDENCE, SERVES 8 PEOPLE ~~FOR FLUSHING/SECONDARY USE~~ ~~THAT HAS BEEN USED~~ IT IS ~~USED PRESENTLY~~ FOR DRINKING STILL BEING USED PRESENTLY. I ASKED WHETHER THIS WELL WAS BEING USED FOR PRIMARY OR SECONDARY USE. SHE SAID SHE WASN'T SURE. I TOLD HER THE WELL WAS ORIGINALLY CONTAMINATED AND WAS PREVIOUSLY BEING USED FOR NON-DRINKING PURPOSES.?

ACTION ITEMS:

STEELE WELL - PRIVATE RESIDENCE SERVING 20 PEOPLE. . . . . SAME SITUATION AS SMITH WELL . . . ?

TUCKET WELL - NOT USED/PUBLIC SUPPLY WELL SERVED 200 PEOPLE PRESENTLY IN THE PAST VIA TRUCK.

TUT 001 1920

Continued

NUS CORPORATION AND SUBSIDIARIES — **TELECON NOTE**

CONTROL NO.:	DATE:	TIME:
02-9102-11	5/1/91	

DISTRIBUTION:

BETWEEN:	OF:	PHONE:
PATRIO / MONSANTO	VIDPNR	( )

AND:

FEINBERG (NUS)

DISCUSSION:

VIHA #1, 4 - 4 WELLS THAT WERE BEING USED AT THE TIME OF TUTU CONTAMINATION. THEY SERVED APPROXIMATELY 300 APTS.

5/1/91

ACTION ITEMS:

FOR POTENTIAL POPULATION PRIVATE WELLS + DEMITREE WELL (WILL BE USED). IT WILL BE ASSUMED THAT ALL OF THESE WELLS ONLY SERVE 300 APTS. AT THE VIHA

TUT 001 1921

NUS 067 REVISED 0685

REFERENCE NO. 55

NUS CORPORATION AND SUBSIDIARIES			STANDARD CALCULATION SHEET
CLIENT: USEPA	FILE NO.: 02-4162-11	BY: RICH FEINBERG	PAGE . OF 1
SUBJECT: WELL [illegible] TUTU WELLFIELD		CHECKED BY:	DATE: 5/20/

THE FOLLOWING IS APPORTIONMENT CALCULATIONS FOR POTENTIAL POPULATION AT RISK TO GROUNDWATER CONTAMINATION WITHIN 4 MILES OF THE SITE

- REF NO. 53 IDENTIFYS THE POTENTIAL POPULATION ON WELLS IN THE TUTU AREA
- REF. NO. 54 FURTHUR EXPLAINS THE LIST IN REF. NO. 53 AND STATES THAT TWO BRYAN WELLS AND THE DEMITREE WELL SERVE 300 APARTMENTS AT THE VIRGIN ISLAND HOUSING AUTHORITY
- REF. NO. 43 pp. 93, 94 STATES THAT 1,428 PEOPLE ARE SERVED POTABLE WATER AT THE VIHA. THIS IS A 1989 REFERENCE.
- REF. NO. 45, pg. 19 STATES THAT 1,685 PEOPLE ARE SERVED POTABLE WATER AT THE VIHA. THIS IS A 1983 REFERENCE.
- REF. NO. 37, pg. 13 AND FIGURE 3 SHOWS THAT THE BRYAN WELLS ARE IN THE 1/2 - 1 MILE RING AND THE DEMITREE/DEMITRY WELL IS IN THE 1/2 - 1 MILE RING.

USING THE MOST RECENT REFERENCE FOR POPULATION SERVED (1989), WE ASSUME THAT 1,428 PEOPLE ARE SERVED BY THE (2) BRYAN WELLS AND THE DEMITREE WELL. THEREFORE 2/3 OF THE POPULATION IS SERVED BY THE BRYAN WELLS AND 1/3 IS SERVED BY THE DEMITREE WELL.

	TOTAL VIHA POPULATION	×	APPORTIONMENT FACTOR		POPULATION APPORTI
BRYAN WELLS - 1/2 - 1 MILE RING -	1,428	×	2/3	=	952
DEMITREE WELL - 1/2 - 1 " " -	1,428	×	1/3	=	476

* NOTE THE VIHA MAY ALSO BE SERVE POTABLE WATER THROUGH A WATER TRUCICING DELIVERY SERVICE.

TUT 001 1923

NUS 155A REVISED 0285

REFERENCE NO. 56

TUT 001 1924

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION II

DATE: JAN 06 1988

SUBJECT: Preliminary Assessment and Confirmation of Authorization of CERCLA Removal Action Monies for the TUTU Well Site, Anna's Retreat, Saint Thomas, U.S. Virgin Islands - ACTION MEMORANDUM

FROM: Carlos E. O'Neill
On-Scene Coordinator

TO: Stephen D. Luftig, Director
Emergency and Remedial Response Division

THRU: George H. Zachos, Acting Chief
Response and Prevention Branch

I. EXECUTIVE SUMMARY

On July 15, 1987, Mr. Allan Smith, Commissioner of the Department of Planning and Natural Resources (DPNR), U.S. Virgin Islands, verbally requested that the U.S. Environmental Protection Agency (EPA) provide analytical support in the sampling of one well which was reported to exhibit a strong unpleasant odor. This well is a major source of commercially provided potable water supply for the eastern portion of St. Thomas. The well is located on the eastern part of the island in the Tutu Section of Anna's Retreat./ This verbal request was followed by an additional request for EPA to assume the role of Lead Agency after sampling results indicated that several commercial wells were found to be contaminated with hazardous substances. This verbal request was followed by a formal request in writing by DPNR on August 10, 1987.

In July and August of 1987, EPA confirmed by sampling and analysis, the contamination of groundwater with volatile organic compounds. A major contaminant in the groundwater is tetrachloroethylene (TCE). The EPA 10-Day Health Advisory Level of 175 ppb was exceeded in three (3) of twenty four (24) wells sampled, with two of the three contaminated wells being private residential wells. The concentrations found ranged from 240 to 7,600 ppb with seven (7) additional wells being below the EPA 10-Day Health Advisory, but above the U.S. Virgin Island's interim maximum permissible concentration levels set on September 1, 1987, by DPNR for volatile organics in drinking water in the Turpentine Run Aquifer (50 ppb for a single compound or 100 ppb for total volatile organic compounds). Three of the previously mentioned seven wells were residential wells.

This Action Memorandum will document funding authorized for Phase I of the Tutu Well Site CERCLA Removal Action. Phase I addresses only residences having contaminated drinking water wells with volatile organic compounds above levels established by the U.S.V.I.'s interim maximum permissible concentration levels for potable water. This action did not include wells where water is used primarily for commercial, business, industrial and/or trade purposes. It also did not include wells contaminated solely by gasoline or gasoline by-products which are not hazardous substances within the definition of Section 101(14) of CERCLA. This action includes the decontamination and cleaning of residential cisterns contaminated by hazardous substances, the modification of plumbing, the delivery of water by tank trucks as a temporary alternate water supply, and a well water monitoring program. The total project ceiling authorized for a 52-week period is $100,000 of which $40,000 is estimated for mitigation contracting; $45,000 for TAT's extramural costs; and $15,000 for EPA's intramural costs.

This memorandum will confirm your prior verbal authorization of Trust Fund monies, issued to the Chief, Incident Response and Prevention Section on September 1, 1987, to initiate the removal action at the subject site, and subsequently revised to the current project ceiling of $100,000.

II. BACKGROUND

A. Historical Information

A request for EPA analytical support for one well in the Tutu Section of St. Thomas was made verbally on July 15, 1987 from DPNR. On July 31, 1987, a verbal request for EPA to assume the role of Lead Agency was made, and this was followed by a written confirmation of the request, dated August 10, 1987 (received by the Emergency and Remedial Response Division on August 19, 1987). The initial request was based on a report that one well was reported to have a strong odor, characteristic of a petroleum product. This well is a major source of commercially provided potable water for the eastern portion of the island. EPA's preliminary investigation commenced on July 21, 1987, with a field reconnaissance and sampling of this one well and six additional wells identified in the immediate area. Several of these wells are also major water suppliers of public drinking water to the eastern part of the island.

Laboratory results from this survey indicated that the initial well was highly contaminated with gasoline and chlorinated organics, and the additional six wells contained elevated levels of chlorinated volatile organic compounds. Based on these results, DPNR declared that an imminent health threat existed, which could affect approximately 20,000 people living in St. Thomas.

In addition, an indefinite number of tourists who vacation in St. Thomas were at risk since these commercial wells supply water to major hotels and restaurants. DPNR issued orders to close these seven commercial wells to protect public health.

Subsequent to this action, EPA expanded their sampling plan due to the threat of greater contamination to drinking water wells in the area. EPA along with DPNR, identified other wells within the Tutu Water/Turpentine Run Aquifer which may be impacted by the hazardous substances identified to be present in the groundwater. A second round of groundwater well sampling took place on August 10 and 11, 1987, which included a total of twenty-four (24) wells identified in the Tutu Section of Anna's Retreat. All twenty-four wells were sampled and analyzed for volatile organic compounds. Following these results, DPNR closed the five private wells which service two three-family homes and one apartment building housing twelve studio units.

B. Site Setting/Description

The contaminated wells are located in the Tutu Section of Anna's Retreat, St. Thomas, U.S. Virgin Islands. The five (5) private wells recently ordered closed are located in the Tutu residential area. At the present time, the affected area is not serviced by any public water supply. EPA sampled a total of twenty-four (24) wells in the Tutu area and found five private wells and eight (8) commercial wells seriously contaminated with up to 7,600 ppb of PCE. (See map attached).

C. Quantity and Type of Substance Present

EPA sampled and analyzed for suspected volatile organic compounds on July 22 and August 10, 1987. Listed below are the maximum concentrations of the hazardous substances identified in the drinking water wells:

Contaminant	Maximum Concentration Found (ppb)	Statutory Source of Hazardous Substances under CERCLA
Tetrachloroethylene	7,600	Clean Water Act Section 307(a)
Trichloroethylene	61	Clean Water Act Section 307(a)
Benzene	1,400	Clean Water Act Section 307(a)

The results of the sampling are contained in Tables I and II. PCE contamination ranged from non-detectable to seven thousand-six hundred parts per billion (7,600 ppb). Sampling results adequately document 3 wells with contamination above EPA's 175 ppb PCE 10-Day Health Advisory Level and eight (8) wells above the DPNR's interim standards for maximum contaminant levels of volatile organic compounds in drinking water.

III. THREAT

A. Threat of Public Exposure

Direct contact with PCE may cause eye and nose irritation along with dry scaly and fissured dermatitis. Acute exposure through absorption, inhalation or ingestion, may cause central nervous system depression, hepatic injury and anesthetic death. PCE has been found to be carcinogenic.

This is a case of actual contamination in excess of the EPA 175 ppb PCE 10-Day Health Advisory Level for a three-family house and one apartment building housing twelve studio units. In the other three family apartment dwellings, the well contamination exceeded the interim DPNR drinking water standard of 50 ppb for any single volatile organic constituent. In addition to the exposure via consumption of the water, or eating food prepared with this water, showering with water contaminated with volatile organics can contaminate the air to significantly unhealthy levels.

The location, direction and dimensions of the plume are affected by variations in water table depth, rate of pumping of the wells, duration and intensity of rainfall, and intermittent releases of chemicals from one or more sources, all of which are unknown at this time. Given the above variables which affect contaminant strengths in any well within the plume may vary randomly.

On September 2, 1987, DPNR issued three (3) orders to close wells and issued two (2) advisory letters to homeowners not to use well water for drinking, bathing and washing.

B. Evidence of Extent of Release

Investigation, sampling and analyses by EPA have identified contaminated groundwater, as described above, and containing contaminates, as described in Tables I and II.

C. Previous Actions to Abate Threat

No mitigative action was taken by any Potentially Responsible Party prior to EPA's recent activities.

D. Current Actions to Abate Threat

EPA has commenced an investigation of the Tutu Water/Turpentine Run Aquifer by establishing a cooperative agreement with the U.S. Geologic Survey to define the characteristics of this aquifer and to determine the extent of contamination. EPA and DPNR have also completed Aquifer and a monthly well monitoring program is being developed.

DPNR has issued a total of ten (10) orders/advisories to well owners to close sixteen (16) wells.

A local dry-cleaner has been identified as using and storing PCE. Handling, storage and disposal practices from this facility are unknown at this time. DPNR has proposed to issue an advisory to local dry cleaning establishments instructing them to properly store and hold all waste for proper disposal by an industrial waste hauler. DPNR with the assistance of EPA is conducting an assessment of at least nine (9) facilities identified to be potential sources of hazardous waste and/or substance releases in the Tutu area.

EPA has cleaned the homeowner's cisterns that have been contaminated by hazardous substances from the groundwater, modified the existing home plumbing to terminate well connections, and intends to continue to deliver clean water via tank trucks on a regular basis, and establish a surveillance program for all wells in the area by a monthly groundwater monitoring program. This Phase I, short-term removal action will mitigate the threat to public health by providing a temporary alternate source of water for affected consumers.

IV. ENFORCEMENT

The contaminant plume is generally believed by both DPNR and EPA, to have its source from past and present improper handling and disposal practices of organic solvents, possibly from dry cleaners and auto repair shops operating in the area. This site has been referred to the Site Compliance Branch for enforcement action. An attorney and enforcement project officer have been assigned to this case. EPA issued Request for Information letters to all Potentially Responsible Parties.

V. PROPOSED PROJECT

A. Objective of the Phase I Removal Action

The primary objective of the Phase I of the removal action is the mitigation of the threat to public health by providing a safe potable water supply to the affected residences.

Two three-family homes and one apartment complex housing twelve studio units were identified as being dependent on groundwater from their own private wells. Their respective wells were ordered closed-down by DPNR for exceeding interim drinking water standards.

To reach the objective of providing a safe interim drinking water supply and protect the health of the public at risk, the following removal action was initiated. Water storage cisterns, which received contaminated groundwater from affected wells, were cleaned and sanitized. Cisterns were filled with clean, safe, drinking water. Water tank trucks from local water haulers will be providing water for the affected cisterns on a regular basis. Plumbing modification was made to disconnect water lines from the contaminated wells which provide groundwater to the cisterns.

TUT 001 1930

An attempt to connect well water directly to toilets for flushing will be made, if physically and economically feasible. A well surveillance program will be implemented involving all the wells in the Turpentine Run Aquifer, thru monthly sampling and monitoring.

The longer term, Phase II objective will require the provision of a permanent alternate water supply in lieu of the temporary trucking of water to the threatened consumers within the plume area. Upon completion of an analysis of the alternatives for permanent water supply to these residences, a recommendation will be made for Phase II.

B. Project Estimated Costs

Water consumption per person per day on the average is thirty (30) gallons. It is estimated that the one apartment building has twelve studio units with the average of two people per unit. The two other private homes are three-family dwellings with the average of ten people in each. The cisterns in the three family houses are small and, therefore, a supply of water must be delivered every two or three weeks, respectively. The delivery period is currently estimated to be one year or when a permanent alternate water supply can be provided, whichever occurs first.

PROJECT COST (PHASE I)

Cisterns Clean-Up:

Provide labor, material and equipment including one vacuum truck, pressure water spray guns, water tank truck, etc., to drain and dispose contaminated water and to clean and sanitize identified cisterns.....	$13,000
Modification of plumbing including Labor and Materials.....	$ 5,035
Refill cisterns with clean and safe drinking water.....	$ 2,665
Provide cisterns with clean and safe drinking water on regular basis according to a pre-approved schedule.....	$15,000
Contingency (10%).....	$ 4,300
Total Mitigation Cost.....	$40,000

TUT 001 1931

Extramural TAT Cost

TAT Monitoring and sampling program (Including travel and per diem).....	$35,000
TAT Technical and administrative support (including travel and per diem).....	$10,000
Total TAT Cost	$45,000

Intramural EPA Cost

(Including travel and per diem).....	$15,000
ESTIMATED TOTAL PROJECT COST.....	$100,000

This figure represents the estimated total for Phase I. It could be reduced significantly, if a reliable and permanent alternate water supply is found sooner than the proposed 52-weeks delivery period; might be increased, depending upon the identification of new drinking water wells found to be contaminated with hazardous substances within the affected area.

C. Project Schedule

Project initiation of cistern clean-up and safe water delivery has already been implemented based on verbal funding authorization. Safe water delivery period is currently estimated not to exceed one year or when a permanent alternate water supply can be provided, whichever occurs first.

V. RECOMMENDATIONS

Conditions at the Tutu Well Site meet the requirements of Section 300.65 of the National Contingency Plan (NCP) for a CERCLA/SARA removal action. EPA has determined that there is a threat to public health at the site (Section 300.65(b)(1). This determination was based on:

1) Human exposure to unacceptably high levels of acutely toxic substances (Section 300.65(b)(2)(i), and

2) Contamination of drinking water supply (Section 300.65 (b)(2)(ii).

The resident population at risk currently relies on private well water as their source of potable water.

This removal action complies with Section 104(b)(2) of CERCLA, as amended by SARA, in that it is consistent with the efficient performance of long-term remedial measures, by providing an interim supply of potable water to the public until a permanent water supply can be secured.

This is a written confirmation of the initial and revised verbal approval of up to $100,000 for the total project ceiling established on September 1, 1987, by the Director of the Emergency and Remedial Response Division to the OSC for the CERCLA removal action at the Tutu Well Site. The mitigation contracting ceiling is estimated at $40,000, with an additional $45,000 for TAT costs, and $15,000 for EPA costs.

Your authority to authorize these funds is pursuant to Deputy Administrator Alvin Alm's memorandum of Delegation Number 14-1A dated April 15, 1984, and Richard Dewling's Redelegation Order R-11-1200.6 of August 29, 1984.

APPROVAL: Stephen D. Luftig DATE: 1/6/88

DISAPPROVAL: _____ DATE: _____

cc: (after approval is obtained)

C. Daggett, 2RA
R. Salkie, 2ERR-DD
S. Luftig, 2ERR
G. Zachos, 2ERR-RP
B. Sprague, 2ERR-RP
J. Czapor, 2ERRD-SC
G. Pavlou, 2ERRD-NYCRA
J. Marshall, 2OEP
P. Gelabert, 2CFO
R. Gherardi, 2OPM-FIN
T. Sullivan, PM-214F (EXPRESS MAIL)
T. Fields, WH-548B
P. McKechnie, 2IG

PHOTOVAC SAMPLING RESULTS
TUTU WELL SITE
ST. THOMAS, U.S. VIRGIN ISLANDS

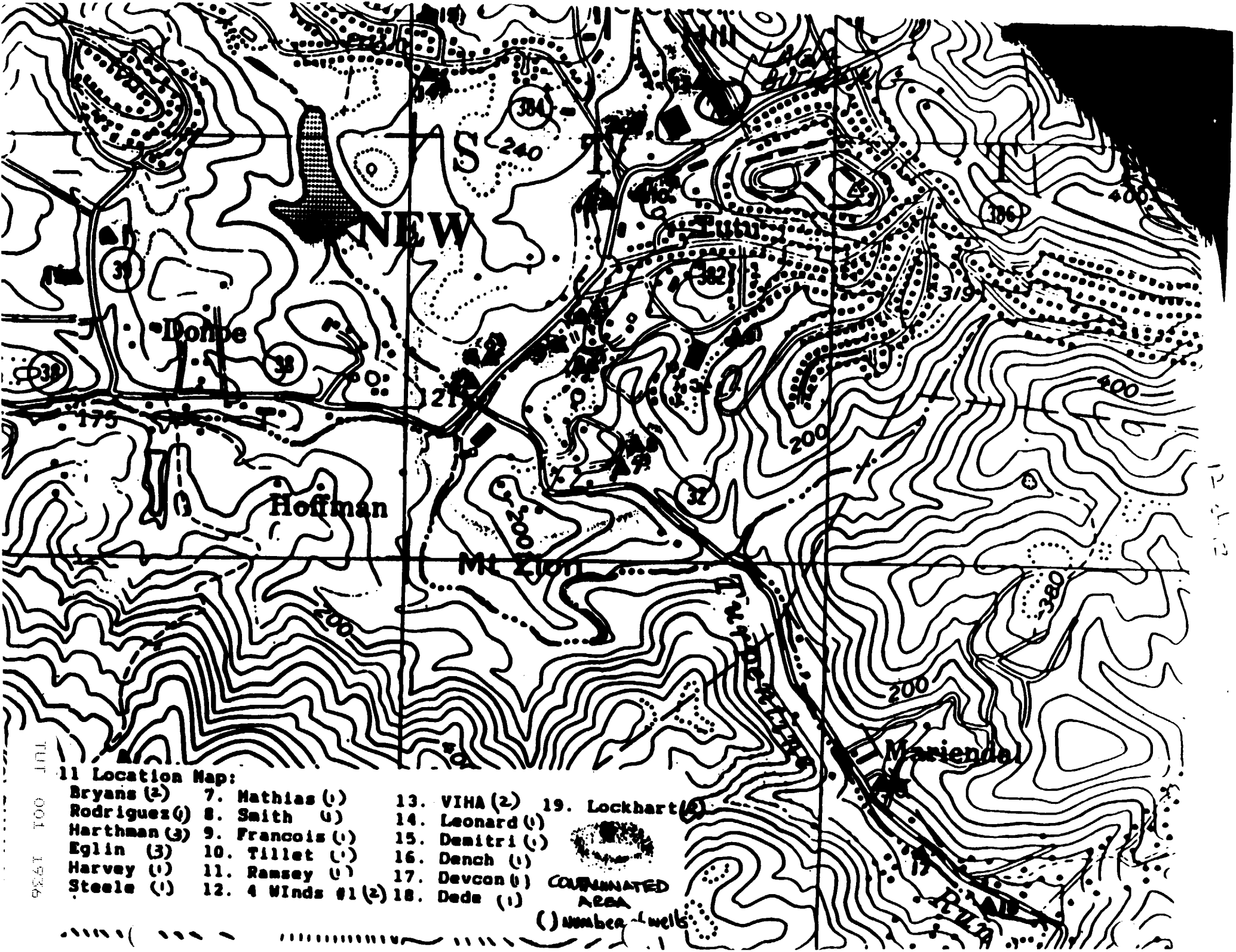
SAMPLE LOCATION	SAMPLE NUMBER	DATE SAMPLED	DATE ANALYZED	SOURCE	BEN	TCE	PCE	TOL	DCE	GCMS
HARTMAN CRUSH	87-473	07/22/87	07/30/87	IW	0	7	102	6	0	.T.
HARTMAN BAKERY	87-474	07/22/87	07/30/87	IW	0	0	3	6	0	.T.
4 WINDS WELL#1	87-475	07/22/87	07/30/87	CW	7	19	64	6	0	.T.
4 WINDS WELL#1	87-476	07/22/87	07/30/87	CW	7	19	61	6	0	.T.
TILLET	87-477	07/22/87	07/30/87	CW	633	65	200	48	38	.T.
VINA	87-478	07/22/87	07/30/87	IW	15	9	36	6	0	.T.
ECLIN	87-479	07/22/87	07/30/87	CW	3	16	58	6	0	.T.
TILLET	87-480	07/22/87	07/30/87	CW	6980	711	2040	492	327	.T.
FIELD BLANK	87-481	07/22/87	07/30/87	BA	0	0	0	6	0	.T.

TABLE 1

WELL SAMPLING RESULTS
TUTU WELL SITE
ST. THOMAS, U.S. VIRGIN ISLANDS

SAMPLE LOCATION	SAMPLE NUMBER	DATE SAMPLED	DATE ANALYZED	SOURCE	BEN	TCE	PCE	TOL	DCE	GCMS
4 WINDS #1	001A	08/10/87	08/13/87	CW	2	21	72	1	213	.T.
EGLIN WELL #1	002A	08/10/87	08/13/87	CW	0	11	38	0	63	.T.
EGLIN WELL #2	003A	08/10/87	08/13/87	CW	0	13	43	0	74	.T.
EGLIN WELL #3	004A	08/10/87	08/13/87	CW	0	16	57	0	66	.T.
HARTMAN BAKERY	005A	08/10/87	08/13/87	IW	0	0	3	0	1	.T.
HARTMAN CRUSH	006A	08/10/87	08/13/87	IW	0	3	26	0	12	.T.
HARTMAN ESTATE	007A	08/10/87	08/13/87	PW	0	0	1	0	0	.T.
RODRIGUEZ AUTO	008A	08/10/87	08/13/87	IW	0	0	1	0	0	.T.
BRYAN	009A	08/10/87	08/13/87	CW	0	0	0	0	0	.T.
ALPHA,LEONARD	010A	08/10/87	08/13/87	PW	0	0	1	0	0	.T.
SMITH,LUCITA	011A	08/10/87	08/13/87	PW	0	17	120	1	81	.T.
DEVCON #3	012A	08/10/87	08/13/87	CW	0	0	0	0	0	.T.
DEVCON #1	013A	08/10/87	08/13/87	CW	0	0	0	0	0	.T.
DEDE	014A	08/10/87	08/13/87	HA	0	0	0	0	0	.T.
DEMITRI	020A	08/10/87	08/13/87	CW	0	0	2	0	0	.T.
VIHA WELL #3	021A	08/10/87	08/13/87	IW	0	0	0	0	7	.T.
VIHA WELL #1	022A	08/10/87	08/13/87	IW	0	3	10	1	12	.T.
RANSEY	030A	08/10/87	08/13/87	IW	0	0	7	0	1	.T.
STEEL	031A	08/10/87	08/13/87	PW	0	28	270	0	61	.T.
HARVEY	032A	08/10/87	08/13/87	PW	0	61	7600	1	86	.T.
MATHIAS	033A	08/10/87	08/13/87	PW	0	4	66	1	9	.T.
FRANCOIS	034A	08/10/87	08/13/87	PW	0	28	120	0	140	.T.
BENCH	035A	08/10/87	08/13/87	PW	0	0	0	0	0	.T.
TILLET	036A	08/10/87	08/13/87	CW	1300	0	240	86	570	.T.
TILLET DUP	037A	08/10/87	08/13/87	CW	1400	36	120	33	620	.T.
FIELD BLANK	040A	08/10/87	08/13/87	HA	0	0	0	0	0	.T.

TABLE II


NEW
Tutu
Donie
Hoffman
Mt Zion
Mariendel
Lockhart
Harthman (3)
Eglin (3)
Harvey (1)
Steele (1)
Bryans (2)
Rodriguez (1)
7. Mathias (1)
8. Smith (1)
9. Francois (1)
10. Tillet (1)
11. Ramsey (1)
12. 4 Winds #1 (2)
13. VIHA (2)
14. Leonard (1)
15. Demitri (1)
16. Danch (1)
17. Devcon (1)
18. Dede (1)
19. Lockhart (6)
COMMINATED AREA
( ) Number of wells

REFERENCE NO. 57

TUT 001 1937

FILE COPY

August 22, 1988

Request for a Twelve Month Exemption for the TUTU Well Site, Saint Thomas, US Virgin Islands - ACTION MEMORANDUM

Carlos E. O'Neill
On Scene Coordinator, CFO

William Muszynski
Acting Regional Administrator

THRU: Stephen D. Luftig, Director
Emergency and Remedial Response Division

I. ISSUE

Continued response actions which exceed a twelve-month time period cannot be undertaken unless an exemption from Section 104(c)(1) of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) of 1980, as amended by the Superfund Amendments and Reauthorization Act (SARA) of 1986, is granted. Reroval activities were initiated at the TUTU Well Site in Saint Thomas, U.S. Virgin Islands on September 1, 1987, and the twelve month time limitation for reroval actions under CERCLA/SARA will expire on the same day in 1988. Circumstances, discussed on the following pages, have arisen which will prevent the reroval action from being completed within the authorized time period. These same circumstances prevent an accurate estimation of the amount of time required to complete this removal action. As a result, an exemption from the twelve month time limit is hereby requested to continue to provide an alternate supply of potable water to the affected residents.

II. [illegible]

A. Incident/Response History

On July 15, 1987, Mr. Alan Smith, Commissioner of the Department of Planning and Natural Resources (DPNR), U.S. Virgin Islands, verbally requested from the U.S. Environmental Protection Agency (EPA) to provide analytical support in the sampling of one well

FILE: TUTU WELL SITE St. Thomas, VI
2ERR:RP:O'Neill:TT:9/31/88:

2CA	2CA						
O'Neill	GELABERT						
9/1/88	9/1/88						
2ERR-RP	2RPO	2ERR-SC	20RC	20EP	2ERR	2DRA	2RA
SPRAGUE	SALKIE	CRAPOR	SCHAAF	RANDOL	LUFTIG	MARSHALL	MUSZYNSKI
9/1/88	9/1/88	9/6/88	9/7	9/12	9/12	9/12	9/14

TUT 001 1988

9/2/88-4

which was reported to exhibit a strong unpleasant odor. This well was a major source of commercially provided potable water for the eastern portion of Saint Thomas. The well is located on the eastern part of the island in the Tutu Section of Anna's Retreat. This verbal request was followed by an additional request for EPA to assume the role of Lead Agency after sampling results indicated that several commercial wells were found to be contaminated with hazardous substances. This verbal request was followed by a formal request in writing from DPNR on August 10, 1987.

EPA's preliminary investigation commenced on July 21, 1987, with a field reconnaissance and sampling of this one well and six additional wells identified in the immediate area. Several of these wells were also major water suppliers of public drinking water for the eastern part of the island.

Laboratory results from this survey indicated that the initial well was highly contaminated with gasoline and chlorinated organics, and the additional six wells contained elevated levels of chlorinated volatile organic compounds. Based on these results, DPNR declared that an imminent health threat existed, which could affect approximately 20,000 people living in St. Thomas.

In addition, an indefinite number of tourists vacationing in St. Thomas were at risk, since these commercial wells supplied water to major hotels and restaurants. DPNR issued orders to close these seven commercial wells in order to protect public health.

Subsequent to this action, EPA expanded their sampling plan due to the threat of greater contamination to drinking water wells in the area. EPA along with DPNR, identified other wells within the Tutu Water/Turpentine Run Aquifer which may have been impacted by the hazardous substances identified to be present in the groundwater. A second round of groundwater well sampling took place on August 10 and 11, 1987, which included a total of twenty-four (24) wells identified in the Tutu Section of Anna's Retreat. All twenty-four wells were sampled and analyzed for volatile organic compounds. Following these results, DPNR closed five private wells which serviced two three-family homes and one apartment building housing of twelve studio units.

A third round of groundwater well sampling took place on October 5 and 6, 1987, which included twenty-four (24) wells previously identified in the Turpentine Run Aquifer. All twenty-four wells were sampled and analyzed for full Hazardous Substance List (HSL) compounds. From these results, EPA once again confirmed the gross contamination of the groundwater wells with volatile organic compounds (VOC). Major contaminants in groundwater are tetrachloroethylene (PCE), trans 1-2 dichloroethylene (DCE) and benzene. The EPA's Removal Action Level (RAL) of 66 ppb for PCE was exceeded in seven (7) wells, the RAL of 175 ppb for DCE was exceeded in three (3) wells, and the RAL of 120 ppb for benzene was exceeded in one (1) well. There was one (1) additional well found below the EPA Removal Action Level, but above the U.S. Virgin Island's interim maximum permissible concentration levels set on September 1, 1987, by DPNR for volatile organics in drinking water in the Turpentine Run Aquifer (50 ppb for a single compound or 100 ppb for total volatile organic compounds). Five of the seven previously mentioned wells were residential wells.

EPA and DPNR commenced an investigation of the Tutu Water/ Turpentine Run Aquifer by issuing Enforcement Orders to PRP's to define Potential Responsible Parties and determine the extent of contamination. EPA initiated a monthly/quarterly well monitoring program. DPNR issued a total of ten (10) orders to well owners to close sixteen (16) wells and issued two (2) advisory letters to owners not to use well water for drinking, bathing and washing.

EPA initiated a removal action on September 1, 1987. The action involved cleaning the homeowner's cisterns that had been contaminated by hazardous substances from the groundwater, modifying the existing home plumbing to terminate well connections, and delivering clean water to 3 well owners via tank trucks on a regular basis, and establishing a surveillance program for all wells in the area by a monthly/quarterly groundwater monitoring program. This Phase I, short-term removal action has mitigated the threat to public health by providing a temporary alternate source of water for affected consumers.

This site is not on the National Priorities List (NPL), nor is it currently proposed.

F. Site Conditions

The long term solution to this problem appears to be the extension of a public water main to the affected residences. Implementation of this plan has been delayed due to the budgetary constraints facing the Removal Program. As a result, trucking water deliveries are continuing until the funds necessary to extend the water main are obtained. Awaiting this funding has prevented this site from being completed within the twelve month statutory limit.

III. EXEMPTION FROM STATUTORY LIMITS

Section 104(c)(1) of CERCLA limits Federal removal actions to twelve months in duration unless certain criteria are met. These criteria, along with a discussion of how this site conforms to them, are discussed in the following paragraphs.

A. There is an Immediate Risk to Public Health, Welfare or the Environment

This is a case of actual well water contamination in excess of the EPA's 66 ppb removal action levels (RAL) for PCE, 175 ppb RAL for DCE, 120 ppb RAL for benzene and 48 ppb RAL for methylene chloride affecting two multi-family dwellings and an apartment complex housing twelve studio units. In addition to the exposure via consumption of water, or eating food prepared with this water, showering with water contaminated with volatile organics contaminate the air. This causes an elevation in household air contaminant concentrations and exposes residents through inhalation and adsorption through the skin. Contaminated water supplies, therefore, pose a serious threat not only through drinking and cooking, but also through showering, bathing, and dishwashing. A complete history of sample results taken to date has been included in Attachment "A". Since our initiation of this removal action, the concentrations of contaminants has not diminished at the residential wells. For example: Smith, Steele and Harvey wells have consistently shown high levels of PCE above the EPA's Removal Action Levels (RAL).

B. Continued Response Actions are Immediately Required to Prevent, Limit or Mitigate an Emergency

The contamination existing at this site is an emergency in that residential potable water supplies are contaminated with hazardous materials. Provision of trucking water by EPA to

the residents has reduced the risk of exposure by ingestion, and contact through bathing and showering. If this twelve month exemption request is not approved, trucking water deliveries will have to be terminated. This would leave residents with only their own contaminated wells as a potable source of water and would result in a direct exposure problem.

C. Assistance Will Not Otherwise be Provided on a Timely Basis

No other level of government has agreed to take any action on a timely basis which could provide an adequate solution to this problem. EPA enforcement has investigated this area, and some Responsible Parties have been identified. However, at this time, a PRP removal action appears unlikely.

IV. RECOMMENDATION

Conditions at this site continues to meet the criteria for a removal action under CERCLA 104(c)(1). Therefore, I recommend the approval of an exemption from the twelve month limit and allow the continuation of removal activities at the TUTU Well Site in Saint Thomas, U.S. Virgin Island.

Your authority to approve this time exemption is pursuant to Administrator's September 21, 1987 Memorandum Delegation 14-3.

APPROVED _____ DATE SEP 14 1988

DISAPPROVED _____ DATE _____

cc: (after approval is obtained)

J. Marshall, 2ADRA
R. Salkie, 2ERR-RPO
S. Luftig, 2ERPD
B. Sprague, 2ERR-PP
G. Zachos, 2ERR-RP
J. Czapor, 2ERR-SC
G. Pavlou, 2ERR-NYCRA
J. Malleck, 2WMD-OWM
V. Pitruzzello, 2ERR-PS
M. Randal, 20EP
E. Schaff, 20RC-SUP
R. Gherardi, 20PM-FIN
S. Anderson, PM-214F (express mail)
T. Fields, WH-548B
A. Smith, DPNR-USVI

bcc: C. Hoyik, 2ERR-PS
J. Rosianski, 2-OEP
L. Guarneiri, WH-548B

REFERENCE NO. 58

TUT 001 1943

PROJECT APPROVAL ROUTING FORM

Attached are completed projects for your approval. Please indicate projects with discrepancies, if any, in the remarks column. If the project is approved, sign your name and record the date and time in the appropriate column. Pass the reports on to the next lead analyst for the surveys.

ROUTING	PROJECT NUMBER	REMARKS AND SIGNATURE	TIME (DAY/HOUR)
Sanitary Chemistry and Micro. Sect. Cheif	169 ✓	JK	5:10 P.M. 7/31/87
Organic Chemistry Section Chief			
Inorganic Chemistry Section Chief			
Ambient Monitoring Section Chief			
		Fwk for T.F. 8/4/87	

CAD DATA MANAGEMENT SYSTEM - REGION 01

COMPLETED PROJECT LOAD

PROJECT NUMBER	PROJECT DATE	PROJECT NAME	
169	87/07/22	TOYO WELL SITE V.I.	APPROVED

KWK for T.T.
8/4/87

TUT 001 1945

4 of 4

COMPLETED ANALYSIS REPORT — REPORT DATE: 87/07/30

PROJECT NO: 169 — PROJECT NAME: TUTU WELL SITE V.I.

STATION NO	DATE FROM / TO	TIME OF DAY	LABNO	PARNO	PARAMETER NAME	UNITS	CHEMISTRY	VALUE & REMARK
TAT	87/7/22	0900						
COMPOSITE	87/07/22	0907						
DEPTH: 0000 SUBSTRATE: AQUEOUS								
DESCRIPTION: CRUSHER WELL HARTAMAN								
			090809	00680	TOTAL ORGANIC CARBON	MG/L	TOTAL	10.2 M
TAT	87/07/22	0910						
COMPOSITE	87/07/22	0915						
DEPTH: 0000 SUBSTRATE: AQUEOUS								
DESCRIPTION: BAKERY WELL HARTAMAN								
			090810	00680	TOTAL ORGANIC CARBON	MG/L	TOTAL	8.0 M
TAT	87/07/22	0930						
COMPOSITE	87/07/22	0932						
DEPTH: 0000 SUBSTRATE: AQUEOUS								
DESCRIPTION: FOUR WINDS SHOPPING CENTER PARKING LOT								
			090811	00680	TOTAL ORGANIC CARBON	MG/L	TOTAL	7.9 M
TAT	87/07/22	0939						
COMPOSITE	87/07/22	0938						
DEPTH: 0000 SUBSTRATE: AQUEOUS								
DESCRIPTION: FOUR WINDS SHOPPING CENTER PARKING LOT ** DUPLICATE **								
			090812	00680	TOTAL ORGANIC CARBON	MG/L	TOTAL	7.2 M
TAT	87/07/22	1019						
COMPOSITE	87/07/22	1020						
DEPTH: 0000 SUBSTRATE: AQUEOUS								
DESCRIPTION: TILLET WELL / GARDENS								
			090813	00680	TOTAL ORGANIC CARBON	MG/L	TOTAL	8.5 M
TAT	87/07/22	1104						
COMPOSITE	87/07/22	1110						
DEPTH: 0000 SUBSTRATE: AQUEOUS								
DESCRIPTION: V.I. HOUSING AUTHORITY WELL UNUSED 6 MOS. RUN 10 MIN.								
			090814	00680	TOTAL ORGANIC CARBON	MG/L	TOTAL	5.8 M

TUT 001 1746

4 of 8

COMPLETED ANALYSIS REPORT

REPORT DATE: 87/07/22

PROJECT NO: 169 PROJECT NAME: TUTU WELL SITE V.I.

STATION NO	DATE FROM TO	TIME OF DAY	LABNO	PARNO	PARAMETER NAME	UNITS	CHEMISTRY	VALUE & REMARK
TAT	87/07/22	1123						
COMPOSITE	87/07/22	1130						
DEPTH: 0000 SUBSTRATE: AQUEOUS								
DESCRIPTION: GENE EGLIN WELL								
			090815	00680	TOTAL ORGANIC CARBON	MG/L	TOTAL	6.1 M
TAT	87/07/22	1450						
COMPOSITE	87/07/22	1500						
DEPTH: 0000 SUBSTRATE: AQUEOUS								
DESCRIPTION: TILLET WELL								
			090816	00680	TOTAL ORGANIC CARBON	MG/L	TOTAL	6.8 M
TAT	87/07/22	1525						
COMPOSITE	87/07/22	1530						
DEPTH: 0000 SUBSTRATE: AQUEOUS								
DESCRIPTION: SAMPLE BLANK FROM DCCA								
			090817	00680	TOTAL ORGANIC CARBON	MG/L	TOTAL	4.2 M

***** END OF PROJECT *****

1947 TOO TUT

454

REFERENCE NO. 59

NUS CORPORATION AND SUBSIDIARIES			STANDARD CALCULATION SHEET
CLIENT: USEPA	FILE NO.: 02-9102-11	BY: Richard L. Feinberg	PAGE 1 OF 3
SUBJECT: CALCULATION OF GW CONTAMINATION AREA		CHECKED BY:	DATE: 8/24/91

APPROXIMATE AREA OF OBSERVED CONTAMINATION (CONFIRMED W/ CLP DATA FROM 1990)

$\frac{A \times B}{2}$ = AREA OF RIGHT TRIANGLE $L^{90°}$

A = 950 feet
B = 1,600 feet

$\frac{950\ ft \times 1{,}600\ ft}{2} = 760{,}000\ ft^2$

ACRE = 43,560 ft^2

$\frac{760{,}000\ ft^2}{43{,}560\ ft^2} = 17.4$ ACRES

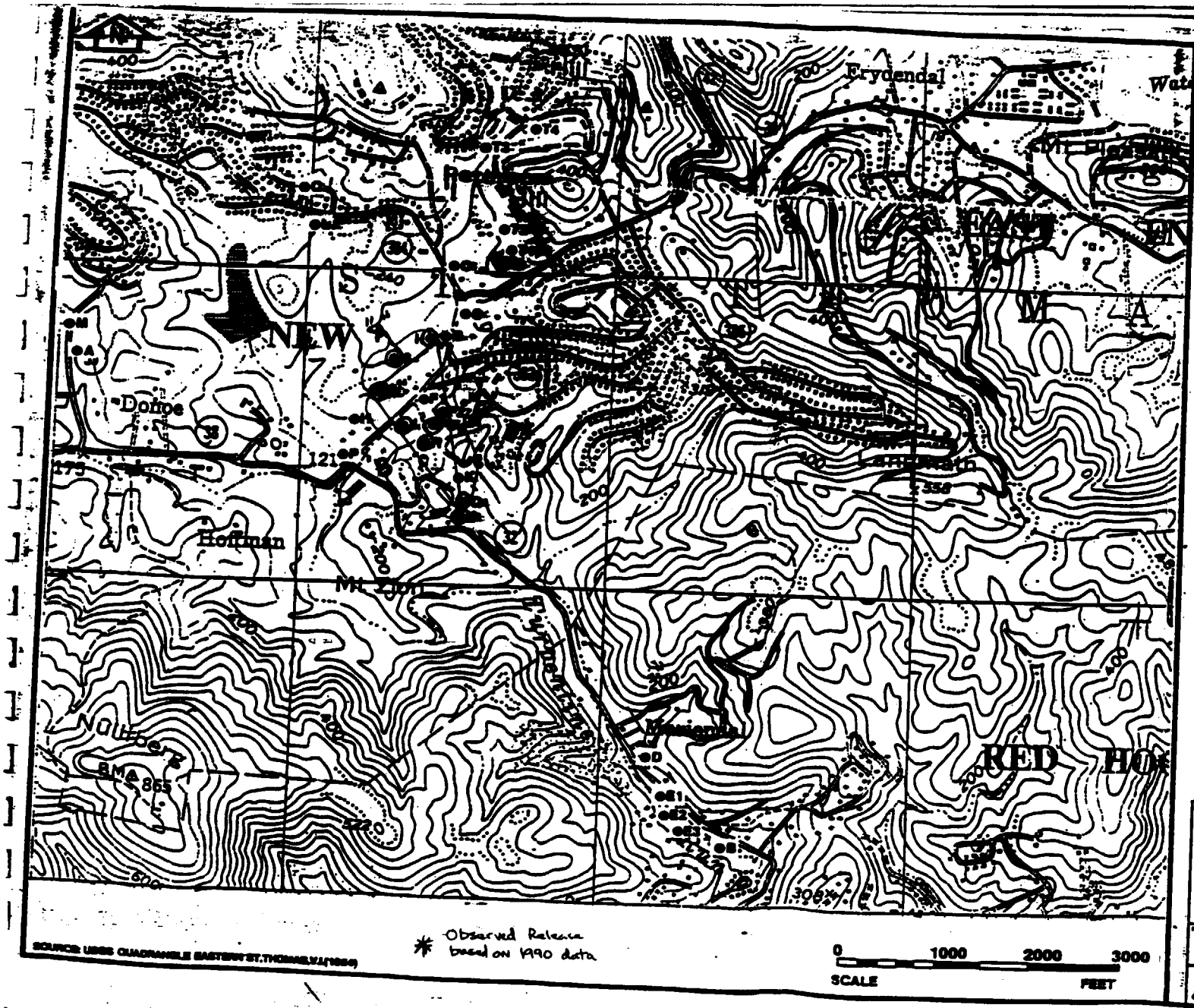
SEE PAGE 2 of 3 for measurements

APPROXIMATE AREA OF OBSERVED CONTAMINATION (CONFIRMED W/ NON CLP DATA FROM 1987 THROUGH 1990)

A = 2,900 feet
B = 1,500 feet

$\frac{2{,}900\ ft \times 1{,}500\ ft}{2} = 4{,}350{,}000\ ft^2$

$\frac{2{,}175000\ ft^2}{43{,}560\ ft^2} = 49.9$ ACRES



LEGEND

- RESIDENTIAL WELL
- A BRYAN
- B DEDE
- C DEMITRI
- D DENCH
- E1 DEVCON 1
- E2 DEVCON 2 (ALTERNATE)
- E3 DEVCON 3
- P1 EGLIN 1
- P2 EGLIN 2 *
- P3 EGLIN 3 *
- G FOUR WINDS No.1
- H FOUR WINDS No.2 *
- I GASSETT
- J HARTMAN CRUSHER *
- JB HARTMAN ESTATE *
- J HARVEY *
- K LaPLACE
- L LEONARD
- M LOCKHART (ALTERNATE)
- N MATTHAS *
- O RAMSEY
- P RODRIGUES
- Q SMITH *
- R STEELE *
- S TILLETT
- T1 VIHA No.1
- T2 VIHA No.2 (ALTERNATE)
- T3 VIHA No.3
- T4 VIHA No.4 (ALTERNATE)

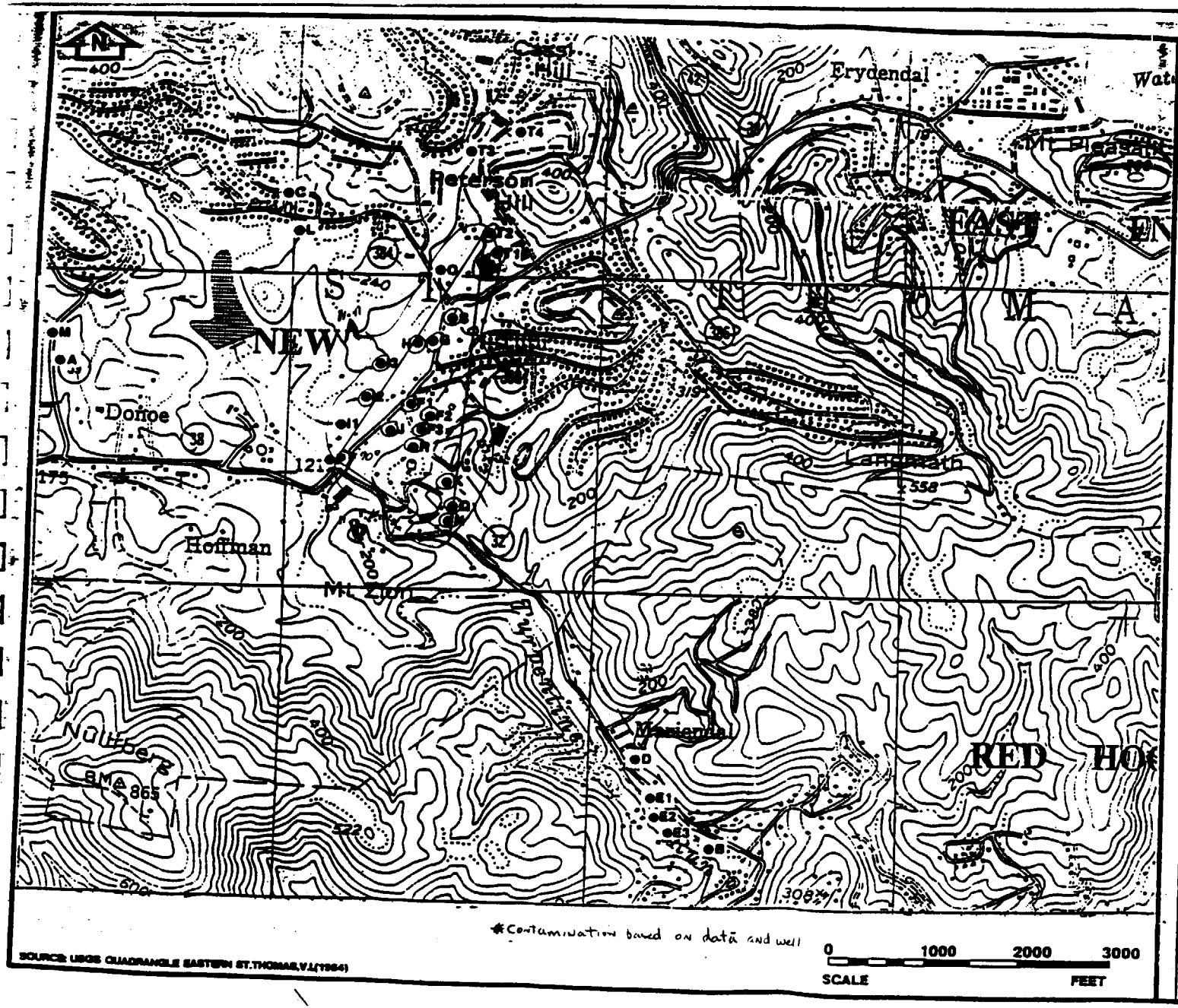
WELL SAMPLING LOCATIONS,
TUTU WELLS SITE SAMPLING
ANALYSIS, AND MONITORING PLAN,
ST. THOMAS, USVI

TEIC

Geraghty & Miller, Inc.

1

TUT 001 1950



*Contamination based on data and well

SOURCE: USGS QUADRANGLE EASTERN ST. THOMAS, V.I. (1964)

LEGEND

- RESIDENTIAL WELL
- A BRYAN
- B DEDE
- C DEMITRI
- D DENCH
- E1 DEVCON 1
- E2 DEVCON 2 (ALTERNATE)
- E3 DEVCON 3
- F1 EGLIN 1 *
- F2 EGLIN 2 *
- F3 EGLIN 3 *
- G FOUR WINDS No.1 *
- H FOUR WINDS No.2 *
- I1 GASSETT
- I2 HARTMAN CRUSHER *
- I3 HARTMAN ESTATE *
- J HARVEY *
- K LaPLACE *
- L LEONARD
- M LOCKHART (ALTERNATE)
- N MATTHIAS *
- O RAMSEY
- P RODRIGUES
- Q SMITH *
- R STEELE *
- S TILLETT *
- T1 VIHA No.1 *
- T2 VIHA No.2 (ALTERNATE)
- T3 VIHA No.3
- T4 VIHA No.4 (ALTERNATE)

WELL SAMPLING LOCATIONS, TUTU WELLS SITE SAMPLING ANALYSIS, AND MONITORING PLAN, ST. THOMAS, USVI

TEIC

Geraghty & Miller, Inc.				
	PREPARED BY:	FINDLAY	SCALE:	FIGURE:
	REVIEWED BY:	PADULA	UNKNOWN	1
	APPROVED BY:	FINDLAY	DATE: 5/88	

5 of 3

TUT 001 1951

REFERENCE NO. 60

SAMPLING, ANALYSIS, AND MONITORING PLAN FOR WELLS TUTU WELLS SITE ST. THOMAS, U.S. VIRGIN ISLANDS

September 1990

Prepared for

Tutu Environmental Investigation Committee

Geraghty & Miller, Inc.
INTERNATIONAL GROUP
290 Vincent Avenue
Hackensack, New Jersey 07601
(201) 646-1400

TUT 001 1953

GERAGHTY & MILLER, INC.
Environmental Services
INTERNATIONAL GROUP

September 19, 1990

Caroline Kwan
U.S. Environmental Protection Agency
Region II
26 Federal Plaza
New York, NY 10278

RE: Final Tutu Wells Site Sampling, Analysis, and Monitoring Plan

Dear Caroline:

On behalf of the Ana Gloria Ramos, Designated Coordinator for the Tutu Environmental Investigation Committee (TEIC), Geraghty & Miller, Inc. is submitting the final version of the Sampling, Analysis, and Monitoring Plan (SAMP) for the Tutu Wells Site, St. Thomas, USVI.

Please note that the total number of wells to be sampled has been changed from 29 to 25, as agreed upon during our site visit on August 20 and 21, 1990. The four wells which have been removed from the sampling schedule (Wells Devcon 2, Lockhart, VIHA No. 2, and VIHA No. 4) may be used as alternate sampling locations in the event that nearby wells are inaccessible.

Please call with any questions.

Sincerely,

GERAGHTY & MILLER, INC.
INTERNATIONAL GROUP

Marcia Findlay
Senior Scientist

Daniel [illegible]
Director of Caribbean Operations

[illegible]

TUT 001 1954

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4. Ceimic Internal Sample Control Record.

5. Project Schedule, Tutu Wells Site Sampling, Analysis, and Monitoring Plan, St. Thomas, USVI.

6. Health and Safety Plan Sign-Off Sheet, Tutu Wells Site Sampling, Analysis, and Monitoring Plan, St. Thomas, USVI.

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B. Well Sampling Procedures.

C. Sampling Quality Assurance/Quality Control Protocols.

D. Ceimic Corporation Quality Assurance Plan.

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SAMPLING, ANALYSIS, AND MONITORING PLAN FOR WELLS TUTU WELLS SITE ST. THOMAS, U.S. VIRGIN ISLANDS

INTRODUCTION

This Sampling, Analysis, and Monitoring Plan (SAMP) has been prepared for the Tutu Environmental Investigation Committee (TEIC) which is comprised of Texaco Caribbean Inc. (Texaco), Esso U.S. Virgin Islands, Inc. (Esso), and L'Henri, Inc. (O'Henry) by Geraghty & Miller, Inc. for well sampling in the vicinity of the Tutu Wells Site, Anna's Retreat, St. Thomas, U.S. Virgin Islands (USVI). The SAMP was developed in order to satisfy requirements set forth in the Administrative Order (Order) issued on March 22, 1990 to Texaco, Esso, and O'Henry by the U.S. Environmental Protection Agency (USEPA) Region II. Responding parties have denied any liability or responsibility and the work to be conducted pursuant to this plan does not constitute any admission that the respondents are liable or responsible for any constituents which may be present in the wells sampled.

Objectives

The objectives of the SAMP are to identify, quantify, and monitor the occurrence of gasoline constituents and tetrachloroethene (and its breakdown products) in wells in the vicinity of Route 38 within the Tutu Wells Site.

BACKGROUND

The Tutu Wells Site is located in the upper Turpentine Run basin in east central St. Thomas (Figure 1). The Turpentine Run basin is one of the most heavily populated areas in the Virgin Islands. Various commercial establishments line the major roads in the area. These establishments include the Texaco Tutu service station at the intersection of Highways 38 and 384, the Esso Tutu service station on Highway 38, and O'Henry Dry Cleaners on Highway 38. Private homes and multi-family housing, such as the Virgin

Islands Housing Authority (VIHA) buildings, generally occupy the less heavily traveled roads. Several water supply wells are located in the Turpentine Run basin (Figure 2). These wells are operated by the VIHA, water purveyors, and private concerns, and supply water for domestic and commercial purposes.

The Texaco Tutu service station has been in continuous operation since 1964. The station is a retail outlet for gasoline and diesel fuel and also provides mechanical servicing of automobiles. Over the life of the station, fuel has been stored underground with the exception of the period from July 1987 to September 1988 when the fuel storage tanks and piping were replaced with new tanks and piping.

The Esso Tutu service station has been in continuous operations since 1970. The station sells gasoline for retail and performs mechanical repairs. The station has two underground storage tanks; one of them was removed from service from August 1987 to June 1989. Fuel has been stored underground over the life of the station except for a brief period in June 1989 when the tanks and piping were removed and replaced with new tanks and piping.

O'Henry Dry Cleaners has been owned and operated by L'Henri, Inc. since 1981. Tetrachloroethene, commonly referred to as "perchloroethylene" and hence abbreviated as PCE, is used, stored, and handled at the establishment.

A brief reconnaissance of the area revealed that there are other establishments which represent potential sources of constituents of concern to soil and ground water. These establishments include but may not be limited to:

- A Jeep dealership and repair shop.
- The Ramsey Motor dealership and repair shop.
- The LAGA building, which formerly housed a textile processing operation.
- Tillett Garden, where silk screening and pottery manufacturing and glazing are performed.

- The paint store.
- The Fire Station.
- The Vitelco facility.
- Other small repair shops located on Highway 38.
- The sanitary/storm sewer line(s).

The locations of these establishments, with the exception of the sanitary/storm sewer line(s), are shown on Figure 3.

The following information is derived from the USEPA's Administrative Consent Order of March 22, 1990 and other reports prepared by USEPA and its consultants. Responding parties have not made an independent determination of these facts.

In July 1987, water from the Tillett well was reported to have an unusual odor. Subsequent sampling and analysis of water from that well and other water supply wells in the area by the USEPA Technical Assistance Team (TAT) revealed the presence of volatile organic compounds (VOCs) in the well water.

The compounds detected included gasoline constituents and chlorinated organic compounds. As a result of the presence of these constituents, the USVI Department of Planning and Natural Resources (DPNR) closed 18 wells in the area from July through September 1987. The wells have remained closed and have been sampled quarterly by the USEPA Region II TAT team.

The majority of the quarterly sampling events performed by the TAT team involved analysis of the well water samples using a portable Photovac Gas Chromatograph (GC). Water samples were sent to a laboratory for chemical analysis on at least two occasions, in October 1987 and in November 1988. During both the October 1987 and November 1988 sampling events, the samples were analyzed for the EPA Target Compound List (TCL) of parameters. It appears that an earlier sampling event occurred in July 1987, when the wells were first sampled and analyzed for VOCs using EPA Method 8240.

SCOPE OF WORK

The objective of the SAMP is to identify, quantify, and monitor the occurrence of gasoline constituents and PCE and its breakdown products in residential wells in the vicinity of Route 38 within the Tutu Wells Site.

Twenty-five wells will be included in the sampling program. These wells are:

Bryan	Gassett (formerly Hartman Bakery)	Rodriguez
Dede	Hartman Estate	Smith
Demitri	Harvey	Steele
Dench	La Place	Tillett
Devcon No. 1	Matthias	VIHA No. 1
Devcon No. 3	Ramsey	VIHA No. 3
Eglin (3)		
Four Winds No. 1		
Four Winds No. 2		

The approximate locations of the wells are shown on Figure 2.

During the initial sampling event and once every year thereafter, the 25 wells will be sampled and submitted for laboratory analysis of the TCL and the Target Analyte List (TAL), with the exception of polychlorinated biphenyls (PCBs), under the Contract Laboratory Program (CLP). TAL analyses will be performed in accordance with the CLP Statement of Work (SOW) for Inorganics Analysis as revised in June 1989. TCL analyses, with the exception of VOCs, will be performed in accordance with the CLP SOW for organics analysis as revised in April 1989. All VOC analyses will be performed in accordance with a modified version of EPA Method 524.2 in order to achieve lower detection levels. EPA Method 524.2 analysis will be modified in accordance with the methodology described in Appendix A. VOC data reporting and validation will be performed in accordance with the CLP SOW for Organics Analysis, April 1989. Table 1 summarizes the proposed sampling and analysis effort. Table 2 lists the specific compounds and metals which are to be analyzed for this project.

methodology described in Appendix A. VOC data reporting and validation will be performed in accordance with the CLP SOW for Organics Analysis, April 1989. Table 1 summarizes the proposed sampling and analysis effort. Table 2 lists the specific compounds and metals which are to be analyzed for this project.

During the three remaining quarterly sampling events per year, the 25 wells will be sampled and submitted for laboratory analysis of TCL VOCs under CLP using modified EPA Method 524.2 in order to achieve lower detection levels. If the validated data from the initial sampling event indicates the presence of TCL semi-volatiles, pesticides, or TAL constituents above the detection limit, then samples collected from those wells during subsequent quarterly sampling events will be analyzed for the analyte group detected, in addition to VOCs. For example, if during the initial sampling event semi-volatiles are detected in Well A and one metal is detected in Well B, then during subsequent sampling events Well A samples will be analyzed for semi-volatiles in addition to VOCs and Well B samples will be analyzed for metals, in addition to VOCs.

However, if semi-volatile, pesticide, or TAL concentrations above the detection limit do not pass data validation criteria or if there is reason to suspect that blank or laboratory contamination or matrix interferences have cause the detection of these constituents in the samples, then those wells will not be analyzed in subsequent quarterly sampling events for the analyte group detected. Instead, samples from those wells will be analyzed for TCL VOCs only.

The analytical data will be reviewed every quarter after the comprehensive sampling of all 25 wells to determine the appropriateness of reductions in sampling frequency or complete determination of sampling activities. If sampling reduction or termination is warranted, such a proposal will be submitted to the USEPA for approval. If any two successive quarterly sampling events indicate that constituents of concern are not detected at concentrations above the detection limit, a proposal to terminate sampling will be submitted to the USEPA for approval.

QUALITY ASSURANCE/QUALITY CONTROL PROGRAM

The objective of the Quality Assurance/Quality Control (QA/QC) program is to provide data of known quality and to be able to defend the data. The QA/QC program consists of three parts: the sampling QA/QC program, the analytical QAPP, and independent data review.

Sampling Quality Assurance/Quality Control Program

The sampling QA/QC objectives are to ensure the reliability and safety of all data and documentation generated as a part of the monitoring program. Well samples will be collected in accordance with USEPA-approved methods. Sampling will be conducted in such a way as to ensure that a water sample of quality representative of the hydrogeologic environment is obtained. Specific sampling protocols are described in Appendix B.

Quality control sampling, sample custody, handling, and data management will be conducted in accordance with USEPA-approved methods. Sampling QA/QC protocols are detailed in Appendix C.

Analytical Quality Assurance Project Plan

Laboratory analysis of well water will be performed by Ceimic Corporation (Ceimic) of Narragansett, Rhode Island. Ceimic routinely participates in laboratory performance evaluations for the USEPA as part of the Water Pollution (WP) program. The laboratory also undergoes quarterly audits by USEPA as required by the Contract Laboratory Program (CLP), and has been audited and approved by Geraghty & Miller's own internal laboratory contracting program. Ceimic Corporation is a United States Department of Agriculture (USDA) certified laboratory and may accept samples from the USVI.

Project Description

The analytical QAPP details the QA/QC procedures employed to ensure the accuracy, precision, comparability, representativeness, and completeness of analytical services to be provided for this monitoring program.

Project Organization and Responsibility

The organizational chart which delineates organization and responsibilities at Ceimic is included in the Ceimic Quality Assurance (QA) Plan dated December 1989 and included as Appendix D.

Quality Assurance Objectives

As part of the evaluation component of the QA Program, laboratory results are compared with certain data quality objectives. These objectives, in terms of precision, accuracy, representativeness, completeness, and comparability, may be defined as follows:

- Precision - the agreement or reproducibility among individual measurements of the same property, usually made under the same conditions.

- Accuracy - the degree of agreement of a measurement with the true or accepted value.

- Representativeness - the degree to which data accurately and precisely represent a characteristic of a population, parameter variations at a sampling point, a process condition, or an environmental condition.

- Completeness - a measure of the amount of valid data obtained from a measurement system compared with the amount that was expected to be obtained under correct normal conditions.

- o Comparability - an expression of the confidence with which one data set can be compared with another data set in regard to the same property.

The accuracy, precision, and representativeness of data will be functions of the origins of the samples, the procedures used to analyze samples and generate data, and the specific sample matrices involved in each project. Quality control practices utilized in the evaluation of these data quality objectives include blanks, replicates, spikes, standards, check samples, calibrations and recoveries.

Table 3 lists the objectives as defined for this project.

Sampling Procedures

Ceimic will not perform any sample collection as a part of the SAMP. Sampling procedures are described in Appendix B.

Sample Custody

Field Sample Custody: Sample custody procedures outside the laboratory are discussed in the section entitled Sampling QA/QC Program and in Appendix C.

Laboratory Sample Custody: Chain-of-custody originates as samples are collected. Chain-of-custody documentation accompanies samples as they are moved from the field to the laboratory with shipping information and appropriate signatures indicating custody changes along the way.

Laboratory chain-of-custody is initiated as samples are received and signed for on the Geraghty & Miller Chain-of-Custody form by the Sample Custodian at Ceimic. The sample custodian documents the condition of the sealed sample shipment cooler on the chain-of-custody form. The sample label information is checked against the chain-of-custody record and proper container and preservative procedures as detailed in Table 4 are verified.

The samples are then logged in by assigning laboratory identification numbers. The sample log-in record will include the sample identification, date of receipt, sample condition, the laboratory identification number, sample preparation, and sample distribution. The samples are secured in a refrigerator maintained at approximately 4°C prior to preparation and analysis. Documentation of samples are signed in and out of the central storage facility for analysis in the several Ceimic laboratories using the Sample Control Record (Figure 4). After analysis, extracts and any remaining samples are held in the central storage area for up to 120 days to await disposal.

Samples at Ceimic are kept within secure areas during all stages of tenure, including the periods of time spent in preparation, analysis, and storage. The laboratory area is designated as a secure area. The doors to this area are kept locked at all times and may be accessed only by key. Authorized personnel only are allowed to enter the secure area. Visitors to the laboratories must be accompanied by Ceimic staff members.

Calibration Procedures and Frequency

Instrument calibration procedures and frequency for organics analysis will be conducted in accordance with the methodology described in the CLP SOW for Organics Analysis, April 1989. Calibration procedures and frequency for inorganics analysis will be conducted in accordance with the methodology described in the CLP SOW for Inorganics Analysis, June 1989.

Analytical Procedures

Ceimic Corporation will analyze TCL semivolatile organic compounds and pesticides in accordance with the methods detailed in the USEPA CLP SOW for Organics Analysis, February 1988, with revisions dated September 1988 and April 1989. TCL VOCs will be analyzed in accordance with a modified version of EPA Method 524.2 in order to achieve lower detection levels. EPA Method 524.2 analysis will be modified in accordance with the methodology described in Appendix A. TAL inorganic constituents will be analyzed for in accordance with the methods detailed in the USEPA CLP SOW for Inorganics Analysis.

July 1988, with revisions dated February 1989 and June 1989. Table 5 summarizes the analytical methods to be employed.

Data Reduction, Validation, and Reporting

Data reduction, validation, and reporting are examined in depth as part of the Ceimic QA Plan dated December 1989, Sections 11.1, 11.2, 11.3. This plan is attached as Appendix D.

Internal Quality Control and Quality Assurance

For this project, the internal quality control practices will include the following samples analyzed one per batch of twenty samples of the same matrix received by the laboratory:

1 Laboratory Control Sample (Blank Spike)
1 Laboratory Control Sample Duplicate
1 Matrix Spike Sample
1 Matrix Spike Sample Duplicate
1 Method Blank

In addition, the following will also be required:

Surrogate Standards - to be added to every organic sample analyzed. The control limits are those listed in Table 6.

Performance and System Audits

This section is examined in detail in the Ceimic QA Plan dated December 1989, Section 13.0, included in Appendix D.

Preventative Maintenance

This section is examined in detail in the Ceimic QA Plan dated December 1989, Section 14.0, included in Appendix D.

Procedures to Assess Data Precision, Accuracy, Representativeness, Comparability and Completeness

Specific routine procedures to assess data precision, accuracy, representativeness, comparability, and completeness are examined in the Ceimic QA Plan dated December 1989, Section 15.0, included in Appendix D.

Corrective Action

This section is examined in detail in the Ceimic QA Plan dated December 1989, Section 16.0, included in Appendix D.

Quality Assurance Reports to Management

This section is examined in detail in the Ceimic QA Plan dated December 1989, Section 17.0, included in Appendix D.

Independent Data Validation

Geraghty & Miller will validate the entire data set, independently of the laboratory. Data validation will be performed in accordance with the USEPA Standard Operating Procedures (SOP) No. HW-2, February 1990 for inorganics and the USEPA SOP No. HW-6, March 1990 for organics. In brief, the data will be reviewed for compliance with the QC criteria based on the spike, duplicate, and blank results provided by the laboratory. The data will be evaluated for its precision, accuracy, completeness, representativeness, and comparability. If any data omissions or out-of-control data points are identified, they will be discussed with the laboratory and accounted for or corrected. A summary of the data

validation findings will be included in each sampling report. The qualifications of the data validator are provided in Appendix E.

DATA SUBMISSION

A data package will be prepared and submitted to USEPA Region II after the analytical results are received and validated from each quarterly sampling event. The package will include tabulated data, a figure showing the sampling locations, and the complete laboratory data package. The laboratory data package for organic data will include the sample data summary package and the sample data package, as described in the CLP SOW for Organics Analysis, April 1989, in Exhibit B, Section II, Items D and E. The laboratory data package for inorganic data will include the sample data package as described in the CLP SOW for Inorganic Analysis, June 1989 in Exhibit B, Section II, Item D. The data validation summaries and CLP data forms from the first quarterly sampling event will be submitted to the Agency.

PROJECT MANAGEMENT

A clear understanding of project team responsibilities and project schedule are essential to the timely and efficient completion of any sampling program. Maintaining open lines of communication between all parties is equally important, particularly for the completion of this potentially problematic sampling and analysis program. The following sections describe project personnel responsibilities, the project schedule, and procedures for notification to USEPA Region II.

Project Team Responsibilities

The project will be overseen by the TEIC Designated Coordinator and will be implemented by qualified representatives of Soil Tech and Geraghty & Miller. Specific project team responsibilities are as follows:

Tutu Environmental Investigation Committee

The Designated Coordinator (Ana Gloria Ramos) is responsible for overseeing the implementation of the Consent Order and will make all final decisions regarding technical matters. The Designated Coordinator will act as the primary communicator for the respondents and their technical consultants with USEPA and will review and approve all documents prior to submission.

Soil Tech

The Project Coordinator (Jose C. Agrelot) is responsible for the overall technical adequacy of the sampling and the performance of the sampling in conformance with the scope of work.

The Sampling Team Leader (Alberto Barrera) is responsible for coordinating each sampling event, the management of field activities, and conformance of sampling activities, and conformance of sampling activities with the scope of work.

The Health and Safety Officer (Alberto Barrera) is responsible for implementing the specific health and safety directives detailed in the HASP.

The Sampling Field Team (Fernando Zavala, Felix Roman, Jose Ramos) are responsible for implementation at sampling activities and in accordance with the scope of work.

The Project Electrician (Guillermo Gonzalez) is responsible for determining safe usage of well pumps and for making adjustments to existing systems, where applicable, for sampling activities.

Geraghty & Miller

The Project Officer (Daniel Nachman) is responsible for the overall technical adequacy of the SAMP and conformance to the scope of work.

The Data Validator (Lauren Sjogren) is responsible for reviewing the laboratory data for compliance with the quality assurance objectives and for preparation of the data validation findings.

The Project Manager (Marcia Findlay) is responsible for coordinating the sampling, analysis, and data validation functions of the project and for overseeing preparation of the quarterly reports.

The Project QA/QC Manager (Jorge Gomez) is responsible for providing independent review of project documents and reports.

Project Schedule

Once written approval of the SAMP has been received from USEPA Region II, the schedule shown on Figure 5 will go into effect. Within 30 days of USEPA approval, written permission to sample the wells will be mailed to the owners. Permission letters will be mailed to the well owners at least 2 weeks prior to sampling.

A site visit to each of the wells to be sampled, is scheduled for the week of August 20, 1989. A member of the EPA TAT who participated in previous sampling events will accompany TEIC and USEPA Region II personnel to facilitate identification of the wells. During the site visit, each well will be inspected to identify previous sampling points, determine if alternative sampling points are necessary and/or advisable, and determine accessibility so that accommodations can be made, if necessary, for sampling each well. Within four weeks after the well inspection, the initial quarterly sampling event will be performed.

Subsequent sampling events will be performed on a quarterly basis thereafter. Approximately two weeks prior to each quarterly sampling event, written notification will be mailed to each well owner of a well to be sampled during that quarterly event.

The analytical data will be reviewed every quarter after the comprehensive sampling of all 29 wells to determine the appropriateness of reductions of sampling frequency or complete determination of sampling activities. If sampling reduction or termination is warranted, such a proposal will be submitted to the USEPA for approval. If any two successive quarterly sampling events indicate that constituents of concern are not detected at concentrations above the detection limit, a proposal to terminate sampling will be submitted to the USEPA for approval.

The results of each quarterly analysis will be available approximately five weeks after the samples are received by the laboratory. The analytical results will be submitted to USEPA Region II within three weeks after the receipt of all of the laboratory data.

Notification to USEPA

The designated coordinator will notify USEPA of all on-site activities to be performed at least 15 days in advance. Any significant deviations in the work plan will be communicated to USEPA Region II verbally and in writing within 5 days.

HEALTH AND SAFETY PLAN

The Health and Safety Plan (HASP) has been developed for the purpose of providing protocols that will minimize the potential for workers exposure to chemical constituents during sampling activities.

Tasks and Potential Hazards

Work to be performed as a part of this plan includes the pumping of wells and collection of water samples from these wells. It is not known whether the wells will be sampled at the tap, well head, or at some point in between. If evacuation and sampling occur at the well head, the potential for dermal contact exists. Other possible hazards include the potential for inhalation of vapors emanating from the well head or water, and heat stress.

The time weighted average (TWA) threshold limit value (TLV) for compounds detected in wells in the area are listed below.

Compound	TLV-TWA* (ppm)
Benzene	10
Toluene	100
Ethylbenzene	100
Xylenes	100
Tetrachloroethene	50
Trichloroethene	50
1,2-trans dichloroethene	200

Equipment and Monitoring

Evacuation and sampling will be performed by workers wearing a modified Level D work uniform. The work uniform will consist of full-length pants, work boots, shirt, inner latex gloves, and outer nitrile gloves. If there is a potential for dermal contact during sampling, i.e. the well head is open and evacuated and sampled manually, workers will wear Tyvek coveralls and splash shields.

A photoionization detector (PID) will be used to monitor the breathing zone of the workers throughout sampling activities. The PID will be calibrated daily and a record of calibration will be maintained. If PID readings remain constant at 5 to 10 parts per million (ppm), or if unusual odors are detected, workers will don respirators outfitted with organic vapor cartridges. Prior to sampling initiation, all personnel who will be involved in the sampling program will undergo fit testing to ensure that each individual's respirator will provide adequate protection. If PID readings remain constant at levels greater than 10 ppm for 15 minutes, workers will leave the area and will inform the on-site coordinator.

*Time-weighted average concentration for a normal 8-hour workday and a 40-hour work week to which nearly all workers may be repeatedly exposed, day after day without adverse effects. Source: Threshold Limit Values and Biological Indices for 1988-1989. American Conference of Governmental Industrial Hygienists (ACGIH). All concentrations are expressed as parts per million (ppm).

Decontamination Procedures

Personnel will be decontaminated by washing and removing their outer gloves, followed by respirator removal (if worn) and Tyvek removal (if worn), followed by washing hands and face with soap and water.

The exterior of filled sample containers will be decontaminated by immersing each bottle up to its neck in a detergent solution, followed by a tap water rinse. The sample containers will be sealed before decontamination.

Responsibilities

The site Health and Safety Officer will be responsible for the implementation of the HASP. The sampling team will be responsible for implementing the HASP under the direction of the site Health and Safety Officer. All personnel have completed a 40-hour health and safety training course which satisfies the requirement of OSHA, 29 CFR 1910.120.

The following general work rules will be adhered to by all sampling personnel:

- No eating, drinking, or smoking will be allowed in the sampling area.
- No facial hair which interferes with the respirator mask seal will be allowed.
- Personnel will avoid contact with potentially harmful substances.
- Sampling personnel will monitor themselves and each other for signs of chemical exposure. Indications of adverse effects may include the following:

Headaches	Changes in complexion
Dizziness	Changes in coordination
Nausea	Changes in demeanor
Blurred Vision	Changes in speech pattern
Cramps	Pupillary response
Eye, skin, or throat irritation	

All sampling personnel will read the HASP prior to the initiation of sampling and will acknowledge that they have read and understood the HASP by signing the form shown on Figure 6. A copy of the HASP will be readily available to all sampling personnel during all sampling activities.

Emergency Response Plan

All sampling personnel will be aware of the location of the nearest telephone. Emergency telephone numbers are listed in Table 7.

A first-aid kit, including an eyewash bottle will be kept in close proximity to the sampling team during all sampling activities.

In the event of the injury requiring treatment, the individual will be taken to the hospital. The route to the hospital and written directions are provided on Figure 7. In the event that personnel should require specialized medical care, personnel will be flown to Puerto Rico.

The symptoms of heat stress include the following, in order of increasing seriousness:

- Heat rash
- Heat cramps (muscle spasms; pain in the hands, feet and abdomen)
- Heat exhaustion (pale, cool, moist skin; heavy sweating; dizziness)
- Heat stroke (red, hot, dry skin; lack of perspiration; nausea; dizziness and confusion; strong rapid pulse; coma)

Heat stroke can result in serious injury or death; immediate action must be taken to cool down a worker exhibiting these symptoms.

The following measures should be implemented to prevent heat stress if conditions warrant:

- Provide adequate liquids to replace lost body fluids and electrolytes lost from perspiration. Replacement fluids can include fresh water, 0.1 percent saltwater solution, commercial mixes such as Gatorade or Quick Kick, or a combination of these. Encourage workers to drink more than thirst requires.

- Establish a work regimen that will provide adequate rest and cooling down periods. This may require adjusting work schedules, and/or rotating personnel.

- Take breaks in an air-conditioned (preferably) or a shaded rest area. Remove all impermeable protective garments during rest periods.

- Inform all personnel of the importance of adequate rest, acclimatization, and proper diet.

- In temperature above 70° F personnel using Level C will be monitored via heart rate and oral temperature at rest periods. If the heart rate exceeds 110 beats per minute or oral temperature is above 99.6° F, subsequent work periods are shortened by one-third. Repeat if necessary once only or remove

from work site for rest and medical attention. Do not allow personnel to work in protective coveralls if oral temperature exceeds 100.6° F.

Respectfully submitted,

TUTU ENVIRONMENTAL INVESTIGATION COMMITTEE

Ana Gloria Ramos/mp

Ana Gloria Ramos
Designated Coordinator

GERAGHTY & MILLER, INC.

Marcia Findlay
Senior Scientist

Daniel A. Nachman, Jr.

Daniel A. Nachman
Senior Associate

MF/DAN:lmm/gv
#NJ07904/SAMP.REV

Table 1. Summary of Proposed Sampling and Analysis Effort, Tutu Wells Site Sampling, Analysis, and Monitoring Plan, St. Thomas, USVI.

Matrix	Number of (a) Residential Well Samples	Field Replicate Samples	Equipment (b) Blank Samples	Trip (c) Blank Samples	Water (d) Blank Samples	Total (e) Samples	Test Parameters (f)
Ground Water	25	2	3		1	35	TCL VOCs (Modified EPA Method 524.2 (g)), TCL semivolatiles and pesticides, TAL metals and cyanide.
				4		4	TCL VOCs (Modified EPA Method 524.2) (g).
Total	25	2	3	4	1	39	

Notes:

VOC - Volatile Organic Compounds.
TCL - Target Compound List.
TAL - Target Analyte List.

(a) One matrix spike/matrix spike duplicate (MS/MSD) will be analyzed for organics for every 20 ground-water samples analyzed for organics. One duplicate and one spike sample will be analyzed for metals for every 20 ground-water samples analyzed for metals.

(b) One equipment blank sample will be collected on every day that sampling occurs for which sampling equipment is used. Accordingly, the number listed is an estimate. Equipment blank samples will be analyzed for every parameter analyzed for in ground water samples on that day.

(c) One trip blank sample will be submitted for laboratory analysis on every day that sampling occurs. Accordingly, the number listed is an estimate.

(d) One blank sample of the water to be used for equipment blanks and decontamination will be analyzed each quarter. The water blank sample will be analyzed for every parameter analyzed for that quarter.

(e) The total number of samples is an estimate because the number of blank samples is estimated.

(f) Sampling and analysis will be performed as summarized in this table on an annual basis. For the three remaining quarterly sampling events each year, samples will be analyzed for VOCs (using EPA Method 524.2), and for other TCL or TAL analyte groups if such compounds occur above the detection limit. However, if other TCL or TAL concentrations above the detection limit do not pass data validation criteria or if there is reason to suspect that blank or laboratory contamination or matrix interferences have caused the detection of these constituents in the samples, then those samples will not be analyzed for the other TCL or TAL analyte groups in the three remaining quarterly sampling events each year.

(g) EPA Method 524.2 analysis will be modified in accordance with the methodology described in Appendix A.

Table 2. Project Analyte List and Contract Required Quantitation Limits, Tutu Wells Site Sampling, Analysis, and Monitoring Plan, St. Thomas, USVI.

	Target Compound List Volatiles	CAS Number	Quantitation Limits* Water ug/L
1.	Chloromethane	74-87-3	1
2.	Bromomethane	74-83-9	1
3.	Vinyl Chloride	75-01-4	1
4.	Chloroethane	75-00-3	1
5.	Methylene Chloride	75-09-2	1
6.	Acetone	67-64-1	1
7.	Carbon Disulfide	75-15-0	1
8.	1,1-Dichloroethene	75-35-4	1
9.	1,1-Dichloroethane	75-34-3	1
10.	1,2-Dichloroethene (total)	540-59-0	1
11.	Chloroform	67-66-3	1
12.	1,2-Dichloroethane	107-06-2	1
13.	2-Butanone	78-93-3	1
14.	1,1,1-Trichloroethane	71-55-6	1
15.	Carbon Tetrachloride	56-23-5	1
16.	Vinyl Acetate	108-05-4	1
17.	Bromodichloromethane	75-27-4	1
18.	1,2-Dichloropropane	78-87-5	1
19.	cis-1,3-Dichloropropene	10061-01-5	1
20.	Trichloroethene	79-01-6	1
21.	Dibromochloromethane	124-48-1	1
22.	1,1,2-Trichloroethane	79-00-5	1
23.	Benzene	71-43-2	1
24.	trans-1,3-Dichloropropene	10061-02-6	1
25.	Bromoform	75-25-2	1
26.	4-Methyl-2-pentanone	108-10-1	1
27.	2-Hexanone	591-78-6	1
28.	Tetrachloroethene	127-18-4	1
29.	Toluene	108-88-3	1
30.	1,1,2,2-Tetrachloroethane	79-34-5	1
31.	Chlorobenzene	108-90-7	1
32.	Ethyl Benzene	100-41-4	1
33.	Styrene	100-42-5	1
34.	Xylenes (Total)	1330-20-7	1
35.	Phenol	108-95-2	10
36.	bis (2-Chloroethyl) ether	111-44-4	10
37.	2-Chlorophenol	95-57-8	10
38.	1,3-Dichlorobenzene	541-73-1	10
39.	1,4-Dichlorobenzene	106-46-7	10
40.	Benzyl alcohol	100-51-6	10

* Specific quantitation limits are highly matrix dependent. The quantitation limits listed are provided for guidance and may not always be achievable.

Table 2. Project Analyte List and Contract Required Quantitation Limits. Tutu Wells Site Sampling, Analysis, and Monitoring Plan. St. Thomas, USVI (Continued).

	Target Compound List Volatiles	CAS Number	Quantitation Limits* Water ug/L
41.	1,2-Dichlorobenzene	95-50-1	10
42.	2-Methylphenol	95-48-7	10
43.	bis(2-Chloroisopropyl) ether	108-60-1	10
44.	4-Methylphenol	106-44-5	10
45.	N-Nitroso-di-n-dipropylamine	621-64-7	10
46.	Hexachloroethane	67-72-1	10
47.	Nitrobenzene	98-95-3	10
48.	Isophorone	78-59-1	10
49.	2-Nitrophenol	88-75-5	10
50.	2,4-Dimethylphenol	105-67-9	10
51.	Benzoic acid	65-85-0	50
52.	bis (2-Chloroethoxy) methane	111-91-1	10
53.	2-4-Dichlorophenol	120-83-2	10
54.	1,2,4-Trichlorobenzene	120-82-1	10
55.	Naphthalene	91-20-3	10
56.	4-Chloroaniline	106-47-8	10
57.	Hexachlorobutadiene	87-68-3	10
58.	4-Chloro-3-methylphenol (para-chloro-meta-cresol)	59-50-7	10
59.	2-Methylnaphthalene	91-57-6	10
60.	Hexachlorocyclopentadiene	77-47-4	10
61.	2,4,6-Trichlorophenol	88-06-2	10
62.	2,4,5-Trichlorophenol	95-95-4	50
63.	2-Chloronaphthalene	91-58-7	10
64.	2-Nitroaniline	88-74-4	50
65.	Dimethylphthalate	131-11-3	10
66.	Acenaphthylene	208-96-8	10
67.	2,6-Dinitrotoluene	606-20-2	10
68.	3-Nitroaniline	99-09-2	50
69.	Acenaphthene	83-32-9	10
70.	2,4-Dinitrophenol	51-28-5	50
71.	4-Nitrophenol	100-02-7	50
72.	Dibenzofuran	132-64-9	10
73.	2,4-Dinitrotoluene	121-14-2	10
74.	Diethylphthalate	84-66-2	10
75.	4-Chlorophenyl-phenyl ether	7005-72-3	10
76.	Fluorene	86-73-7	10
77.	4-Nitroaniline	100-01-6	50
78.	4,6-Dinitro-2-methylphenol	534-52-1	50
79.	N-nitrosodiphenylamine	86-30-6	10
80.	4-Bromophenyl-phenylether	101-55-3	10

Specific quantitation limits are highly matrix dependent. The quantitation limits listed are provided for guidance and may not always be achievable.

Table 2. Project Analyte List and Contract Required Quantitation Limits, Tutu Wells Site Sampling, Analysis, and Monitoring Plan, St. Thomas, USVI (Continued).

	Target Compound List Volatiles	CAS Number	Quantitation Limits* Water ug/L
81.	Hexachlorobenzene	118-74-1	10
82.	Pentachlorophenol	87-86-5	50
83.	Phenanthrene	85-01-8	10
84.	Anthracene	120-12-7	10
85.	Di-n-butylphthalate	84-74-2	10
86.	Fluoranthene	206-44-0	10
87.	Pyrene	129-00-0	10
88.	Butylbenzylphthalate	85-68-7	10
89.	3,3-Dichlorobenzidine	91-94-1	20
90.	Benzo(a)anthracene	56-55-3	10
91.	Chrysene	218-01-9	10
92.	bis(2-Ethylhexyl)phthalate	117-81-7	10
93.	Di-n-octylphthalate	117-84-0	10
94.	Benzo(b)fluoranthene	205-99-2	10
95.	Benzo(k)fluoranthene	207-08-9	10
96.	Benzo(a)pyrene	50-32-8	10
97.	Indeno(1,2,3-cd)pyrene	193-39-5	10
98.	Dibenz(a,h)antracene	53-70-3	10
99.	Benzo(g,h,i)perylene	191-24-2	10
100.	alpha-BHC	319-84-6	0.05
101.	beta-BHC	319-85-7	0.05
102.	delta-BHC	319-86-8	0.05
103.	gamma-BHC (Lindane)	58-89-9	0.05
104.	Heptachlor	76-44-8	0.05
105.	Aldrin	309-00-2	0.05
106.	Heptachlor epoxide	1024-57-3	0.05
107.	Endosulfan I	959-98-8	0.05
108.	Dieldrin	60-57-1	0.10
109.	4,4'-DDE	72-55-9	0.10
110.	Endrin	72-20-8	0.10
111.	Endosulfan II	33213-65-9	0.10
112.	4,4-DDD	72-54-8	0.10
113.	Endosulfan sulfate	1031-07-8	0.10
114.	4,4'-DDT	50-29-3	0.10
115.	Methoxychlor	72-43-5	0.5
116.	Endrin ketone	53494-70-5	0.10
117.	alpha-Chlordane	5103-71-9	0.5
118.	gamma-Chlordane	5103-74-2	0.5
119.	Toxaphene	8001-35-2	1.0

Specific quantitation limits are highly matrix dependent. The quantitation limits listed are provided for guidance and may not always be achievable.

Table 2. Project Analyte List and Contract Required Quantitation Limits, Tutu Wells Site Sampling, Analysis, and Monitoring Plan, St. Thomas, USVI (Continued).

	Target Analyte List	Contract Required* Detection Limit Water (ug/L)
1.	Aluminum	200
2.	Antimony	60
3.	Arsenic	10
4.	Barium	200
5.	Beryllium	5
6.	Cadmium	5
7.	Calcium	5000
8.	Chromium	10
9.	Cobalt	50
10.	Copper	25
11.	Iron	100
12.	Lead	3
13.	Magnesium	5000
14.	Manganese	15
15.	Mercury	0.2
16.	Nickel	40
17.	Potassium	5000
18.	Selenium	5
19.	Silver	10
20.	Sodium	5000
21.	Thallium	10
22.	Vanadium	50
23.	Zinc	20
24.	Cyanide	10

* The contract required detection limits (CRDLs) are the instrument detection limits obtained in pure water that must be met using the procedure in the CLP SOW for organics analysis, June 1989, Exhibit E. The detection limits for samples may be considerably higher depending on the sample matrix.

Table 3. Precision, Accuracy, and Completeness Objectives. Tutu Wells Site Sampling, Analysis, and Monitoring Plan. St. Thomas, USVI.

Fraction	Matrix Spike Compound/Element	Water*		Completeness
		%Rec.	RPD%	
VOA	1,1-Dichlorethene	61-145	14	100%
VOA	Trichlorethene	71-120	14	100%
VOA	Chlorobenzene	75-130	13	100%
VOA	Toluene	76-125	13	100%
VOA	Benzene	76-127	11	100%
SV-BN	1,2,4-Trichlorobenzene	39-98	28	100%
SV-BN	Acenaphthene	46-118	31	100%
SV-BN	2,4-Dinitrotoluene	24-96	38	100%
SV-BN	Pyrene	26-127	31	100%
SV-BN	N-Nitroso-di-n-propylamine	41-116	38	100%
SV-BN	1,4-Dichlorobenzene	36-97	28	100%
SV-A	Pentachlorophenol	9-103	50	100%
SV-A	Phenol	12-89	42	100%
SV-A	2-Chlorophenol	27-123	40	100%
SV-A	4-Chloro-3-methylphenol	23-97	42	100%
SV-A	4-Nitrophenol	10-80	50	100%
Pest.	Lindane	56-123	15	100%
Pest.	Heptachlor	40-131	20	100%
Pest.	Aldrin	40-120	22	100%
Pest.	Dieldrin	52-126	18	100%
Pest.	Endrin	56-121	21	100%
Pest.	4,4'-DDT	38-127	27	100%
CN	CN	75-125	20	100%

Notes:

VOA - Volatile Organic Analysis.
SV-BN - Semi-Volatile Base-Neutral Extractables.
SV-A - Semi-Volatile Acid Extractables.
Pest. - Pesticides.
* - These limits are for advisory purposes only (as noted in CLP SOW 4/89).
% Rec - Percent Recovery.
RPD% - Relative Percent Difference.

#NJ07904/TAB3.WK1

Table 4. Requirements for Sample Containers, Preservation, and Holding Times, Tutu Wells Sampling, Analysis, and Monitoring Plan, St. Thomas, USVI.

Test Parameter	Number of Containers Per Sample	Container	Preservation	Maximum Holding Time
Volatile Organic Compounds	2 (c)	40 Milliliter Glass with Teflon Lined Septum and Open-Hole Caps	Cool to 4 degrees C 1:1 HCl to pH<2	14 Days from time of sampling. (a)
Semivolatile Organic Compounds and Pesticides	4 (c)	1 Liter Glass, Amber with Teflon Lined Cap	Cool to 4 degrees C	7 days from time of sampling to extraction; 40 days after extraction.
Metals	1	1 Liter Polyethylene with Polyethylene Cap	Cool to 4 degrees C HNO to pH<2	180 days from time of sample receipt. (b)
Cyanide	1	1 Liter Polyethylene with Polyethylene Cap	Cool to 4 degrees C NaOH to pH >12	14 days from time of sampling.

Notes:

NA Not applicable; will be tested in the field immediately upon sample retrieval using field instruments.

(a) If sample acidification causes effervescence, the sample will not be acidified but will be cooled to 4 degrees C. In this event, the holding time is 7 days from the time of sampling.

(b) For mercury, the holding time is 28 days from the time of sampling.

(c) Triple volume will be collected for matrix spike/matrix spike duplicate (MS/MSD) analysis for organics.

#NJ07904/TAB4.WK1

DRAFT 100 JUL 1994

Table 5. Summary of Analytical Methods, Tutu Wells Site Sampling, Analysis, and Monitoring Plan, St. Thomas, USVI.

Test Parameter	Method Reference	Method Description
TCL Volatile Organic Compounds	Modified 524.2 (a)	Purge and trap, gas chromatography/mass spectrometry.
TCL Semivolatile Organic Compounds	CLP SOW, 4/89 (b)	Solvent extraction, gas chromatography/mass spectrometry.
TCL Pesticides	CLP SOW, 4/89 (b)	Solvent extraction, gas chromatography/electron capture detection.
TAL Metals	CLP SOW, 6/89 (c)	Inductively coupled plasma/graphite furnace atomic absorption spectrophotometry/ manual cold vapor method.
Cyanide	CLP SOW, 6/89 (c)	Manual distillation/manual spectrophotometric determination.
Temperature, pH, Specific Conductance	N/A	Tested in the field immediately upon sample retrieval using field instruments.

Notes:

TCL Target Compound List
TAL Target Analyte List
NA Not applicable

(a) USEPA 1988. Methods for the Determination of Organic Compounds in Drinking Water, Revision 3.0. EPA -600/4-88/039, as modified by the methodology described in Appendix A.
(b) USEPA 1989. USEPA Contract Laboratory Program Statement of Work for Organic Analysis, Multi-Media, Multi-Concentration, Revision April 1989. USEPA Contract Laboratory Program, Washington, DC.
(c) USEPA, 1989. USEPA Contract Laboratory Statement of Work for Inorganic Analysis, Multi-Media, Multi-Concentration, Revision June 1989. USEPA Contract Laboratory Program, Washington, DC.

#NJ07904/TAB5.WK1

Table 6. Surrogate Spike Control Limits*, Tutu Wells Site Sampling, Analysis, and Monitoring Plan, St. Thomas, USVI.

Fraction	Surrogate Compound	Water RPD
VOA	d4-1,2-Dichloroethane	76-114
VOA	4-Bromofluorobenzene	86-115
VOA	d8-Toluene	88-110
SV-BN	d5-Nitrobenzene	35-114
SV-BN	d10-Pyrene	40-130**
SV-BN	d14-Terphenyl	33-141
SV-BN	2-Fluorobiphenyl	43-116
SV-A	2-Flurophenol	21-100
SV-A	2,4,6-Tribromophenol	10-123
SV-A	d6-Phenol	10-94
Pest.	Dibutylchlorendate (DBC)	24-154***

Notes:

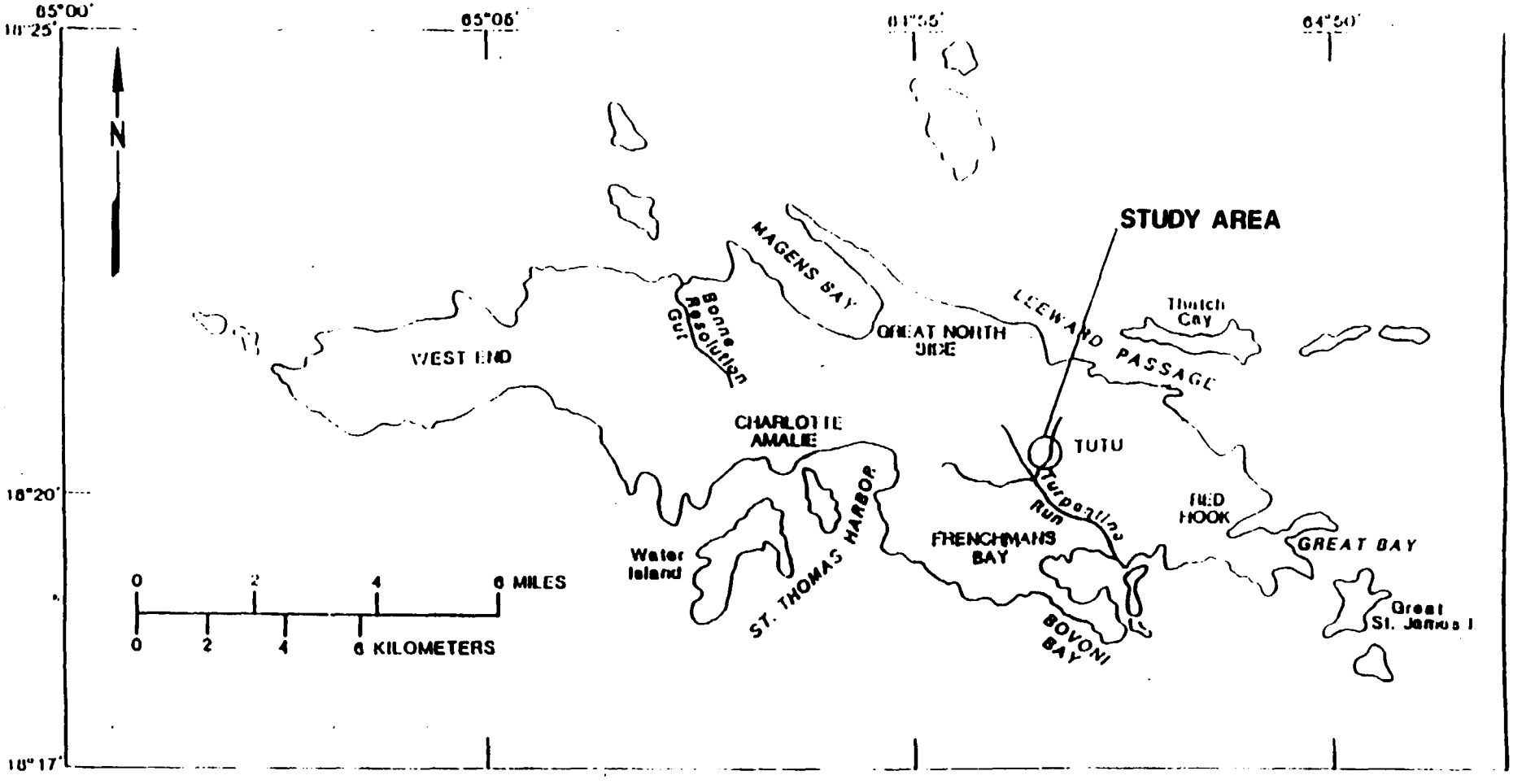
* - From CLP SOW dated 4/89.
** - Laboratory optional surrogate only; no action limits at this time.
*** - Advisory surrogate; minimum 10% recovery used as action limit.
VOA - Volatile Organic Analysis
SV-BN - Semi-Volatile Base-Neutral Extractables.
SV-A - Semi-Volatile Acid Extractables.
Pest. - Pesticides.
RPD - Relative Percent Difference.

#NJ07904/TAB6.WK1

e 7. Emergency Telephone Numbers, Tutu Wells Site Sampling, Analysis, and Monitoring Plan, St. Thomas, USVI.

Dep ent	(809) 921
ulance	(809) 922
ital	(809) 776-8311
e Department	(809) 915
PA Caribbean Field Office	(809) 729-6951
rtment of Planning and Natural Resources	(809) 774-3320
I	(809) 774-3320

7904/TAB7.WK1



STUDY AREA,

TUTU WELLS SITE SAMPLING,

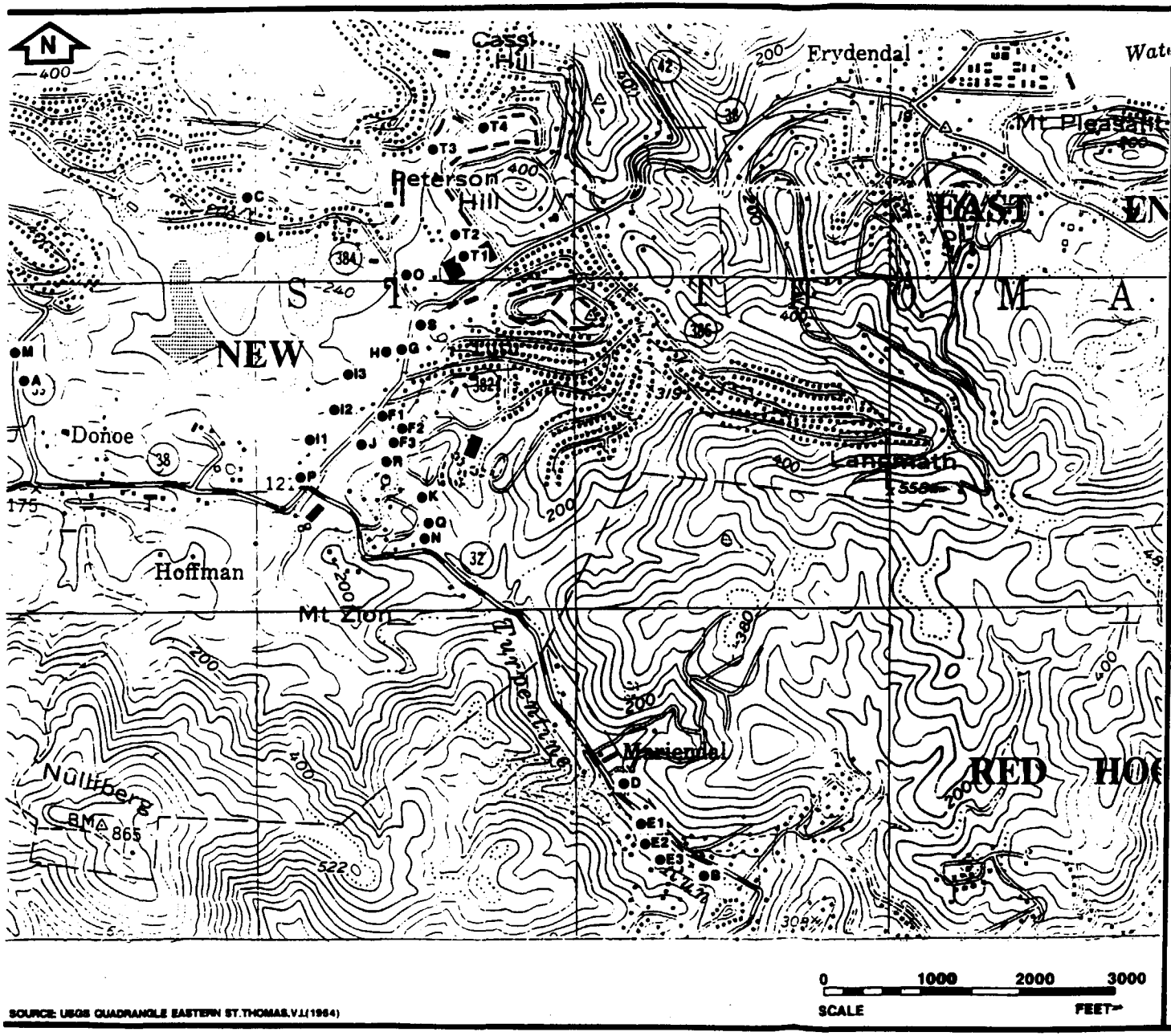
ANALYSIS, AND MONITORING PLAN,

ST. THOMAS, USVI

PREPARED FOR

TEIC

Geraghty & Miller, Inc.	COMPILED BY: NACHMAN	SCALE: SHOWN	FIGURE: 1
	DRAFTED BY: MISSINGER	DATE: 2/90	
	PROJECT MGR: FINDLAY		



SOURCE: USGS QUADRANGLE EASTERN ST.THOMAS,V.I.(1964)

LEGEND

- ● RESIDENTIAL WELL
- A BRYAN
- B DEDE
- C DEMITRI
- D DENCH
- E1 DEVCON 1
- E2 DEVCON 2 (ALTERNATE)
- E3 DEVCON 3
- F1 EGLIN 1
- F2 EGLIN 2
- F3 EGLIN 3
- G FOUR WINDS No.1
- H FOUR WINDS No.2
- I1 GASSETT
- I2 HARTMAN CRUSHER
- I3 HARTMAN ESTATE
- J HARVEY
- K LaPLACE
- L LEONARD
- M LOCKHART (ALTERNATE)
- N MATTHIAS
- O RAMSEY
- P RODRIGUES
- Q SMITH
- R STEELE
- S TILLETT
- T1 VIHA No.1
- T2 VIHA No.2 (ALTERNATE)
- T3 VIHA No.3
- T4 VIHA No.4 (ALTERNATE)

WELL SAMPLING LOCATIONS,
TUTU WELLS SITE SAMPLING
ANALYSIS, AND MONITORING PLAN,
ST. THOMAS, USVI

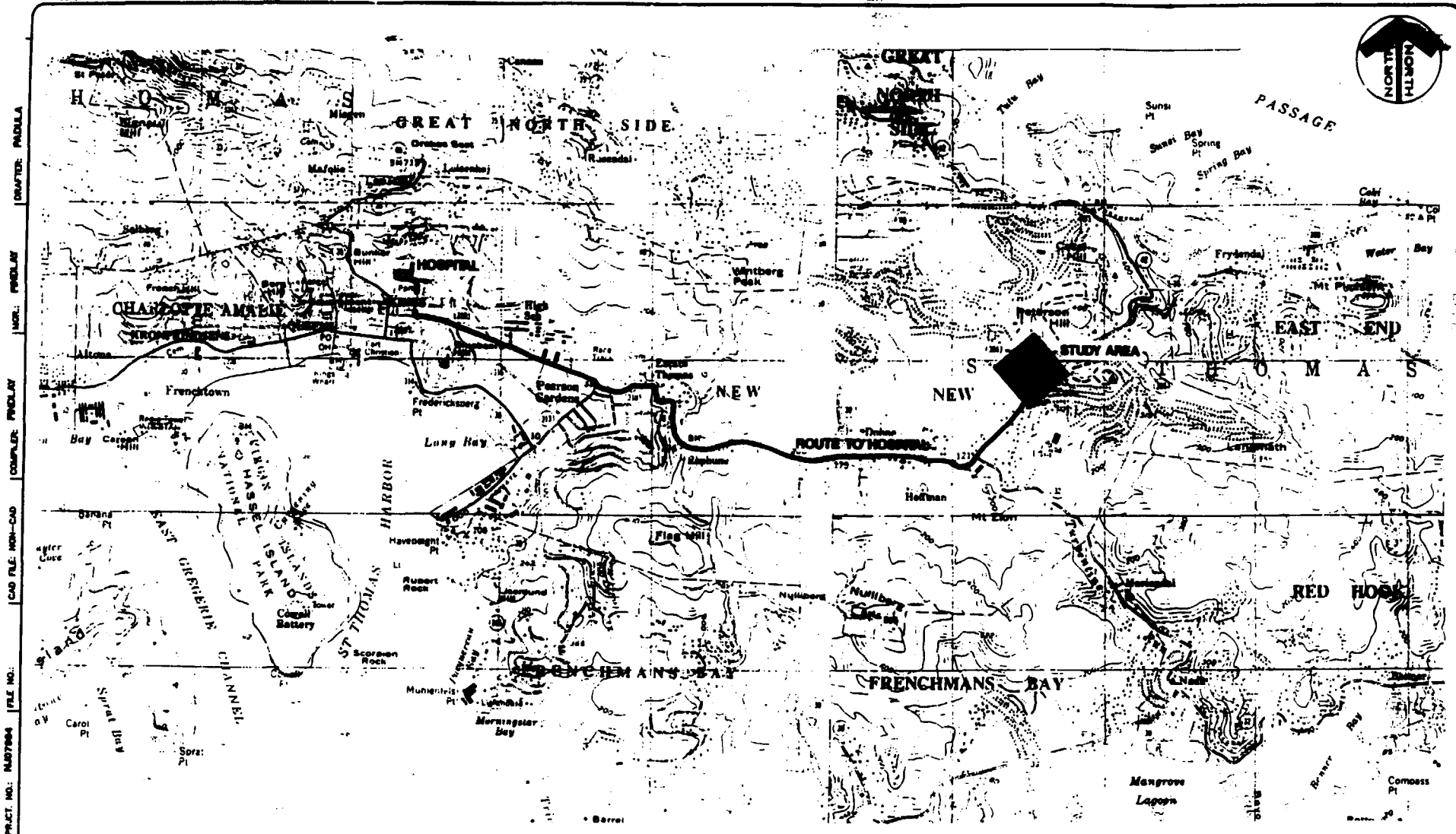
TEIC

Geraghty & Miller, Inc.

FINDLAY
PADULA
FINDLAY

SCALE AS SHOWN
DATE 5/89

FIGURE 2



0 SCALE 2000 FEET

GERAGHTY & MILLER, INC.
Environmental Services

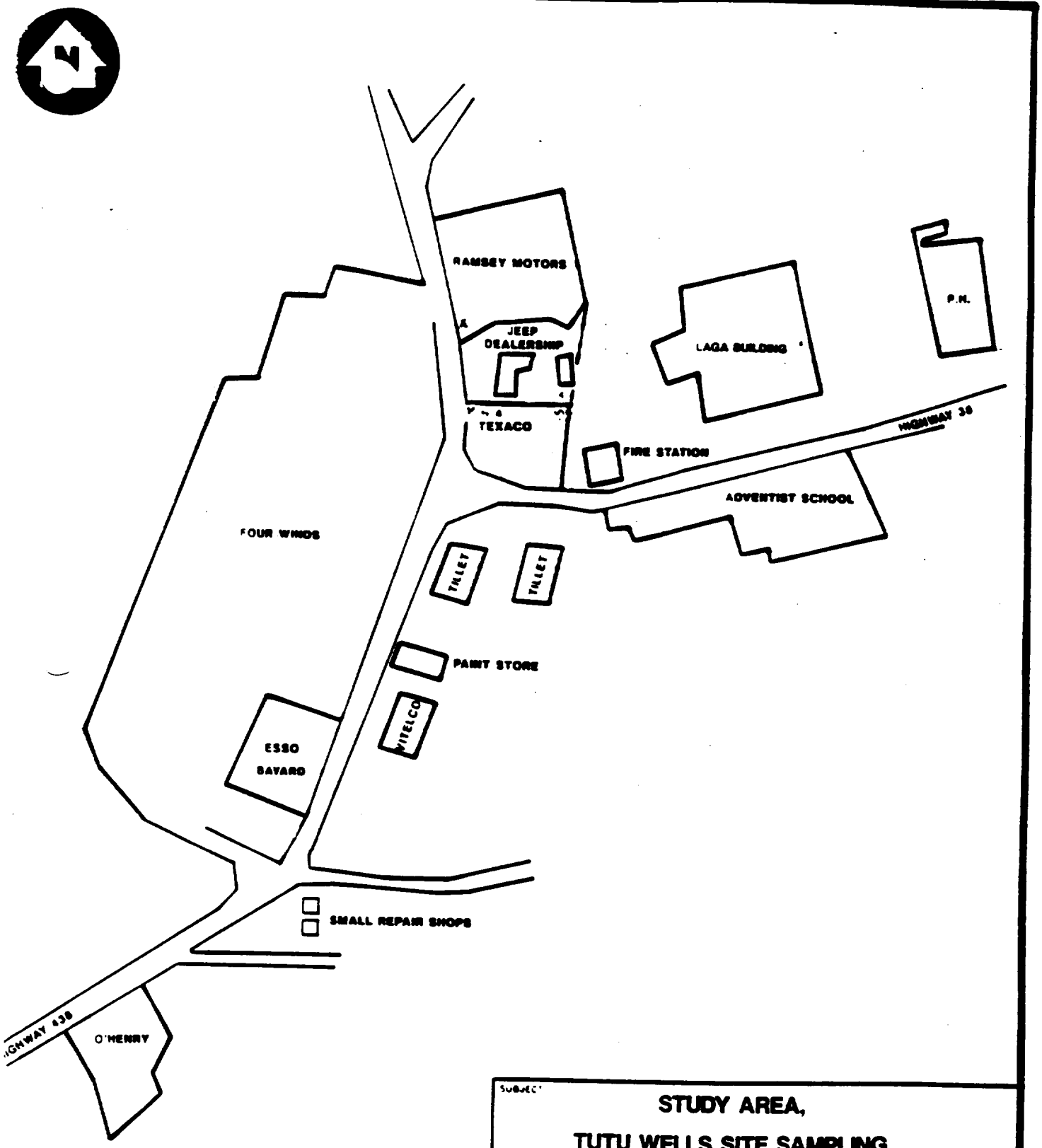
ROUTE TO HOSPITAL

TUTU WELLS SITE SAMPLING, ANALYSIS, AND MONITORING PLAN, ST. THOMAS, USVI

PREPARED FOR: TUTU ENVIRONMENTAL INVESTIGATION COMMITTEE

FIGURE 7

DRAFTER: PADILLA
WDR: FINDLAY
COMPILER: FINDLAY
CAD FILE: HSH-CAD
FILE NO.:
PROJ. NO.: NJ07984
DATE: AUGUST 90



0 200 400

SCALE FEET

SUBJECT:

STUDY AREA, TUTU WELLS SITE SAMPLING, ANALYSIS, AND MONITORING PLAN, ST. THOMAS, USVI

PREPARED FOR:

TEIC

Geragnty & Miller, Inc.	COMPILED BY: FINDLAY	SCALE: SHOWN	FIGURE: 3
	PREPARED BY: PADULA	DATE: 2/90	
	PROJECT MGR: FINDLAY		

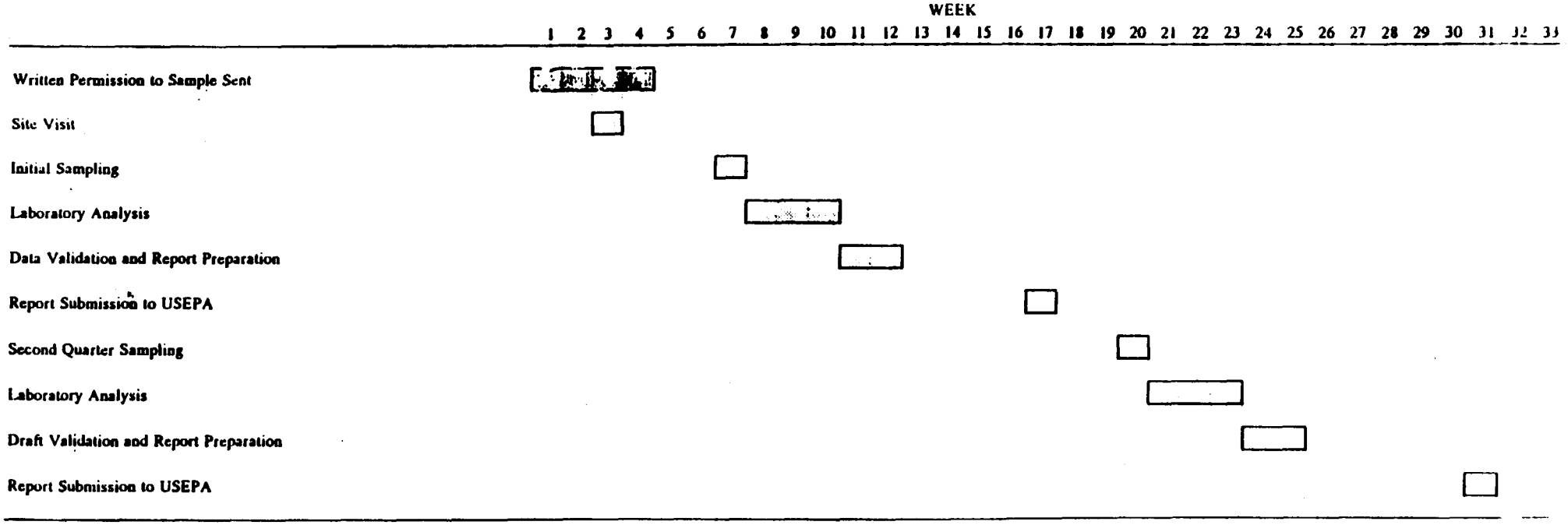
0041 TOO 111

Figure -. Ceimic Internal Sample Control Record

Labs ID	Bottle NO.	Date/Time Removed	Inita.	Date/Time Returned	Inita.	Comments

JUT 001 1991

Figure 5. Project Schedule, Tutu Wells Site Sampling, Analysis, and Monitoring Plan, St. Thomas, USVI.



* Time from written approval of the SAMP from USEPA.
** Subsequent sampling events will occur quarterly.

#NJ07904/Samp.WK1

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Figure 6
Health and Satety Plan Sign-off Sheet
Tutu Wells Site Sampling, Analysis, and
Monitoring Plan, St. Thomas, USVI

I acknowledge that I have read and understood the Health and Safety Plan (HASP) for the above project.

Name	Signature	Date

NJ07904/Fig.6

APPENDIX A

Additional Quality Control Requirements for Method 524.2 Analysis

1. The parameter list for this site is the TCL. All method requirements must be followed for these compounds.

2. All samples are to be analyzed within holding times, 14 days from date if sampling when sample is preserved.

3. Sample batch is 20 samples maximum.

4. Detection limit determination must be performed for all analytes prior to start of sample collection. The lab must use the MDL determination procedures stated in Section 10.3 of M524.2. All results must be provided to this office. Include (for each analyte): concentration spiked into blank water, concentrations obtained for each 7 or more replicates, standard deviation, mean conc. of replicates, and the student t value used in the calculation. This information must enable the reviewer to regenerate the lab's calculations of the detection limit.

5. At minimum, a five point initial calibration must be performed within the two days preceding sample analysis. It has been shown that the five concentrations following often yield results which meet the required QC criteria: 4, 10, 20, 30, and 40 ug/l. The lab may use these or may extend their calibration range, however, all QC criteria must be adhered to for each analyte.

6. The continuing calibration standard must be analyzed prior to sample analysis and once per 12 hours in order to verify a valid initial calibration. Use the % Difference criteria specified in Method 524.2.

7. A laboratory fortified blank at a concentration of 1 ug/l for each analyte must be analyzed immediately following each continuing calibration. The accuracy for this standard must be between 80% - 120% recovery. (Exception for methylene chloride, acetone, 2-butanone and 2-hexanone, the accuracy must be between 50 - 150%). If this accuracy cannot be achieved, the problem must be located and corrected, then the instrument must be recalibrated prior to sample analysis.

8. The MS tune be verified at the beginning of each 12 hour period of analysis and all samples must be run within this 12 hour period.

9. A lab reagent blank must be analyzed prior to the samples shown to be free of contamination. Failure to obtain method blank values less than 1 ug/l requires that all samples prepared with that method blank be reprepared and reanalyzed for the affected parameters. (Exception for methylene chloride, acetone, the blank value is to be less than ug/l.)

10. All samples, blanks, duplicates, and calibration standards must be spiked with the surrogates and internal standard compounds stated in Section 7.5.1 of M.524.2 at the specified concentrations. Re-analysis is required if one or more % recoveries as stated in the 2/88 CLP SOW are exceeded.

11. The primary and secondary ions listed in the 2/88 CLP SOW for organics must be used for identification of the TCL parameters not listed in Method 524.2.

12. A laboratory generated mass spectrum must be provided for all compounds detected above and below the detection limit.

13. All calibration and analytical procedures given in Method 524.2 whether presented or optional or required, must be followed.

14. Up to ten volatile organic compounds (not on the TCL) of greatest apparent concentration shall be tentatively identified via a forward search of the NBS mass spectral library as described in the 2/88 CLP SOW for organics. Only tentatively identified compounds (TICs) with a peak area >40% of the nearest internal standard are to be reported.

15. If the EPA RPM wishes MMB to audit a certain percentage of the data validation effort of Geraghty & Miller, and EPA-CLP type deliverables package must be made available. This will also include a detailed example calculation that clearly demonstrates the manner in which the final results were derived. Where applicable, each component of the calculation must be explained (eg. if the calculation includes a dilution factor, it must be clear how and why each dilution occurred). The laboratory must supply any and all information required to reproduce, during an EPA data validation, all results reported.

APPENDIX B

Well Sampling Procedures

APPENDIX B

Well Sampling Procedures

Twenty-five wells along Route 38 within the Tutu Wells Site will be initially sampled and analyzed for TCL and TAL constituents with the exception of PCBs during the initial sampling event. During subsequent quarterly sampling events, samples from the 25 wells will be submitted for laboratory analysis of TCL VOCs. If the validated data from the initial sampling event indicates the presence of TCL semi-volatiles, pesticides, or TAL constituents above the detection limit, then samples collected from those wells during subsequent quarterly sampling events will be analyzed for the analyte group detected, in addition to TCL VOCs.

1.0 Preparation for Sampling

1.1 The location of the well relative to the nearest road, the house, and other visible structures will be sketched and described. The location of septic systems, any work shops, and/or other potential constituent sources will be carefully noted, sketched, and described.

1.2 The well and the piping system will be examined, sketched, and described. The sketch and description will include the type of pump and treatment systems, if present; any holding tanks; the piping material and solder, if possible; and the location of the sampling point.

1.3 The well will be sampled as close to the pump as possible. It may be necessary to temporarily disconnect the pump from the piping to the point of use to ensure that the sample is collected before the water passes through a holding tank or treatment. Permission to disconnect the piping or to effect any other plumbing changes must be received in writing from the owner or resident. After sampling, the system will be restored immediately to its original configuration.

2.0 Sampling Procedure

2.1 For wells sampled from the tap, the pump, faucet, or outside tap will be run at full capacity to purge the well prior to collecting the sample. At least one well volume will be evacuated, if this calculation can be made from the information available. If the well volume cannot be estimated, the well will be pumped for a minimum of 15 minutes. The temperature, pH, and specific conductance of the discharge water will be measured at intervals no greater than 5 minutes in length during purging. . If it is determined that one or more of these parameters continues to change after the evacuation of a well volume or at the end of 15 minutes, the purge time will be extended until stabilization occurs.

2.2 After the purge process, the flow rate will be reduced, and the samples will be collected directly into the sample containers. Sampling personnel will wear surgical gloves during handling of the containers. The gloves will be disposed after sampling is finished at each location.

2.3 For wells sampled from the well head, at least one well volume will be evacuated prior to sample collection using a Teflon™ bailer, centrifugal pump, or submersible pump. The method of evacuation used will depend on well diameter, depth to water, and well head access. Temperature, pH, and specific conductance will be measured initially and after the removal of each well volume. If one or more of these parameters continues to change after the evacuation of one well volume, evacuation will continue until stabilization occurs.

2.4 For wells sampled from the well head, samples will be collected using a Teflon™ bailer. Samples will be poured directly from the bailer into the sample containers. Bailer cord will consist of stainless steel wire, Teflon™ coated wire, or polypropylene monofilament.

2.5 Bailers and bailer cord will be decontaminated prior to use by washing with laboratory-grade detergent (Micro™ or equivalent); rinsed with tap water; rinsed with ultra-pure grade 10% nitric acid (when metals are being analyzed for); rinsed with tap water; rinsed with pesticide-grade methanol; rinsed with pesticide-grade hexane; allowed to air dry; rinsed with demonstrated analyte free deionized water; allowed to air dry; wrapped in aluminum foil until use.

2.6 Pumps which are to be used for well evacuation (other than pumps which are permanently installed in the well) will be decontaminated prior to each use by washing in tap water mixed with laboratory grade detergent. The detergent-water mix will be run through the pump to decontaminate the internal components. Next the pump will be washed/pumped with tap water, followed by a final wash/pump with deionized water.

2.7 Samples to be analyzed for VOCs will be collected first. Samples will be preserved immediately upon collection. VOC samples will be acidified with ultra pure grade 1:1 hydrochloric acid (HCl) to pH <2. Metal samples will be acidified with ultra pure grade concentrated nitric acid (HNO_3) to pH <2. Metals samples will not be filtered. In order to determine if VOC and metals samples are acidified to pH <2, a third portion of sample of equal volume will be acidified and its pH tested using pH paper. Acidification will be performed by adding the acid drop by drop until a pH of 2 or less is attained. An equal number of drops of acid will then be added to the sample to be submitted to the laboratory. If acidification of the VOC test sample causes effervescence, the sample will not be acidified, but will be cooled to 4°C.

2.8 Sample containers will be labeled prior to sample collection. The following information will be recorded on each sample label:

- Project name
- Sample identification
- Sample matrix
- Requested analysis
- Chemical preservation and pH achieved (if applicable)
- Date and time of sample collection
- Sampler signature

3.0 Field Analyses

3.1 After the laboratory containers are filled, approximately 0.5 gallon of sample will be collected in a clean, unpreserved glass container and its color, odor, and appearance will be noted. The pH, temperature, and specific conductance of the sample will be measured.

3.2 Temperature will be measured immediately after collection of the sample with a mercury-filled Celsius thermometer in order to calibrate the pH and specific conductance meters.

3.3 pH will be measured with a glass hydrogen-ion electrode against a reference electrode of known potential by means of pH meter. Calibration of the pH meter will be completed before analysis with two buffer solution standards bracketing the sample pH (nominal pH values of 4 and 7, or 7 and 11). The probe will be lowered into the sample and gently stirred to allow equilibration before the reading is taken.

3.4 Specific conductance will be measured with a battery-powered specific conductance meter. The probe will be lowered into the sample and the reading will be immediately taken.

3.5 The field analyses and sample descriptions will be recorded on a Geraghty & Miller, Inc. Water Sampling Log (attached).

3.6 All parts of the field instrumentation which come in contact with the sample must be cleaned initially and between samples with a stream of deionized or distilled water.

GERAGHTY & MILLER, INC.
Ground-Water Consultants

SAMPLING OF MONITORING WELLS
DAILY CHECKLIST

PROJECT _____ WELL(S) _____

LOCATION _____ DATE _____

G&M PERSONNEL ON SITE _____ TIME _____

CHECKED BY _____

ITEMS	OK/NA	COMMENTS
PRIOR TO DRILLING:		
Health & safety precautions (HASP) received; equipment ready.		
Sample containers, coolers, received from laboratory; ice or ice packs ready.		
Sampling equipment and supplies inventoried, clean and operational.		
Check in with client at site.		
Integrity of well noted.		
Well area prepared for sampling; plastic placed around well; gasoline-powered pumps placed downwind.		
Well and water-level measurements made and recorded along with other pertinent field information on water sampling log.		
Field instruments calibrated.		
Sample containers labelled; preservatives added, if necessary.		
DURING AND AFTER SAMPLING:		
Well purged three to five times its volume.		
Sample collected using a bailer or pump as per sampling plan.		
Measurement of field parameters recorded on sampling log.		
Sample containers filled according to collection protocol of analyses.		
Field and trip blanks collected; replicates or split samples collected as per sampling plan.		
Samples stored at 4°C in coolers for transport to lab.		
Water sampling log and chain-of-custody form completed.		
Reusable equipment decontaminated; non-reusable equipment disposed of in appropriate manner.		
Well secured and locked.		
Laboratory contacted to confirm receipt and condition of samples.		

Additional Comments:

TUT 001 2000

Instructions: Original to Field Project File; copy to Project Manager and to QA Representative.

G&M Form 13 6 86

Southwest 87 1777

APPENDIX C

Sampling Quality Assurance/Quality Control Protocols

APPENDIX C

Sampling Quality Assurance/Quality Control Protocols

The objective of the sampling QA/QC program is to ensure the reliability and safety of all data and documentation generated as a part of the monitoring program. Major elements of the program are: quality control sampling, sample custody and handling, and data management.

1.0 Quality Control Sampling

1.10 Field Replicate Samples

1.11 One field replicate water sample will be collected and analyzed for every ten water samples submitted to the laboratory. Care will be taken to ensure that each sample and sample replicate pair can be compared as a homogeneous sample split in two.

1.12 Each field replicate sample will be given a fictitious sample identification so that it is not identified in the laboratory as a replicate sample.

1.20 Blank Samples

1.21 One equipment blank sample will be collected on every day that sampling occurs for which sampling equipment is used. The equipment sample will be analyzed for every parameter analyzed for on that day in accordance with the CLP SOWs for Organics and Inorganics Analysis. The equipment blank sample will be collected by pouring deionized water over the bailer so that the rinsate flows directly into the sample container(s).

1.22 One trip blank sample will be submitted to the laboratory for every day on which sampling occurs. Trip blank samples will be prepared at the beginning of each day that sampling occurs and will accompany the samples collected on a given day. Trip blank samples will be analyzed for VOCs in accordance with the CLP SOW for Organics Analysis. Trip blank samples will be prepared in an identical manner to sample preparation for VOC analysis.

1.30 Spike Samples

1.31 One matrix spike/matrix spike duplicate (MS/MSD) will be analyzed for organics per sample delivery group. Since all 25 samples will be collected and submitted to the laboratory within 14 calendar days, one MS/MSD sample will be analyzed for every 20 ground-water samples analyzed for organics.

1.32 Triple sample volume of organics analysis will be collected for each MS/MSD analysis.

1.33 One duplicate and one spike sample will be analyzed for metals per sample delivery group. Since all 25 samples will be collected and submitted to the laboratory within 14 calendar days, one duplicate and spike sample will be analyzed for every 20 ground-water samples analyzed for metals.

1.40 Water Blank Samples

1.41 One blank sample of the water to be used for equipment blanks and decontamination will be analyzed each quarter. The water blank sample will be analyzed for every parameter analyzed for each quarter.

2.0 Sample Custody

2.1 The sampling team will be responsible for maintaining custody of the samples until they are delivered to the courier for shipment to the laboratory. All samples shipped to the laboratory will be accompanied by the Geraghty & Miller, Inc. Chain-of-Custody Record (attached). The Chain-of-Custody Record will be completed in the field; the original form will accompany the shipment and a copy will be retained in the field project file. The Chain-of-Custody form will include the project name and the signatures of the sampling team members who participated in collecting the samples. Each sample container and the corresponding information for each container will be listed on the form.

- Sample identification
- Sample matrix
- Requested analysis
- Chemical preservation and pH achieved (if applicable)
- Date and time of sample collection

2.2 The original Chain-of-Custody Record form will be placed in a plastic bag and taped to the underside of the lid of the cooler.

2.3 Samples will be placed in a clean, dry, undamaged cooler such that there is sufficient packaging material (vermiculite and/or bubble wrap) to prevent bottle breakage. Sufficient ice will be placed in each cooler to ensure that sample temperature is maintained at approximately 4°C until arrival at the laboratory. Ice will be placed in double zip lock plastic bags. The ice-filled bags will be distributed in the cooler evenly, in order to ensure that all samples are maintained at approximately 4°C. The cooler will be sealed by wrapping nylon-reinforced packing tape entirely around the cooler.

2.4 To provide a means of detecting any potential tampering during shipment, all shipment containers (coolers) will be affixed with signed Geraghty & Miller, Inc. sample seals (attached). Two seals will be affixed to each cooler, on opposite ends.

2.5 The courier service utilized for sample shipment and the number which identifies each shipment will be recorded on the Chain-of-Custody form. A receipt from the courier service or copy of the airbill which identifies each shipment will be retained in the field project file. Samples will be shipped to the laboratory daily. Shipment will be arranged such that samples arrive at the laboratory within 48 hours of collection.

3.0 Data Management

3.1 Field data and documentation will be recorded in serialized sheets for every day during which activities occur at the site.

3.2 Field procedures, measurements, and observations will be described in sufficient detail, so as to enable others to reconstruct the events.

3.3 The project manager will maintain all project documentation in a central project file. This file will include:

- o Project plans and specifications
- o Field data and documentation
- o Chain-of-Custody documentation
- o Sample identification documents
- o Laboratory data packages
- o Data review notes
- o Report notes and calculations
- o Final maps and drawings

4.0 Sample Container Quality Control

4.1 In order to document the quality of sample containers, containers will be proven clean by analysis for each quarterly sampling event in accordance with the CLP Sample Bottle Repository (SBR) Statement of Work (SOW). Sample bottle analysis will be performed by either Ceimic Corporation upon I-Chem Series 200 sample bottles or by I-Chem upon their Series 300 sample bottles or Eagle Pitcher upon their Level I sample bottles.

4.2 Results of the bottle blank analyses will be provided to USEPA Region II prior to each quarterly sampling event.

TUT 001 2004

GERAGHTY & MILLER, INC.
Environmental Services

Laboratory Task Order No

CHAIN-OF-CUSTODY RECORD

Page of

Project Number

Project Location

Laboratory

Sampler(s)/Affiliation

SAMPLE BOTTLE / CONTAINER DESCRIPTION

SAMPLE IDENTITY	Code	Date/Time Sampled	Lab ID										TOTAL

Sample Code: I = Liquid; S = Solid; A = Air

Total No. of Bottles/ Containers

Relinquished by Received by	Organization: Organization	Date / / Time	Seal Intact? Yes No N/A
Relinquished by Received by	Organization: Organization	Date / / Time	Seal Intact? Yes No N/A

Special Instructions/Remarks:

Delivery Method: ☐ In Person ☐ Common Carrier ☐ Lab Courier ☐ Other

SPECIFY

SPECIFY

G&M Form 09 1 90

OCT 001 2005

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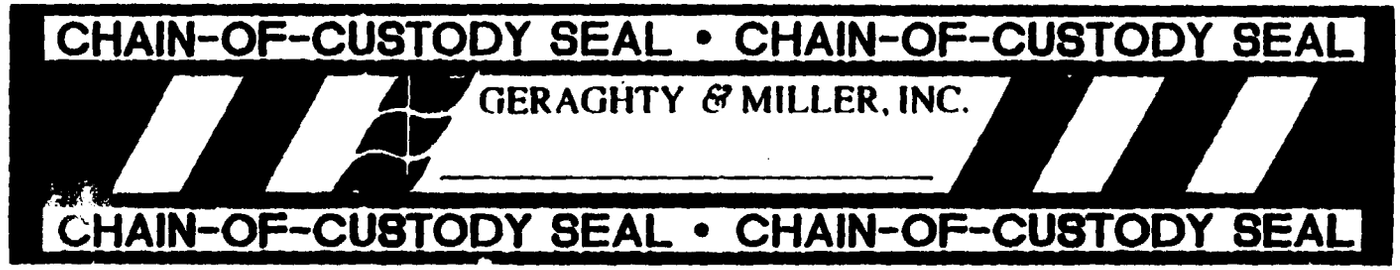

CHAIN-OF-CUSTODY SEAL • CHAIN-OF-CUSTODY SEAL
GERAGHTY & MILLER, INC.
CHAIN-OF-CUSTODY SEAL • CHAIN-OF-CUSTODY SEAL

TUT 001 2006

REFERENCE NO. 61

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION II

DATE: JAN 06 1988

SUBJECT: Preliminary Assessment and Confirmation of Authorization of CERCLA Removal Action Monies for the TUTU Well Site, Anna's Retreat, Saint Thomas, U.S. Virgin Islands - ACTION MEMORANDUM

FROM: Carlos E. O'Neill
On-Scene Coordinator

TO: Stephen D. Luftig, Director
Emergency and Remedial Response Division

THRU: George H. Zachos, Acting Chief
Response and Prevention Branch

I. EXECUTIVE SUMMARY

On July 15, 1987, Mr. Allan Smith, Commissioner of the Department of Planning and Natural Resources (DPNR), U.S. Virgin Islands, verbally requested that the U.S. Environmental Protection Agency (EPA) provide analytical support in the sampling of one well which was reported to exhibit a strong unpleasant odor. This well is a major source of commercially provided potable water supply for the eastern portion of St. Thomas. The well is located on the eastern part of the island in the Tutu Section of Anna's Retreat./ This verbal request was followed by an additional request for EPA to assume the role of Lead Agency after sampling results indicated that several commercial wells were found to be contaminated with hazardous substances. This verbal request was followed by a formal request in writing by DPNR on August 10, 1987.

In July and August of 1987, EPA confirmed by sampling and analysis, the contamination of groundwater with volatile organic compounds. A major contaminant in the groundwater is tetrachloroethylene (TCE). The EPA 10-Day Health Advisory Level of 175 ppb was exceeded in three (3) of twenty four (24) wells sampled, with two of the three contaminated wells being private residential wells. The concentrations found ranged from 240 to 7,600 ppb with seven (7) additional wells being below the EPA 10-Day Health Advisory, but above the U.S. Virgin Island's interim maximum permissible concentration levels set on September 1, 1987, by DPNR for volatile organics in drinking water in the Turpentine Run Aquifer (50 ppb for a single compound or 100 ppb for total volatile organic compounds). Three of the previously mentioned seven wells were residential wells.

This Action Memorandum will document funding authorized for Phase I of the Tutu Well Site CERCLA Removal Action. Phase I addresses only residences having contaminated drinking water wells with volatile organic compounds above levels established by the U.S.V.I.'s interim maximum permissible concentration levels for potable water. This action did not include wells where water is used primarily for commercial, business, industrial and/or trade purposes. It also did not include wells contaminated solely by gasoline or gasoline by-products which are not hazardous substances within the definition of Section 101(14) of CERCLA. This action includes the decontamination and cleaning of residential cisterns contaminated by hazardous substances, the modification of plumbing, the delivery of water by tank trucks as a temporary alternate water supply, and a well water monitoring program. The total project ceiling authorized for a 52-week period is $100,000 of which $40,000 is estimated for mitigation contracting; $45,000 for TAT's extramural costs; and $15,000 for EPA's intramural costs.

This memorandum will confirm your prior verbal authorization of Trust Fund monies, issued to the Chief, Incident Response and Prevention Section on September 1, 1987, to initiate the removal action at the subject site, and subsequently revised to the current project ceiling of $100,000.

II. BACKGROUND

A. Historical Information

A request for EPA analytical support for one well in the Tutu Section of St. Thomas was made verbally on July 15, 1987 from DPNR. On July 31, 1987, a verbal request for EPA to assume the role of Lead Agency was made, and this was followed by a written confirmation of the request, dated August 10, 1987 (received by the Emergency and Remedial Response Division on August 19, 1987). The initial request was based on a report that one well was reported to have a strong odor, characteristic of a petroleum product. This well is a major source of commercially provided potable water for the eastern portion of the island. EPA's preliminary investigation commenced on July 21, 1987, with a field reconnaissance and sampling of this one well and six additional wells identified in the immediate area. Several of these wells are also major water suppliers of public drinking water to the eastern part of the island.

Laboratory results from this survey indicated that the initial well was highly contaminated with gasoline and chlorinated organics, and the additional six wells contained elevated levels of chlorinated volatile organic compounds. Based on these results, DPNR declared that an imminent health threat existed, which could affect approximately 20,000 people living in St. Thomas.

In addition, an indefinite number of tourists who vacation in St. Thomas were at risk since these commercial wells supply water to major hotels and restaurants. DPNR issued orders to close these seven commercial wells to protect public health.

Subsequent to this action, EPA expanded their sampling plan due to the threat of greater contamination to drinking water wells in the area. EPA along with DPNR, identified other wells within the Tutu Water/Turpentine Run Aquifer which may be impacted by the hazardous substances identified to be present in the groundwater. A second round of groundwater well sampling took place on August 10 and 11, 1987, which included a total of twenty-four (24) wells identified in the Tutu Section of Anna's Retreat. All twenty-four wells were sampled and analyzed for volatile organic compounds. Following these results, DPNR closed the five private wells which service two three-family homes and one apartment building housing twelve studio units.

B. Site Setting/Description

The contaminated wells are located in the Tutu Section of Anna's Retreat, St. Thomas, U.S. Virgin Islands. The five (5) private wells recently ordered closed are located in the Tutu residential area. At the present time, the affected area is not serviced by any public water supply. EPA sampled a total of twenty-four (24) wells in the Tutu area and found five private wells and eight (8) commercial wells seriously contaminated with up to 7,600 ppb of PCE. (See map attached).

C. Quantity and Type of Substance Present

EPA sampled and analyzed for suspected volatile organic compounds on July 22 and August 10, 1987. Listed below are the maximum concentrations of the hazardous substances identified in the drinking water wells:

TUT 001 2010

Contaminant	Maximum Concentration Found (ppb)	Statutory Source of Hazardous Substances under CERCLA
Tetrachloroethylene	7,600	Clean Water Act Section 307(a)
Trichloroethylene	61	Clean Water Act Section 307(a)
Benzene	1,400	Clean Water Act Section 307(a)

The results of the sampling are contained in Tables I and II. PCE contamination ranged from non-detectable to seven thousand-six hundred parts per billion (7,600 ppb). Sampling results adequately document 3 wells with contamination above EPA's 175 ppb PCE 10-Day Health Advisory Level and eight (8) wells above the DPNR's interim standards for maximum contaminant levels of volatile organic compounds in drinking water.

III. THREAT

A. Threat of Public Exposure

Direct contact with PCE may cause eye and nose irritation along with dry scaly and fissured dermatitis. Acute exposure through absorption, inhalation or ingestion, may cause central nervous system depression, hepatic injury and anesthetic death. PCE has been found to be carcinogenic.

This is a case of actual contamination in excess of the EPA 175 ppb PCE 10-Day Health Advisory Level for a three-family house and one apartment building housing twelve studio units. In the other three family apartment dwellings, the well contamination exceeded the interim DPNR drinking water standard of 50 ppb for any single volatile organic constituent. In addition to the exposure via consumption of the water, or eating food prepared with this water, showering with water contaminated with volatile organics can contaminate the air to significantly unhealthy levels.

TUT 001 2011

The location, direction and dimensions of the plume are affected by variations in water table depth, rate of pumping of the wells, duration and intensity of rainfall, and intermittent releases of chemicals from one or more sources, all of which are unknown at this time. Given the above variables which affect contaminant strengths in any well within the plume may vary randomly.

On September 2, 1987, DPNR issued three (3) orders to close wells and issued two (2) advisory letters to homeowners not to use well water for drinking, bathing and washing.

B. Evidence of Extent of Release

Investigation, sampling and analyses by EPA have identified contaminated groundwater, as described above, and containing contaminates, as described in Tables I and II.

C. Previous Actions to Abate Threat

No mitigative action was taken by any Potentially Responsible Party prior to EPA's recent activities.

D. Current Actions to Abate Threat

✓ EPA has commenced an investigation of the Tutu Water/Turpentine Run Aquifer by establishing a cooperative agreement with the U.S. Geologic Survey to define the characteristics of this aquifer and to determine the extent of contamination. EPA and DPNR have also completed Aquifer and a monthly well monitoring program is being developed.

✓ DPNR has issued a total of ten (10) orders/advisories to well owners to close sixteen (16) wells.

A local dry-cleaner has been identified as using and storing PCE. Handling, storage and disposal practices from this facility are unknown at this time. DPNR has proposed to issue an advisory to local dry cleaning establishments instructing them to properly store and hold all waste for proper disposal by an industrial waste hauler. ✓DPNR with the assistance of EPA is conducting an assessment of at least nine (9) facilities identified to be potential sources of hazardous waste and/or substance releases in the Tutu area.

EPA has cleaned the homeowner's cisterns that have been contaminated by hazardous substances from the groundwater, modified the existing home plumbing to terminate well connections, and intends to continue to deliver clean water via tank trucks on a regular basis, and establish a surveillance program for all wells in the area by a monthly groundwater monitoring program. This Phase I, short-term removal action will mitigate the threat to public health by providing a temporary alternate source of water for affected consumers.

IV. ENFORCEMENT

The contaminant plume is generally believed by both DPNR and EPA, to have its source from past and present improper handling and disposal practices of organic solvents, possibly from dry cleaners and auto repair shops operating in the area. This site has been referred to the Site Compliance Branch for enforcement action. An attorney and enforcement project officer have been assigned to this case. EPA issued Request for Information letters to all Potentially Responsible Parties.

V. PROPOSED PROJECT

A. Objective of the Phase I Removal Action

The primary objective of the Phase I of the removal action is the mitigation of the threat to public health by providing a safe potable water supply to the affected residences.

Two three-family homes and one apartment complex housing twelve studio units were identified as being dependent on groundwater from their own private wells. Their respective wells were ordered closed-down by DPNR for exceeding interim drinking water standards.

To reach the objective of providing a safe interim drinking water supply and protect the health of the public at risk, the following removal action was initiated. Water storage cisterns, which received contaminated groundwater from affected wells, were cleaned and sanitized. Cisterns were filled with clean, safe, drinking water. Water tank trucks from local water haulers will be providing water for the affected cisterns on a regular basis. Plumbing modification was made to disconnect water lines from the contaminated wells which provide groundwater to the cisterns.

An attempt to connect well water directly to toilets for flushing will be made, if physically and economically feasible. A well surveillance program will be implemented involving all the wells in the Turpentine Run Aquifer, thru monthly sampling and monitoring.

The longer term, Phase II objective will require the provision of a permanent alternate water supply in lieu of the temporary trucking of water to the threatened consumers within the plume area. Upon completion of an analysis of the alternatives for permanent water supply to these residences, a recommendation will be made for Phase II.

B. Project Estimated Costs

Water consumption per person per day on the average is thirty (30) gallons. It is estimated that the one apartment building has twelve studio units with the average of two people per unit. The two other private homes are three-family dwellings with the average of ten people in each. The cisterns in the three family houses are small and, therefore, a supply of water must be delivered every two or three weeks, respectively. The delivery period is currently estimated to be one year or when a permanent alternate water supply can be provided, whichever occurs first.

PROJECT COST (PHASE I)

Cisterns Clean-Up:

Provide labor, material and equipment including one vacuum truck, pressure water spray guns, water tank truck, etc., to drain and dispose contaminated water and to clean and sanitize identified cisterns.....	$13,000
Modification of plumbing including Labor and Materials.....	$ 5,035
Refill cisterns with clean and safe drinking water.....	$ 2,665
Provide cisterns with clean and safe drinking water on regular basis according to a pre-approved schedule.....	$15,000
Contingency (10%).....	$ 4,300
Total Mitigation Cost.....	$40,000

TUT 001 2014

Extramural TAT Cost

TAT Monitoring and sampling program (Including travel and per diem).....	$35,000
TAT Technical and administrative support (including travel and per diem).....	$10,000
Total TAT Cost	$45,000

Intramural EPA Cost

(Including travel and per diem).....	$15,000
ESTIMATED TOTAL PROJECT COST.....	$100,000

This figure represents the estimated total for Phase I. It could be reduced significantly, if a reliable and permanent alternate water supply is found sooner than the proposed 52-weeks delivery period; might be increased, depending upon the identification of new drinking water wells found to be contaminated with hazardous substances within the affected area.

C. Project Schedule

Project initiation of cistern clean-up and safe water delivery has already been implemented based on verbal funding authorization. Safe water delivery period is currently estimated not to exceed one year or when a permanent alternate water supply can be provided, whichever occurs first.

V. RECOMMENDATIONS

Conditions at the Tutu Well Site meet the requirements of Section 300.65 of the National Contingency Plan (NCP) for a CERCLA/SARA removal action. EPA has determined that there is a threat to public health at the site (Section 300.65(b)(1). This determination was based on:

1) Human exposure to unacceptably high levels of acutely toxic substances (Section 300.65(b)(2)(i), and

2) Contamination of drinking water supply (Section 300.65 (b)(2)(ii).

The resident population at risk currently relies on private well water as their source of potable water.

This removal action complies with Section 104(b)(2) of CERCLA, as amended by SARA, in that it is consistent with the efficient performance of long-term remedial measures, by providing an interim supply of potable water to the public until a permanent water supply can be secured.

This is a written confirmation of the initial and revised verbal approval of up to $100,000 for the total project ceiling established on September 1, 1987, by the Director of the Emergency and Remedial Response Division to the OSC for the CERCLA removal action at the Tutu Well Site. The mitigation contracting ceiling is estimated at $40,000, with an additional $45,000 for TAT costs, and $15,000 for EPA costs.

Your authority to authorize these funds is pursuant to Deputy Administrator Alvin Alm's memorandum of Delegation Number 14-1A dated April 15, 1984, and Richard Dewling's Redelegation Order R-11-1200.6 of August 29, 1984.

APPROVAL: Stephen D. Luftig DATE: 1/6/88

DISAPPROVAL: _____ DATE: _____

cc: (after approval is obtained)

C. Daggett, 2RA
R. Salkie, 2ERR-DD
S. Luftig, 2ERR
G. Zachos, 2ERR-RP
B. Sprague, 2ERR-RP
J. Czapor, 2ERRD-SC
G. Pavlou, 2ERRD-NYCRA
J. Marshall, 20EP
P. Gelabert, 2CFO
R. Gherardi, 20PM-FIN
T. Sullivan, PM-214F (EXPRESS MAIL)
T. Fields, WH-548B
P. McKechnie, 2IG

PHOTOVAC SAMPLING RESULTS
TUTU WELL SITE
ST. THOMAS, U.S. VIRGIN ISLANDS

SAMPLE LOCATION	SAMPLE NUMBER	DATE SAMPLED	DATE ANALYZED	SOURCE	BEN	TCE	PCE	TOL	DCE	GCMS
MARTHMAN CRUSH	87-473	07/22/87	07/30/87	IW	0	7	102	6	0	.T.
MARTHMAN BAKERY	87-474	07/22/87	07/30/87	IW	0	0	3	6	0	.T.
4 WINDS WELL#1	87-475	07/22/87	07/30/87	CW	7	19	64	6	0	.T.
4 WINDS WELL#1	87-476	07/22/87	07/30/87	CW	7	19	61	6	0	.T.
TILLET	87-477	07/22/87	07/30/87	CW	633	65	200	48	35	.T.
VINA	87-478	07/22/87	07/30/87	IW	15	9	36	6	0	.T.
EGLIN	87-479	07/22/87	07/30/87	CW	3	16	58	6	0	.T.
TILLET	87-480	07/22/87	07/30/87	CW	6980	711	2040	492	327	.T.
FIELD BLANK	87-481	07/22/87	07/30/87	BA	0	0	0	6	0	.T.

TABLE I

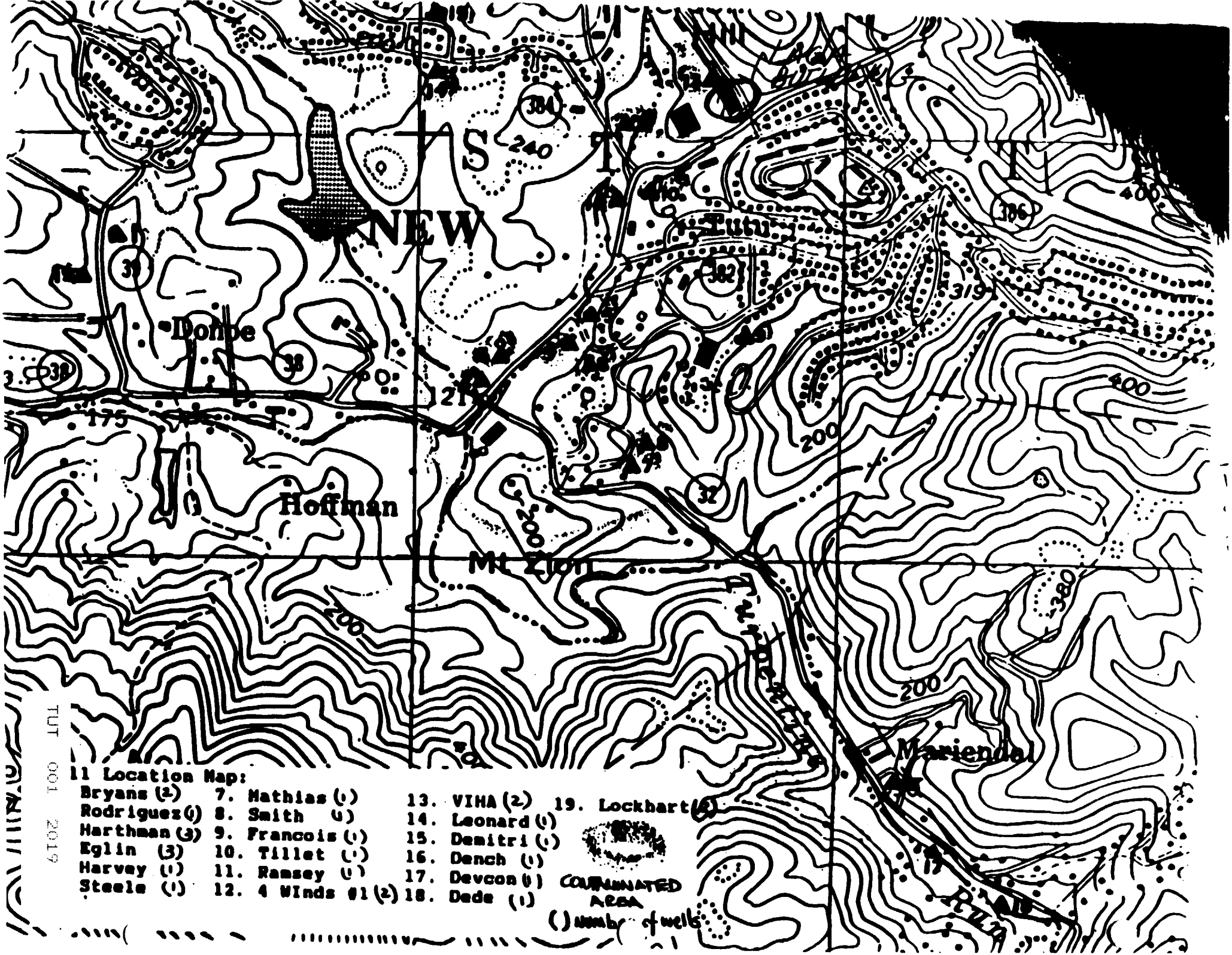
TUT 001 2017

WELL SAMPLING RESULTS
TUTU WELL SITE
ST. THOMAS, U.S. VIRGIN ISLANDS

SAMPLE LOCATION	SAMPLE NUMBER	DATE SAMPLED	DATE ANALYZED	SOURCE	BZN	TCE	PCE	TOL	DCE	GCMS
4 WINDS #1	001A	08/10/87	08/13/87	CW	2	21	72	1	213	.T.
EGLIN WELL #1	002A	08/10/87	08/13/87	CW	0	11	38	0	63	.T.
EGLIN WELL #2	003A	08/10/87	08/13/87	CW	0	13	43	0	74	.T.
EGLIN WELL #3	004A	08/10/87	08/13/87	CW	0	16	57	0	66	.T.
HARTMAN BAKERY	005A	08/10/87	08/13/87	IW	0	0	3	0	1	.T.
HARTMAN CRUSH	006A	08/10/87	08/13/87	IW	0	3	26	0	12	.T.
HARTMAN ESTATE	007A	08/10/87	08/13/87	PW	0	0	1	0	0	.T.
RODRIGUEZ AUTO	008A	08/10/87	08/13/87	IW	0	0	1	0	0	.T.
BRYAN	009A	08/10/87	08/13/87	CW	0	0	0	0	0	.T.
ALPHA,LEONARD	010A	08/10/87	08/13/87	PW	0	0	1	0	0	.T.
SMITH,LUCITA	011A	08/10/87	08/13/87	PW	0	17	120	1	81	.T.
DEVCON #3	012A	08/10/87	08/13/87	CW	0	0	0	0	0	.T.
DEVCON #1	013A	08/10/87	08/13/87	CW	0	0	0	0	0	.T.
DEDE	014A	08/10/87	08/13/87	HA	0	0	0	0	0	.T.
DEMITRI	020A	08/10/87	08/13/87	CW	0	0	2	0	0	.T.
VIHA WELL #3	021A	08/10/87	08/13/87	IW	0	0	0	0	7	.T.
VIHA WELL #1	022A	08/10/87	08/13/87	IW	0	3	10	1	12	.T.
ANSEY	030A	08/10/87	08/13/87	IW	0	0	7	0	1	.T.
STEEL	031A	08/10/87	08/13/87	PW	0	20	270	0	61	.T.
HARVEY	032A	08/10/87	08/13/87	PW	0	61	7600	1	56	.T.
MATHIAS	033A	08/10/87	08/13/87	PW	0	4	66	1	9	.T.
FRANCOIS	034A	08/10/87	08/13/87	PW	0	25	120	0	140	.T.
BENCH	035A	08/10/87	08/13/87	PW	0	0	0	0	0	.T.
TILLET	036A	08/10/87	08/13/87	CW	1300	0	240	56	570	.T.
TILLET DUP	037A	08/10/87	08/13/87	CW	1400	26	130	33	620	.T.
FIELD BLANK	040A	08/10/87	08/13/87	HA	0	0	0	0	0	.T.

TABLE II

TUT 001 2018



11 Location Map:

Bryans (2)	7. Mathias (1)	13. VIHA (2)	19. Lockhart (6)
Rodriguez (1)	8. Smith (1)	14. Leonard (1)	
Harthman (3)	9. Francois (1)	15. Demitri (1)	
Eglin (3)	10. Tillet (1)	16. Dench (1)	
Harvey (1)	11. Ramsey (1)	17. Devcon (1)	
Steele (1)	12. 4 Winds #1 (2)	18. Dede (1)	

TUT 001 2019

REFERENCE NO. 62

FILE COPY

August 22, 1988

Request for a Twelve Month Exemption for the TUTU Well Site, Saint Thomas, US Virgin Islands - ACTION MEMORANDUM

Carlos E. O'Neill
On Scene Coordinator, CFO

William Muszynski
Acting Regional Administrator

THRU: Stephen D. Luftig, Director
Emergency and Remedial Response Division

I. ISSUE

Continued response actions which exceed a twelve-month time period cannot be undertaken unless an exemption from Section 104(c)(1) of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) of 1980, as amended by the Superfund Amendments and Reauthorization Act (SARA) of 1986, is granted. Reroval activities were initiated at the TUTU Well Site in Saint Thomas, U.S. Virgin Islands on September 1, 1987, and the twelve month time limitation for reroval actions under CERCLA/SARA will expire on the same day in 1988. Circumstances, discussed on the following pages, have arisen which will prevent the reroval action from being completed within the authorized time period. These same circumstances prevent an accurate estimation of the amount of time required to complete this removal action. As a result, an exemption from the twelve month time limit is hereby requested to continue to provide an alternate supply of potable water to the affected residents.

II. BACKGROUND

A. Incident/Response History

On July 15, 1987, Mr. Alan Smith, Commissioner of the Department of Planning and Natural Resources (DPNR), U.S. Virgin Islands, verbally requested from the U.S. Environmental Protection Agency (EPA) to provide analytical support in the sampling of one well

FILE: TUTU WELL SITE St. Thomas, VI
2ERR:RP:O'Neill:TT:9/31/88:

2CA	2CA							
O'Neill	GELABERT							
9/16/88	9/16/88							
2ERR-RP	2RPO	2ERR-SC	20RC	20EP	PERR	2DRA	2RA	
SPRAGUE	SALKIE	CRAPOR	SCHAAF	RANDOL	LUFTIG	MARSHALL	MUSZYNSKI	
9/16/88	9/16/88	9/16/88	9/8	9/12	9/12	9/16	9/16	

TUT 001 2021

which was reported to exhibit a strong unpleasant odor. This well was a major source of commercially provided potable water for the eastern portion of Saint Thomas. The well is located on the eastern part of the island in the Tutu Section of Anna's Retreat. This verbal request was followed by an additional request for EPA to assume the role of Lead Agency after sampling results indicated that several commercial wells were found to be contaminated with hazardous substances. This verbal request was followed by a formal request in writing from DPNR on August 10, 1987.

EPA's preliminary investigation commenced on July 21, 1987, with a field reconnaissance and sampling of this one well and six additional wells identified in the immediate area. Several of these wells were also major water suppliers of public drinking water for the eastern part of the island.

Laboratory results from this survey indicated that the initial well was highly contaminated with gasoline and chlorinated organics, and the additional six wells contained elevated levels of chlorinated volatile organic compounds. Based on these results, DPNR declared that an imminent health threat existed, which could affect approximately 20,000 people living in St. Thomas.

In addition, an indefinite number of tourists vacationing in St. Thomas were at risk, since these commercial wells supplied water to major hotels and restaurants. DPNR issued orders to close these seven commercial wells in order to protect public health.

Subsequent to this action, EPA expanded their sampling plan due to the threat of greater contamination to drinking water wells in the area. EPA along with DPNR, identified other wells within the Tutu Water/Turpentine Run Aquifer which may have been impacted by the hazardous substances identified to be present in the groundwater. A second round of groundwater well sampling took place on August 10 and 11, 1987, which included a total of twenty-four (24) wells identified in the Tutu Section of Anna's Retreat. All twenty-four wells were sampled and analyzed for volatile organic compounds. Following these results, DPNR closed five private wells which serviced two three-family homes and one apartment building housing of twelve studio units.

A third round of groundwater well sampling took place on October 5 and 6, 1987, which included twenty-four (24) wells previously identified in the Turpentine Run Aquifer. All twenty-four wells were sampled and analyzed for full Hazardous Substance List (HSL) compounds. From these results, EPA once again confirmed the gross contamination of the groundwater wells with volatile organic compounds (VOC). Major contaminants in groundwater are tetrachloroethylene (PCE), trans 1-2 dichloroethylene (DCE) and benzene. The EPA's Removal Action Level (RAL) of 66 ppb for PCE was exceeded in seven (7) wells, the RAL of 175 ppb for DCE was exceeded in three (3) wells, and the RAL of 120 ppb for benzene was exceeded in one (1) well. There was one (1) additional well found below the EPA Removal Action Level, but above the U.S. Virgin Island's interim maximum permissible concentration levels set on September 1, 1987, by DPNR for volatile organics in drinking water in the Turpentine Run Aquifer (50 ppb for a single compound or 100 ppb for total volatile organic compounds). Five of the seven previously mentioned wells were residential wells.

EPA and DPNR commenced an investigation of the Tutu Water/ Turpentine Run Aquifer by issuing Enforcement Orders to PRP's to define Potential Responsible Parties and determine the extent of contamination. EPA initiated a monthly/quarterly well monitoring program. DPNR issued a total of ten (10) orders to well owners to close sixteen (16) wells and issued two (2) advisory letters to owners not to use well water for drinking, bathing and washing.

EPA initiated a removal action on September 1, 1987. The action involved cleaning the homeowner's cisterns that had been contaminated by hazardous substances from the groundwater, modifying the existing home plumbing to terminate well connections, and delivering clean water to 3 well owners via tank trucks on a regular basis, and establishing a surveillance program for all wells in the area by a monthly/quarterly groundwater monitoring program. This Phase I, short-term removal action has mitigated the threat to public health by providing a temporary alternate source of water for affected consumers.

This site is not on the National Priorities List (NPL), nor is it currently proposed.

F. Site Conditions

The long term solution to this problem appears to be the extension of a public water main to the affected residences. Implementation of this plan has been delayed due to the budgetary constraints facing the Removal Program. As a result, trucking water deliveries are continuing until the funds necessary to extend the water main are obtained. Awaiting this funding has prevented this site from being completed within the twelve month statutory limit.

III. EXEMPTION FROM STATUTORY LIMITS

Section 104(c)(1) of CERCLA limits Federal removal actions to twelve months in duration unless certain criteria are met. These criteria, along with a discussion of how this site conforms to them, are discussed in the following paragraphs.

A. There is an Immediate Risk to Public Health, Welfare or the Environment

This is a case of actual well water contamination in excess of the EPA's 66 ppb removal action levels (RAL) for PCE, 175 ppb RAL for TCE, 120 ppb RAL for benzene and 48 ppb RAL for methylene chloride affecting two multi-family dwellings and an apartment complex housing twelve studio units. In addition to the exposure via consumption of water, or eating food prepared with this water, showering with water contaminated with volatile organics contaminate the air. This causes an elevation in household air contaminant concentrations and exposes residents through inhalation and adsorption through the skin. Contaminated water supplies, therefore, pose a serious threat not only through drinking and cooking, but also through showering, bathing, and dishwashing. A complete history of sample results taken to date has been included in Attachment "A". Since our initiation of this removal action, the concentrations of contaminants has not diminished at the residential wells. For example: Smith, Steele and Harvey wells have consistently shown high levels of PCE above the EPA's Removal Action Levels (RAL).

B. Continued Response Actions are Immediately Required to Prevent, Limit or Mitigate an Emergency

The contamination existing at this site is an emergency in that residential potable water supplies are contaminated with hazardous materials. Provision of trucking water by EPA to

the residents has reduced the risk of exposure by ingestion, and contact through bathing and showering. If this twelve month exemption request is not approved, trucking water deliveries will have to be terminated. This would leave residents with only their own contaminated wells as a potable source of water and would result in a direct exposure problem.

C. Assistance Will Not Otherwise be Provided on a Timely Basis

No other level of government has agreed to take any action on a timely basis which could provide an adequate solution to this problem. EPA enforcement has investigated this area, and some Responsible Parties have been identified. However, at this time, a PRP removal action appears unlikely.

IV. RECOMMENDATION

Conditions at this site continues to meet the criteria for a removal action under CERCLA 104(c)(1). Therefore, I recommend the approval of an exemption from the twelve month limit and allow the continuation of removal activities at the TUTU Well Site in Saint Thomas, U.S. Virgin Island.

Your authority to approve this time exemption is pursuant to Administrator's September 21, 1987 Memorandum Delegation 14-3.

APPROVED _____ DATE SEP 14 1988

DISAPPROVED _____ DATE _____

cc: (after approval is obtained)

J. Marshall, 2ADRA
R. Salkie, 2ERR-RPO
S. Luftig, 2ERPD
B. Sprague, 2ERR-PP
G. Zachos, 2ERR-RP
J. Czapor, 2ERR-SC
G. Pavlou, 2ERR-NYCRA
J. Malleck, 2WMD-OWM
V. Pitruzzello, 2ERR-PS
M. Randal, 2OEP
E. Schaff, 2ORC-SUP
R. Gherardi, 2OPM-FIN
S. Anderson, PM-214F (express mail)
T. Fields, WH-548B
A. Smith, DPNR-USVI

bcc: C. Hoyik, 2ERR-PS
J. Rosianski, 2-OEP
L. Guarneiri, WH-548B

REFERENCE NO. 62

code of federal regulations

Protection of Environment

40

PARTS 100 TO 149

Revised as of July 1, 1986

TUT 001 2027

high pureeable levels, it may be necessary to wash the purging device with a detergent solution, rinse it with distilled water, and then dry it in a 105 ° C oven between analyses. The trap and other parts of the system are also subject to contamination; therefore, frequent bakeout and purging of the entire system may be required.

4. Safety

4.1 The toxicity or carcinogenicity of each reagent used in this method has not been precisely defined; however, each chemical compound should be treated as a potential health hazard. From this viewpoint, exposure to these chemicals must be reduced to the lowest possible level by whatever means available. The laboratory is responsible for maintaining a current awareness file of OSHA regulations regarding the safe handling of the chemicals specified in this method. A reference file of material data handling sheets should also be made available to all personnel involved in the chemical analysis. Additional references to laboratory safety are available and have been identified[**] for the information of the analyst.

4.2. The following parameters covered by this method have been tentatively classified as known or suspected, human or mammalian carcinogens: benzene, carbon tetrachloride, chloroform, 1,4-dichlorobenzene, and vinyl chloride. Primary standards of these toxic compounds should be prepared in a hood. A NIOSH/MESA approved toxic gas respirator should be worn when the analyst handles high concentrations of these toxic compounds.

5. Apparatus and Materials

5.1 Sampling equipment, for discrete sampling.

5.1.1 Vial—25-mL capacity or larger, equipped with a screw cap with a hole in the center (Pierce #13075 or equivalent). Detergent wash, rinse with tap and distilled water, and dry at 105 °C before use.

5.1.2 Septum—Teflon-faced silicane (Pierce #12722 or equivalent). Detergent wash, rinse with tap and distilled water, and dry at 105 °C for 1 h before use.

5.2 Purge and trap system—The purge and trap system consists of three separate pieces of equipment: A purging device, trap, and desorber. Several complete systems are now commercially available.

5.2.1 The purging device must be designed to accept 5-mL samples with a water column at least 3 cm deep. The gaseous head space between the water column and the trap must have a total volume of less than 15 mL. The purge gas must pass though the water column as finely divided bubbles with a diameter of less than 3 mm at the origin. The purge gas must be introduced no more than 5 mm from the base of the water column. The purging device illustrated in Figure 1 meets these design criteria.

5.2.2 The trap must be at least 25 cm long and have an inside diameter of at least 0.105 in. The trap must be packed to contain the following minimum lengths of adsorbents: 1.0 cm of methyl silicone coated packing (Section 6.3.2), 15 cm of 2,6-dyphenylene oxide polymer (Section 6.3.1), and 8 cm of silica gel (Section 6.3.3). The minimum specifications for the trap are illustrated in Figure 2.

5.2.3 The desorber should be capable of rapidly heating the trap to 180 °C. The polymer section of the trap should not be heated higher than 180 °C and the remaining sections should not exceed 200 °C. The desorber illustrated in Figure 2 meets these design criteria.

5.2.4 The purge and trap system may be assembled as a separate unit or be coupled to a gas chromatograph as illustrated in Figures 3 and 4.

5.3 GC/MS system:

5.3.1 Gas chromatograph—An analytical system complete with a temperature programmable gas chromatograph suitable for on-column injection and all required accessories including syringes, analytical columns, and gases.

5.3.2 Column—6 ft long x 0.1 in ID stainless steel or glass, packed with 1% SP-1000 on Carbopack B (60/80 mesh) or equivalent. This column was used to develop the method performance statements in Section 14. Guidelines for the use of alternate column packings are provided in Section 11.1.

5.3.3 Mass spectrometer—Capable of scanning from 20 to 260 amu every 7 s or less, utilizing 70 V (nominal) electron energy in the electron impact ionization mode, and producing a mass spectrum which meets all the criteria in Table 2 when 50 ng of 4-bromofluorobenzene (BFB) is injected through the GC inlet.

5.3.4 GC/MS interface—Any GC to MS interface that gives acceptable calibration points at 50 ng or less per injection for each of the parameters of interest and achieves all acceptable performance criteria (Section 10) may be used. GC to MS interfaces constructed of all glass or glass-lined materials are recommended. Glass can be deactivated by silanizing with dichlorodimethylsilane.

5.3.5 Data system—A computer system must be interfaced to the mass spectrometer that allows the continuous acquisition and storage on machine-readable media of all mass spectra obtained throughout the duration of the chromatographic program. The computer must have software that allows searching any GC/MS data file for specific m/z (masses) and plotting such m/z abundances versus time or scan number. This type of plot is defined as an Extracted Ion Current Profile (EICP). Software must also be available that allows integrating the abundance in any EICP between specified time or scan number limits.

5.4 Syringes—5-mL, glass hypodermic with Luerlok tip (two each), if applicable to the purging device.

5.5 Micro syringes—25-μL, 0.006 in. ID needle.

5.6 Syringe valve—2-way, with Luer ends (three each).

5.7 Syringe—5-mL, gas-tight with shutoff valve.

5.8 Bottle—15-mL, screw-cap, with Teflon cap liner.

5.9 Balance—Analytical, capable of accurately weighing 0.0001 g.

6. Reagents

6.1 Reagent water—Reagent water is defined as a water in which an interferent is not observed at the MDL of the parameters of interest.

6.1.1 Reagent water can be generated by passing tap water through a carbon filter bed containing about 1 lb of activated carbon (Filtrasorb-300, Calgon Corp., or equivalent).

6.1.2 A water purification system (Millipore Super-Q or equivalent) may be used to generate reagent water.

6.1.3 Reagent water may also be prepared by boiling water for 15 min. Subsequently, while maintaining the temperature at 90 °C, bubble a contaminant-free inert gas through the water for 1 h. While still hot, transfer the water to a narrow mouth screw-cap bottle and seal with a Teflon-lined septum and cap.

6.2 Sodium thiosulfate—(ACS) Granular.

6.3 Trap materials:

6.3.1 2,6-Diphenylene oxide polymer—Tenax, (60/80 mesh), chromatographic grade or equivalent.

6.3.2 Methyl silicone packing—3% OV-1 on Chromosorb-W (60/80 mesh) or equivalent.

6.3.3 Silica gel—35/60 mesh, Davison, grade-15 or equivalent.

6.4 Methanol—Pesticide quality or equivalent.

6.5 Stock standard solutions—Stock standard solutions may be prepared from pure standard materials or purchased as certified solutions. Prepare stock standard solutions in methanol using assayed liquids or gases as appropriate. Because of the toxicity of some of the compounds, primary dilutions of these materials should be prepared in a hood. A NIOSH/MESA approved toxic gas respirator should be used when the analyst handles high concentrations of such materials.

6.5.1 Place about 9.8 mL of methanol into a 10-mL ground glass stoppered volumetric flask. Allow the flask to stand, unstoppered, for about 10 min or until all alcohol wetted surfaces have dried. Weigh the flask to the nearest 0.1 mg.

6.5.2 Add the assayed reference material:

6.5.2.1 Liquids—Using a 100-μL syringe, immediately add two or more drops of assayed reference material to the flask, then reweigh. Be sure that the drops fall directly into the alcohol without contacting the neck of the flask.

6.5.2.2 Gases—To prepare standards for any of the four halocarbons that boil below 30 °C (bromomethane, chloroethane, chloromethane, and vinyl chloride), fill a 5-mL valved gas-tight syringe with the reference standard to the 5.0-mL mark. Lower the needle to 5 mm above the methanol meniscus. Slowly introduce the reference standard above the surface of the liquid (the heavy gas will rapidly dissolve in the methanol).

6.5.3 Reweigh, dilute to volume, stopper, then mix by inverting the flask several times. Calculate the concentration in μg/μL from the net gain in weight. When compound purity is assayed to be 96% or greater, the weight may be used without correction to calculate the concentration of the stock standard. Commercially prepared stock standards may be used at any concentration if they are certified by the manufacturer or by an independent source.

6.5.4 Transfer the stock standard solution into a Teflon-sealed screw-cap bottle. Store, with minimal headspace, at −10 to −20 °C and protect from light.

6.5.5 Prepare fresh standards weekly for the four gases and 2-chloroethylvinyl ether. All other standards must be replaced after one month, or sooner if comparison with check standards indicates a problem.

6.6 Secondary dilution standards—Using stock solutions, prepare secondary dilution standards in methanol that contain the compounds of interest, either singly or mixed together. The secondary dilution standards should be prepared at concentrations such that the aqueous calibration standards prepared in Section 7.3 will bracket the working range of the analytical system. Secondary dilution standards should be stored with minimal headspace and should be checked frequently for signs of degradation or evaporation, especially just prior to preparing calibration standards from them.

6.7 Surrogate standard spiking solution—Select a minimum of three surrogate compounds from Table 3. Prepare stock standard solutions for each surrogate standard in methanol as described in Section 6.5. Prepare a surrogate standard spiking solution from these stock standards at a concentration of 15 μg/mL in water. Store the solutions at 4 °C in Teflon-sealed glass contain-

TUT 001 2028

Chlorine, Total Residual," Methods for emical Analysis of Water and Wastes, A-600/4-79-020, U.S. Environmental Protion Agency, Environmental Monitoring d Support Laboratory, Cincinnati, Ohio 268, March 1979.
4. Wong, A.S. et al. "The Determination 2,3,7,8-TCDD in Industrial and Municipal astewaters, Method 613, Part 1—Develop-nt and Detection Limits," G. Choudhay, Keith, and C. Ruppe, ed., Butterworth c., (1983).
15. "EPA Method Study 26, Method 613: ,7,8-Tetrachlorodibenzo-p-dioxin," EPA 0/4-84-037, National Technical Informa-on Service, PB84-188879, Springfield, Virnia 22161, May 1984.

TABLE 1.—Chromatographic Conditions and Method Detection Limit

Parameter	Retention time (min)	Method detection limit (µg/L)
2,3,7,8-TCDD	13.1	0.002

Column conditions: SP-2330 coated on a 60 m long x 25 mm ID glass column with hydrogen carrier gas at 40 n/sec linear velocity, splitless injection using tetradecane. olumn temperature held isothermal at 200°C for 1 min, then ogrammed at 6°C/min to 250 °C and held. Use of helium rrier gas will approximately double the retention time.

TABLE -QC Acceptance Criteria—Method 613

Parameter	Test conc. (µg/L)	Limit for s (µg/L)	Range for X (µg/L)	Range for P, P_s (%)
2,3,7,8-TCDD	0.100	0.0276	0.0523–0.1228	46–129

s = Standard deviation of four recovery measurements, in µg/L (Section 8.2.4).
X = Average recovery for four recovery measurements, in µg/L (Section 8.2.4).
P, P_s = Percent recovery measured (Section 8.3.2, Section 8.4.2).

NOTE: These criteria are based directly upon the method performance data in Table 3. Where necessary, the limits for recovery have been broadened to assure applicability of the limits to concentrations below those used to develop Table 3.

AS FUNCTIONS OF CONCENTRATION—METHOD

	Accuracy, as recovery, X' (µg/L)	Single analyst precision, s_r' (µg/L)	Overall precision, S' (µg/L)
	0.89C+0.00145	0.13X+0.00129	0.18X+0.00269

of a sample containing a concentration of C, in µg/L
ments at an average concentration found of X, in µg/L
ments at an average concentration found of X, in µg/L

aining a concentration of C, in µg/L

METHOD 624—PURGEABLES

1. Scope and Application

1.1 This method covers the determination of a number of purgeable organics. The following parameters may be determined by this method:

Parameter	STORET No.	CAS No.
Benzene	34030	71-43-2
Bromodichloromethane	32101	75-27-4
Bromoform	32104	75-25-2
Bromomethane	34413	74-83-9
Carbon tetrachloride	32102	56-23-5
Chlorobenzene	34301	108-90-7
Chloroethane	34311	75-00-3
2-Chloroethylvinyl ether	34576	110-75-8
Chloroform	32106	67-66-3
Chloromethane	34418	74-87-3
Dibromochloromethane	32105	124-48-1
1,2-Dichlorobenzene	34536	95-50-1
1,3-Dichlorobenzene	34566	541-73-1
1,4-Dichlorobenzene	34571	106-46-7
1,1-Dichloroethane	34496	75-34-3
1,2-Dichloroethane	34531	107-06-2
1,1-Dichloroethene	34501	75-35-4
trans-1,2-Dichloroethene	34546	156-60-5
1,2-Dichloropropane	34541	78-87-5
cis-1,3-Dichloropropene	34704	10061-01-5
trans-1,3-Dichloropropene	34699	10061-02-6
Ethyl benzene	34371	100-41-4
Methylene chloride	34423	75-09-2
1,1,2,2-Tetrachloroethane	34516	79-34-5
Tetrachloroethene	34475	127-18-4
Toluene	34010	108-88-3
1,1,1-Trichloroethane	34506	71-55-6
1,1,2-Trichloroethane	34511	79-00-5
Trichloroethene	39180	79-01-6
Trichlorofluoromethane	34488	75-69-4
Vinyl chloride	39175	75-01-4

1.2 The method may be extended to screen samples for acrolein (STORET No. 34210, CAS No. 107-02-8) and acrylonitrile (STORET No. 34215, CAS No. 107-13-1), however, the preferred method for these two compounds is Method 603.

1.3 This is a purge and trap gas chromatographic/mass spectrometer (GC/MS) method applicable to the determination of the compounds listed above in municipal and industrial discharges as provided under 40 CFR 136.1.

1.4 The method detection limit (MDL, defined in Section 14.1)[1] for each parameter is listed in Table 1. The MDL for a specific wastewater may differ from those listed, depending upon the nature of interferences in the sample matrix.

1.5 Any modification to this method, beyond those expressly permitted, shall be considered as a major modification subject to application and approval of alternate test procedures under 40 CFR 136.4 and 136.5. Depending upon the nature of the modification and the extent of intended use, the applicant may be required to demonstrate that the modifications will produce equivalent results when applied to relevant wastewaters.

1.6 This method is restricted to use by or under the supervision of analysts experienced in the operation of a purge and trap system and a gas chromatograph/mass spectrometer and in the interpretation of mass spectra. Each analyst must demonstrate the ability to generate acceptable results with this method using the procedure described in Section 8.2.

2. Summary of Method

2.1 An inert gas is bubbled through a 5-mL water sample contained in a specially-designed purging chamber at ambient temperature. The purgeables are efficiently transferred from the aqueous phase to the vapor phase. The vapor is swept through a sorbent trap where the purgeables are trapped. After purging is completed, the trap is heated and backflushed with the inert gas to desorb the purgeables onto a gas chromatographic column. The gas chromatograph is temperature programmed to separate the purgeables which are then detected with a mass spectrometer.[1,2]

3. Interferences

3.1 Impurities in the purge gas, organic compounds outgassing from the plumbing ahead of the trap, and solvent vapors in the laboratory account for the majority of contamination problems. The analytical system must be demonstated to be free from contamination under the conditions of the analysis by running laboratory reagent blanks as described in Section 8.1.3. The use of non-Teflon plastic tubing, non-Teflon thread sealants, or flow controllers with rubber components in the purge and trap system should be avoided.

3.2 Samples can be contaminated by diffusion of volatile organics (particularly fluorocarbons and methylene chloride) through the septum seal into the sample during shipment and storage. A field reagent blank prepared from reagent water and carried through the sampling and handling protocol can serve as a check on such contamination.

3.3 Contamination by carry-over can occur whenever high level and low level samples are sequentially analyzed. To reduce carry-over, the purging device and sample syringe must be rinsed with reagent water between sample analyses. Whenever an unusually concentrated sample is encountered, it should be followed by an analysis of reagent water to check for cross contamination. For samples containing large amounts of water-soluble materials, suspended solids, high boiling compounds or

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8.3.2 Analyze one 5-mL sample aliquot to determine the background concentration (B) of each parameter. If necessary, prepare a new QC check sample concentrate (Section 8.2.1) appropriate for the background concentrations in the sample. Spike a second 5-mL sample aliquot with 10 μL of the QC check sample concentrate and analyze it to determine the concentration after spiking (A) of each parameter. Calculate each percent recovery (P) as 100(A-B)%/T, where T is the known true value of the spike.

8.3.3 Compare the percent recovery (P) for each parameter with the corresponding QC acceptance criteria found in Table 5. These acceptance criteria wer calculated to include an allowance for error in measurement of both the background and spike concentrations, assuming a spike to background ratio of 5:1. This error will be accounted for to the extent that the analyst's spike to background ratio approaches 5:1.[7] If spiking was performed at a concentration lower than 20 μg/L, the analyst must use either the QC acceptance criteria in Table 5, or optional QC acceptance criteria calculated for the specific spike concentration. To calculate optional acceptance criteria for the recoveryof a parameter: (1) Calculate accuracy (X') using the equation in Table 6, substituting the spike concentration (T) for C; (2) calculate overall precision (S') using the equation in Table 6, substituting X' for $\bar{X}$; (3) calculate the range for recovery at the spike concentration as (100 X'/T) (±2.44(100 S'/T)%.[7]

8.3.4 If any individual P falls outside the designated range for recovery, that parameter has failed the acceptance criteria. A check standard containing each parameter that failed the criteria must be analyzed as described in Section 8.4.

8.4 If any parameter fails the acceptance criteria for recovery in Section 8.3, a QC check standard containing each parameter that failed must be prepared and analyzed.

NOTE: The frequency for the required analysis of a QC check standard will depend upon the number of parameters being simultaneously tested, the complexity of the sample matrix, and the performance of the laboratory. If the entire list of parameters in Table 5 must be measured in the sample in Section 8.3, the probability that the analysis of a QC check standard will be required is high. In this case the QC check standard should be routinely analyzed with the spiked sample.

8.4.1 Prepare the QC check standard by adding 10 μL of QC check sample concentrate (Section 8.2.1 or 8.3.2) to 5 mL of reagent water. The QC check standard needs only to contain the parameters that failed criteria in the test in Section 8.3.

8.4.2 Analyze the QC check standard to determine the concentration measured (A) of each parameter. Calculate each percent recovery (P_s) as 100 (A/T)%, where T is the true value of the standard concentration.

8.4.3 Compare the percent recovery (P_s) for each parameter with the corresponding QC acceptance criteria found in Table 5. Only parameters that failed the test in Section 8.3 need to be compared with these criteria. If the recovery of any such parameter falls outside the designated range, the laboratory performance for that parameter is judged to be out of control, and the problem must be immediately identified and corrected. The analytical result for that parameter in the unspiked sample is suspect and may not be reported for regulatory compliance purposes.

8.5 As a quality control check, the laboratory must spike all samples with the surrogate standard spiking solutions as described in Section 11.4, and calculate the percent recovery of each surrogate compound.

8.6 As part of the QC program for the laboratory, method accuracy for wastewater samples must be assessed and records must be maintained. After the analysis of five spiked wastewater samples as in Section 8.3, calculate the average percent recovery ($\bar{P}$) and the standard deviation of the percent recovery (s_p). Express the accuracy assessment as a percent recovery interval from $\bar{P}-2s_p$ to $\bar{P}+2s_p$. If $\bar{P}=90\%$ and $s_p=10\%$, for example, the accuracy interval is expressed as 70–110%. Update the accuracy assessment for each parameter a regular basis (e.g. after each five to ten new accuracy measurements).

8.7 It is recommended that the laboratory adopt additional quality assurance practices for use with this method. The specific practices that are most productive depend upon the needs of the laboratory and the nature of the samples. Field duplicates may be analyzed to assess the precision of the environmental measurements. Whenever possible, the laboratory should analyze standard reference materials and participate in relevant performance evaluation studies.

9. Sample Collection, Preservation, and Handling

9.1 All samples must be iced or refrigerated from the time of collection until analysis. If the sample contains residual chlorine, add sodium thiosulfate preservative (10 mg/40 mL is sufficient for up to 5 ppm Cl_2) to the empty sample bottle just prior to shipping to the sampling site. EPA Methods 330.4 and 330.5 may be used for measurement of residual chlorine.[8] Field test kits are available for this purpose.

9.2 Grab samples must be collected in glass containers having a total volume of at least 25 mL. Fill the sample bottle just to overflowing in such a manner that no air bubbles pass through the sample as the bottle is being filled. Seal the bottle so that no air bubbles are entrapped in it. If preservative has been added, shake vigorously for 1 min. Maintain the hermetic seal on the sample bottle until time of analysis.

9.3 Experimental evidence indicates that some aromatic compounds, notably benzene, toluene, and ethyl benzene are susceptible to rapid biological degradation under certain environmental conditions.[9] Refrigeration alone may not be adequate to preserve these compounds in wastewaters for more than seven days. For this reason, a separate sample should be collected, acidified, and analyzed when these aromatics are to be determined. Collect about 500 mL of sample in a clean container. Adjust the pH of the sample to about 2 by adding 1+1 HCl while stirring vigorously. Check pH with narrow range (1.4 to 2.8) pH paper. Fill a sample container as described in Section 9.2.

9.4 All samples must be analyzed within 14 days of collection.[9]

10. Daily GC/MS Performance Tests

10.1 At the beginning of each day that analyses are to be performed, the GC/MS system must be checked to see if acceptable performance criteria are achieved for BFB.[9] The performance test must be passed before any samples, blanks, or standards are analyzed, unless the instrument has met the DFTPP test described in Method 625 earlier in the day.[10]

10.2 These performance tests require the following instrumental parameters:

Electron Energy: 70 V (nominal)
Mass Range: 20 to 260 amu
Scan Time: To give at least 5 scans per peak but not to exceed 7 s per scan.

10.3 At the beginning of each day, inject 2 μL of BFB solution directly on the column. Alternatively, add 2 μL of BFB solution to 5.0 mL of reagent water or standard solution and analyze the solution according to section 11. Obtain a background-corrected mass spectrum of BFB and confirm that all the key m/z criteria in Table 2 are achieved. If all the criteria are not achieved, the analyst must retune the mass spectrometer and repeat the test until all criteria are achieved.

11. Sample Purging and Gas Chromatography

11.1 Table 1 summarizes the recommended operating conditions for the gas chromatograph. Included in this table are retention times and MDL that can be achieved under these conditions. An example of the separations achieved by this column is shown in Figure 5. Other packed columns or chromatographic conditions may be used if the requirements of Section 8.2 are met.

11.2 After achieving the key m/z abundance criteria in Section 10, calibrate the system daily as described in Section 7.

11.3 Adjust the purge gas (helium) flow rate to 40 mL/min. Attach the trap inlet to the purging device, and set the purge and trap system to purge (Figure 3). Open the syringe valve located on the purging device sample introduction needle.

11.4 Allow the sample to come to ambient temperature prior to introducing it into the syringe. Remove the plunger from a 5-mL syringe and attach a closed syringe valve. Open the sample bottle (or standard) and carefully pour the sample into the syringe barrel to just short of overflowing. Replace the syringe plunger and compress the sample. Open the syringe valve and vent any residual air while adjusting the sample volume to 5.0 mL. Since this process of taking an aliquot destroys the validity of the sample for future analysis, the analyst should fill a second syringe at this time to protect against possible loss of data. Add 10.0 μL of the surrogate spiking solution (Section 6.7) and 10.0 μL of the internal standard spiking solution (Section 7.3.2) through the valve bore, then close the valve. The surrogate and internal standards may be mixed and added as a single spiking solution.

11.5 Attach the syringe-syringe valve assembly to the syringe valve on the purging device. Open the syringe valves and inject the sample into the purging chamber.

11.6 Close both valves and purge the sample for 11.0±0.1 min at ambient temperature.

11.7 After the 11-min purge time, attach the trap to the chromatograph, adjust the purge and trap system to the desorb mode (Figure 4), and begin to temperature program the gas chromatograph. Introduce the trapped materials to the GC column by rapidly heating the trap to 180 °C while backflushing the trap with an inert gas between 20 and 60 mL/min for 4 min. If rapid heating of the trap cannot be achieved, the GC cloumn must be used as a secondary trap by cooling it to 30 °C (subambient temperature, if problems persist) instead of the initial program temperature of 45 °C.

11.8 While the trap is being desorbed into the gas chromatograph, empty the purging chamber using the sample introduction syringe. Wash the chamber with two 5-mL flushes of reagent water.

11.9 After desorbing the sample for 4 min, recondition the trap by returning the purge and trap system to the purge mode. Wait 15 s then close the syringe valve on the purging device to begin gas flow through the trap. The trap temperature

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ers with a minimum of headspace. The solutions should be checked frequently for stability. The addition of 10 μL of this solution of 5 mL of sample or standard is equivalent to a concentration of 30 μg/L of each surrogate standard.

6.8 BFB Standard—Prepare a 25 μg/mL solution of BFB in methanol.

6.9 Quality control check sample concentrate—See Section 8.2.1.

7. Calibration

7.1 Assemble a purge and trap system that meets the specifications in Section 5.2. Condition the trap overnight at 180 °C by backflushing with an inert gas flow of at least 20 mL/min. Condition the trap for 10 min once daily prior to use.

7.2 Connect the purge and trap system to a gas chromatograph. The gas chromatograph must be operated using temperature and flow rate conditions equivalent to those given in Table 1.

7.3 Internal standard calibration procedure—To use this approach, the analyst must select three or more internal standards that are similar in analytical behavior to the compounds of interest. The analyst must further demonstrate that the measurement of the internal standard is not affected by method or matrix interferences. Some recommended internal standards are listed in Table 3.

7.3.1 Prepare calibration standards at a minimum of three concentration levels for each parameter by carefully adding 20.0 μL of one or more secondary dilution standards to 50, 250, or 500 mL of reagent water. A 25-μL syringe with a 0.006 in. ID needle should be used for this operation. One of the calibration standards should be at a concentration near, but above, the MDL (Table 1) and the other concentrations should correspond to the expected range of concentrations found in real samples or should define the working range of the GC/MS system. These aqueous standards can be stored up to 24 h, if held in sealed vials with zero headspace as described in Section 9.2. If not so stored, they must be discarded after 1 h.

7.3.2 Prepare a spiking solution containing each of the internal standards using the procedures described in Sections 6.5 and 6.6. It is recommended that the secondary dilution standard be prepared at a concentration of 15 μg/mL of each internal standard compound. The addition of 10 μL of this standard to 5.0 mL of sample or calibration standard would be equivalent to 30 μg/L.

7.3.3 Analyze each calibration standard according to Section 11, adding 10 μL of internal standard spiking solution directly to the syringe (Section 11.4). Tabulate the area response of the characteristic m/z against concentration for each compound and internal standard, and calculate response factors (RF) for each compound using Equation 1.

$$RF = \frac{(A_s)(C_{is})}{(A_{is})(C_s)}$$

Equation 1

where:

A_s = Area of the characteristic m/z for the parameter to be measured.

A_{is} = Area of the characteristic m/z for the internal standard.

C_{is} = Concentration of the internal standard.

C_s = Concentration of the parameter to be measured.

If the RF value over the working range is a constant (<35% RSD), the RF can be assumed to be invariant and the average RF can be used for calculations. Alternatively, the results can be used to plot a calibration curve of response ratios, A_s/A_{is} vs. RF.

7.4 The working calibration curve or RF must be verified on each working day by the measurement of a QC check sample.

7.4.1 Prepare the QC check sample as described in Section 8.2.2.

7.4.2 Analyze the QC check sample according to the method beginning in Section 10.

7.4.3 For each parameter, compare the response (Q) with the corresponding calibration acceptance criteria found in Table 5. If the responses for all parameters of interest fall within the designated ranges, analysis of actual samples can begin. If any individual Q falls outside the range, proceed according to Section 7.4.4.

NOTE: The large number of parameters in Table 5 present a substantial probability that one or more will not meet the calibration acceptance criteria when all parameters are analyzed.

7.4.4 Repeat the test only for those parameters that failed to meet the calibration acceptance criteria. If the response for a parameter does not fall within the range in this second test, a new calibration curve or RF must be prepared for that parameter according to Section 7.3.

8. Quality Control

8.1 Each laboratory that uses this method is required to operate a formal quality control program. The minimum requirements of this program consist of an initial demonstration of laboratory capability and an ongoing analysis of spiked samples to evaluate and document data quality. The laboratory must maintain records to document the quality of data that is generated. Ongoing data quality checks are compared with established performance criteria to determine if the results of analyses meet the performance characteristics of the method.

When results of sample spikes indicate atypical method performance, a quality control check standard must be analyzed to confirm that the measurements were performed in an in-control mode of operation.

8.1.1 The analyst must make an initial, one-time, demonstration of the ability to generate acceptable accuracy and precision with this method. This ability is established as described in Section 8.2.

8.1.2 In recognition of advances that are occurring in chromatography, the analyst is permitted certain options (detailed in Section 11.1) to improve the separations or lower the cost of measurements. Each time such a modification is made to the method, the analyst is required to repeat the procedure in Section 8.2.

8.1.3 Each day, the analyst must analyze a reagent water blank to demonstrate that interferences from the analytical system are under control.

8.1.4 The laboratory must, on an ongoing basis, spike and analyze a minimum of 5% of all samples to monitor and evaluate laboratory data quality. This procedure is described in Section 8.3.

8.1.5 The laboratory must, on an ongoing basis, demonstrate through the analyses of quality control check standards that the operation of the measurement system is in control. This procedure is described in Section 8.4. The frequency of the check standard analyses is equivalent to 5% of all samples analyzed but may be reduced if spike recoveries from samples (Section 8.3) meet all specified quality control criteria.

8.1.6 The laboratory must spike all samples with surrogate standards to monitor continuing laboratory performance. This procedure is described in Section 8.5.

8.1.7 The laboratory must maintain performance records to document the quality of data that is generated. This procedure is described in Section 8.6.

8.2 To establish the ability to generate acceptable accuracy and precision, the analyst must perform the following operations.

8.2.1 A quality control (QC) check sample concentrate is required containing each parameter of interest at a concentration of 10 μg/mL in methanol. The QC check sample concentrate must be obtained from the U.S. Environmental Protection Agency, Environmental Monitoring and Support Laboratory in Cincinnati, Ohio, if available. If not available from that source, the QC check sample concentrate must be obtained from another external source. If not available from either source above, the QC check sample concentrate must be prepared by the laboratory using stock standards prepared independently from those used for calibration.

8.2.2 Prepare a QC check sample to contain 20 μg/L of each parameter by adding 200 μL of QC check sample concentrate to 100 mL of reagent water.

8.2.3 Analyze four 5-mL aliquots of the well-mixed QC check sample according to the method beginning in Section 10.

8.2.4 Calculate the average recovery ($\bar{X}$) in μg/L, and the standard deviation of the recovery (s) in μg/L, for each parameter of interest using the four results.

8.2.5 For each parameter compare s and $\bar{X}$ with the corresponding acceptance criteria for precision and accuracy, respectively, found in Table 5. If s and $\bar{X}$ for all parameters of interest meet the acceptance criteria, the system performance is acceptable and analysis of actual samples can begin. If any individual s exceeds the precision limit or any individual $\bar{X}$ falls outside the range for accuracy, the system performance is unacceptable for that parameter.

NOTE: The large number of parameters in Table 5 present a substantial probability that one or more will fail at least one of the acceptance criteria when all parameters are analyzed.

8.2.6 When one or more of the parameters tested fail at least one of the acceptance criteria, the analyst must proceed according to Section 8.2.6.1 or 8.2.6.2.

8.2.6.1 Locate and correct the source of the problem and repeat the test for all parameters of interest beginning with Section 8.2.3.

8.2.6.2 Beginning with Section 8.2.3, repeat the test only for those parameters that failed to meet criteria. Repeated failure, however, will confirm a general problem with the measurement system. If this occurs, locate and correct the source of the problem and repeat the test for all compounds of interest beginning with Section 8.2.3.

8.3 The laboratory must, on an ongoing basis, spike at least 5% of the samples from each sample site being monitored to assess accuracy. For laboratories analyzing 1 to 20 samples per month, at least one spiked sample per month is required.

8.3.1 The concentration of the spike in the sample should be determined as follows:

8.3.1.1 If, as in compliance monitoring, the concentration of a specific parameter in the sample is being checked against a regulatory concentration limit, the spike should be at that limit or 1 to 5 times higher than the background concentration determined in Section 8.3.2, whichever concentration would be larger.

8.3.1.2 If the concentration of a specific parameter in the sample is not being checked against a limit specific to that parameter, the spike should be at 20 μg/L or 1 to 5 times higher than the background concentration determined in Section 8.3.2, whichever concentration would be larger.

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TABLE 4.—CHARACTERISTIC MASSES FOR PURGEABLE ORGANICS

Parameter	Primary	Secondary
Chloromethane	50	52.
Bromomethane	94	96.
Vinyl chloride	62	64.
Chloroethane	64	66.
Methylene chloride	84	49, 51, and 86.
Trichlorofluoromethane	101	103.
1,1-Dichloroethene	96	61 and 98.
1,1-Dichloroethane	63	65, 83, 85, 98, and 100.
trans-1,2-Dichloroethene	96	61 and 98.
Chloroform	83	85.
1,2-Dichloroethane	98	62, 64, and 100.
1,1,1-Trichloroethane	97	99, 117, and 119.
Carbon tetrachloride	117	119 and 121.
Bromodichloromethane	127	83, 85, and 129.
1,2-Dichloropropane	112	63, 65, and 114.
trans-1,3-Dichloropropene	75	77.
Trichloroethene	130	95, 97, and 132.
Benzene	78	

TABLE 4.—CHARACTERISTIC MASSES FOR PURGEABLE ORGANICS—Continued

Parameter	Primary	Secondary
Dibromochloromethane	127	129, 208, and 206.
1,1,2-Trichloroethane	97	99, 83, 85, 132, and 134.
cis-1,3-Dichloropropene	75	77.
2-Chloroethylvinyl ether	106	63 and 65.
Bromoform	173	171, 175, 250, 252, 254, and 256.
1,1,2,2-Tetrachloroethane	166	83, 85, 131, 133, and 168.
Tetrachloroethene	164	129, 131, and 166.
Toluene	92	91.
Chlorobenzene	112	114.
Ethyl benzene	106	91.
1,3-Dichlorobenzene	146	148 and 113.
1,2-Dichlorobenzene	146	148 and 113.
1,4-Dichlorobenzene	146	148 and 113.

TABLE 5.—CALIBRATION AND QC ACCEPTANCE CRITERIA—METHOD 624[a]

Parameter	Range for Q (µg/L)	Limit for s (µg/L)	Range for X̄ (µg/L)	Range for P, P, (%)
Benzene	12.8–27.2	6.9	16.2–26.0	37–151
Bromodichloromethane	13.1–26.9	6.4	16.1–26.0	35–155
Bromoform	14.2–25.8	5.4	11.4–31.1	45–169
Bromomethane	2.8–37.2	17.9	D–41.2	D–242
Carbon tetrachloride	14.6–25.4	5.2	17.2–23.5	70–140
Chlorobenzene	13.2–26.8	6.3	16.4–27.4	37–160
Chloroethane	7.6–32.4	11.4	8.4–40.4	14–230
2-Chloroethylvinyl ether	D–44.8	25.9	D–60.4	D–305
Chloroform	13.5–26.5	6.1	13.7–24.2	51–138
Chloromethane	D–40.9	19.6	D–45.9	D–273
Dibromochloromethane	13.5–26.5	6.1	13.8–26.6	53–149
1,2-Dichlorobenzene	12.8–27.4	7.1	11.8–34.7	18–190
1,3-Dichlorobenzene	14.6–25.4	5.5	17.6–26.8	59–156
1,4-Dichlorobenzene	12.8–27.4	7.1	11.8–34.7	18–190
1,1-Dichloroethane	14.5–25.5	6.1	14.2–25.5	59–155
1,2-Dichloroethane	13.6–26.4	6.0	14.3–27.4	49–155
1,1-Dichloroethene	10.1–29.9	9.1	3.7–42.3	D–234
trans-1,2-Dichloroethene	13.9–26.1	5.7	13.6–26.5	54–156
1,2-Dichloropropane	8.8–33.2	13.8	3.8–36.2	D–210
cis-1,3-Dichloropropene	4.8–35.2	15.8	1.9–38.9	D–227
trans-1,3-Dichloropropene	10.9–30.9	10.4	7.8–32.4	17–183
Ethyl benzene	11.8–28.2	7.5	17.4–28.7	37–162
Methylene chloride	12.1–27.9	7.4	D–41.0	D–221
1,1,2,2-Tetrachloroethane	12.1–27.9	7.4	13.5–27.2	46–157
Tetrachloroethene	14.7–25.3	5.9	17.9–26.6	64–148
Toluene	14.9–25.1	4.8	16.6–26.7	47–150
1,1,1-Trichloroethane	15.0–25.0	4.6	13.7–30.1	52–162
1,1,2-Trichloroethane	14.2–25.8	5.5	14.3–27.1	52–150
Trichloroethene	13.3–26.7	6.6	16.6–27.6	71–157
Trichlorofluoromethane	9.6–30.4	10.9	8.9–31.5	17–181
Vinyl chloride	0.6–39.2	20.0	D–43.5	D–251

Q = Concentration measured in QC check sample, in µg/L (Section 7.5.3).
s = Standard deviation of four recovery measurements, in µg/L (Section 8.2.4).
X̄ = Average of four recovery measurements, in µg/L (Section 8.2.4).
P, P = Percent recovery measured (Section 8.3.2, Section 8.4.2).

[a] Criteria were calculated assuming a QC check sample concentration of 20 µg/L.

[b] These criteria are based on method performance data in Table 6. Where necessary, the limits for recovery have been [illegible] to reflect the capability of the limits to concentrations below those used to develop Table 6

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TABLE 6.—METHOD ACCURACY AND PRECISION AS FUNCTIONS OF CONCENTRATION—METHOD 624

Parameter	Accuracy, as recovery, X̄ (µg/L)	Single analyst precision, s_r (µg/L)	Overall precision, S (µg/L)
Benzene	0.93C + 2.00	0.26X̄ – 1.74	0.25X̄ – 1.33
Bromodichloromethane	1.03C – 1.58	0.15X̄ + 0.59	0.20X̄ + 1.13
Bromoform	1.18C – 2.36	0.12X̄ + 0.36	0.17X̄ + 1.20
Bromomethane[a]	1.00C	0.43X̄	0.56X̄
Carbon tetrachloride	1.10C – 1.88	0.12X̄ + 0.25	0.11X̄ + 0.37
Chlorobenzene	0.98C + 2.28	0.16X̄ – 0.09	0.26X̄ – 1.82
Chloroethane	1.18C + 0.81	0.14X̄ + 2.78	0.20X̄ + 1.75
2-Chloroethylvinyl ether[a]	1.00C	0.62X̄	0.84X̄
Chloroform	0.93C + 0.33	0.16X̄ + 0.22	0.18X̄ + 0.16
Chloromethane	1.03C + 0.81	0.37X̄ + 2.14	0.56X̄ + 0.43
Dibromochloromethane	1.01C – 0.03	0.17X̄ – 0.18	0.17X̄ + 0.49
1,2-Dichlorobenzene[b]	0.94C + 4.47	0.22X̄ – 1.46	0.30X̄ – 1.20
1,3-Dichlorobenzene[b]	1.06C + 1.66	0.14X̄ – 0.46	0.16X̄ – 0.82
1,4-Dichlorobenzene[b]	0.94C + 4.47	0.22X̄ – 1.46	0.30X̄ – 1.20
1,1-Dichloroethane	1.05C + 0.36	0.13X̄ – 0.05	0.16X̄ + 0.47
1,2-Dichloroethane	1.03C + 0.45	0.17X̄ – 0.32	0.21X̄ – 0.38
1,1-Dichloroethene	1.12C + 0.61	0.17X̄ + 1.06	0.43X̄ – 0.22
trans-1,2-Dichloroethene	1.05C + 0.03	0.14X̄ + 0.09	0.18X̄ + 0.17
1,2-Dichloropropane[a]	1.00C	0.35X̄	0.45X̄
cis-1,3-Dichloropropene[a]	1.00C	0.36X̄	0.52X̄
trans-1,3-Dichloropropene[a]	1.00C	0.25X̄	0.34X̄
Ethyl benzene	0.89C + 2.46	0.14X̄ + 1.00	0.26X̄ – 1.72
Methylene chloride	0.87C + 1.88	0.18X̄ + 1.07	0.32X̄ + 4.00
1,1,2,2-Tetrachloroethane	0.93C + 1.76	0.16X̄ + 0.69	0.20X̄ + 0.41
Tetrachloroethene	1.09C + 0.69	0.13X̄ – 0.19	0.16X̄ – 0.46
Toluene	0.96C + 2.09	0.15X̄ – 0.71	0.22X̄ – 1.71
1,1,1-Trichloroethane	1.08C + 0.73	0.12X̄ – 0.15	0.21X̄ – 0.39
1,1,2-Trichloroethane	0.95C + 1.71	0.14X̄ + 0.02	0.18X̄ + 0.00
Trichloroethene	1.04C + 2.27	0.13X̄ + 0.26	0.12X̄ + 0.59
Trichlorofluoromethane	0.89C + 0.39	0.33X̄ – 1.46	0.34X̄ – 0.39
Vinyl chloride	1.00C	0.46X̄	0.66X̄

X̄ = Expected recovery for one or more measurements of a sample containing a concentration of C, in µg/L.
s_r = Expected single analyst standard deviation of measurements at an average concentration found of X̄, in µg/L.
S = Expected interlaboratory standard deviation of measurements at an average concentration found of X̄, in µg/L.
C = True value for the concentration, in µg/L.
X̄ = Average recovery found for measurements of samples containing a concentration of C, in µg/L.

[a] Estimates based upon the performance in a single laboratory.[18]

[b] Due to chromatographic resolution problems, performance statements for these isomers are based upon the sums of their concentrations.

should be maintained at 180 °C. After approximately 7 min, turn off the trap heater and open the syringe valve to stop the gas flow through the trap. When the trap is cool, the next sample can be analysed.

11.10 If the response for any m/z exceeds the working range of the system, prepare a dilution of the sample with reagent water from the aliquot in the second syringe and reanalyse.

12. Qualitative Identification

12.1 Obtain EICPs for the primary m/z (Table 4) and at least two secondary masses for each parameter of interest. The following criteria must be met to make a qualitative identification:

12.1.1 The characteristic masses of each parameter of interest must maximise in the same or within one scan of each other.

12.1.2 The retention time must fall within ±30 s of the retention time of the authentic compound.

12.1.3 The relative peak heights of the three characteristic masses in the EICPs must fall within ± 20% of the relative intensities of these masses in a reference mass spectrum. The reference mass spectrum can be obtained from a standard analyzed in the GC/MS system or from a reference library.

12.2 Structural isomers that have very similar mass spectra and less than 30 s difference in retention time, can be explicitly identified only if the resolution between authentic isomers in a standard mix is acceptable. Acceptable resolution is achieved if the baseline to valley height between the isomers is less than 25% of the sum of the two peak heights. Otherwise, structural isomers are identified as isomeric pairs.

13. Calculations

13.1 When a parameter has been identified, the quantitation of that parameter should be based on the integrated abundance from the EICP of the primary characteristic m/z given in Table 4. If the sample produces an interference for the primary m/z, use a secondary characteristic m/z to quantitate.

Calculate the concentration in the sample using the response factor (RF) determined in Section 7.3.3 and Equation 2.

$$\text{Concentration } (\mu g/L) = \frac{(A_s \times C_is)}{(A_is \times RF)}$$

Equation 2

where:

A_s = Area of the characteristic m/z for the parameter or surrogate standard to be measured.

A_{is} = Area of the characteristic m/z for the internal standard.

C_{is} = Concentration of the internal standard.

13.2 Report results in μg/L without correction for recovery data. All QC data obtained should be reported with the sample results.

14. Method Performance

14.1 The method detection limit (MDL) is defined as the minimum concentration of a substance that can be measured and reported with 99% confidence that the value is above zero.[1] The MDL concentrations listed in Table 1 were obtained using reagent water.[11] Similar results were achieved using representative wastewaters. The MDL actually achieved in a given analysis will vary depending on instrument sensitivity and matrix effects.

14.2 This method was tested by 15 laboratories using reagent water, drinking water, surface water, and industrial wastewaters spiked at six concentrations over the range 5–600 μg/L.[12] Single operator precision, overall precision, and method accuracy were found to be directly related to the concentration of the parameter and essentially independent of the sample matrix. Linear equations to describe these relationships are presented in Table 5.

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TABLE 1.—CHROMATOGRAPHIC CONDITIONS AND METHOD DETECTION LIMITS

Parameter	Retention time (min)	Method detection limit (μg/L)
Chloromethane	2.3	nd
Bromomethane	3.1	nd
Vinyl chloride	3.8	nd
Chloroethane	4.6	nd
Methylene chloride	6.4	2.8
Trichlorofluoromethane	8.3	nd
1,1-Dichloroethene	9.0	2.8
1,1-Dichloroethane	10.1	4.7
trans-1,2-Dichloroethene	10.8	1.8
Chloroform	11.4	1.8
1,2-Dichloroethane	12.1	2.8
1,1,1-Trichloroethane	13.4	3.8
Carbon tetrachloride	13.7	2.8
Bromodichloromethane	14.3	2.2
1,2-Dichloropropane	15.7	8.0
cis-1,3-Dichloropropene	15.9	5.0
Trichloroethene	16.5	1.9
Benzene	17.0	4.4
Dibromochloromethane	17.1	3.1
1,1,2-Trichloroethane	17.2	5.0
trans-1,3-Dichloropropene	17.2	nd
2-Chloroethylvinyl ether	18.6	nd
Bromoform	19.8	4.7
1,1,2,2-Tetrachloroethane	22.1	6.9
Tetrachloroethene	22.2	4.1
Toluene	23.5	6.0
Chlorobenzene	24.6	6.0
Ethyl benzene	26.4	7.2
1,3-Dichlorobenzene	33.9	nd
1,2-Dichlorobenzene	35.0	nd
1,4-Dichlorobenzene	35.4	nd

Column conditions: Carbopak B (60/80 mesh) coated with 1% SP-1000 packed in a 6 ft by 0.1 in. ID glass column with helium carrier gas at 30 mL/min. flow rate. Column temperature held at 45°C for 3 min., then programmed at 8°C/min. to 220°C and held for 15 min.
nd = not determined.

TABLE 2.—BFB KEY M/Z ABUNDANCE CRITERIA

Mass	m/z Abundance criteria
50	15 to 40% of mass 95.
75	30 to 60% of mass 95.
95	Base Peak, 100% Relative Abundance.
96	5 to 9% of mass 95.
173	<2% of mass 174.
174	>50% of mass 95.
175	5 to 9% of mass 174.
176	>95% but < 101% of mass 174.
177	5 to 9% of mass 176.

TABLE 3.—SUGGESTED SURROGATE AND INTERNAL STANDARDS

Compound	Retention time (min)*	Primary m/z	Secondary masses
Benzene d-6	17.0	84	
4-Bromofluorobenzene	26.3	95	174, 176
1,2-Dichloroethane d-4	12.1	102	
1,4-Difluorobenzene	19.6	114	63, 88
Ethylbenzene d-5	26.4	111	
Ethylbenzene d-10	26.4	98	
Fluorobenzene	18.4	96	70
Pentafluorobenzene	23.5	168	
Bromochloromethane	9.3	128	49, 130, 51
2-Bromo-1-chloropropene	19.2	77	79, 156
1, 4-Dichlorobutane	25.8	55	90, 92

*For chromatographic conditions, see Table 1.

METHOD 524.2. MEASUREMENT OF PURGEABLE ORGANIC COMPOUNDS IN WATER BY CAPILLARY COLUMN GAS CHROMATOGRAPHY/MASS SPECTROMETRY

Revision 3.0

A. Alford-Stevens, J. W. Eichelberger, W. L. Budde - Method 524, Revision 1.0 (1983)

R. W. Slater, Jr. - Method 524.2, Revision 2.0 (1986)

J. W. Eichelberger, W. L. Budde - Method 524.2, Revision 3.0 (1989)

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analytes or other interferences are present in the laboratory environment, the reagents, or the apparatus.

3.6 Field reagent blank (FRB) -- Reagent water placed in a sample container in the laboratory and treated as a sample in all respects, including exposure to sampling site conditions, storage, preservation and all analytical procedures. The purpose of the FRB is to determine if method analytes or other interferences are present in the field environment.

3.7 Laboratory performance check solution (LPC) -- A solution of one or more compounds (analytes, surrogates, internal standard, or other test compounds) used to evaluate the performance of the instrument system with respect to a defined set of method criteria.

3.8 Laboratory fortified blank (LFB) -- An aliquot of reagent water to which known quantities of the method analytes are added in the laboratory. The LFB is analyzed exactly like a sample, and its purpose is to determine whether the methodology is in control, and whether the laboratory is capable of making accurate and precise measurements at the required method detection limit.

3.9 Laboratory fortified sample matrix (LFM) -- An aliquot of an environmental sample to which known quantities of the method analytes are added in the laboratory. The LFM is analyzed exactly like a sample, and its purpose is to determine whether the sample matrix contributes bias to the analytical results. The background concentrations of the analytes in the sample matrix must be determined in a separate aliquot and the measured values in the LFM corrected for background concentrations.

3.10 Stock standard solution -- A concentrated solution containing a single certified standard that is a method analyte, or a concentrated solution of a single analyte prepared in the laboratory with an assayed reference compound. Stock standard solutions are used to prepare primary dilution standards.

3.11 Primary dilution standard solution -- A solution of several analytes prepared in the laboratory from stock standard solutions and diluted as needed to prepare calibration solutions and other needed analyte solutions.

3.12 Calibration standard (CAL) -- a solution prepared from the primary dilution standard solution and stock standard solutions of the internal standards and surrogate analytes. The CAL solutions are used to calibrate the instrument response with respect to analyte concentration.

3.13 Quality control sample (QCS) -- a sample matrix containing method analytes or a solution of method analytes in a water miscible solvent which is used to fortify reagent water or environmental samples. The QCS is obtained from a source external to the laboratory, and is used

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2,2-Dichloropropane	590-20-7
1,1-Dichloropropene	563-58-6
cis-1,3-Dichloropropene	10061-01-5
trans-1,3-Dichloropropene	10061-02-6
Ethylbenzene	100-41-4
Hexachlorobutadiene	87-68-3
Isopropylbenzene	98-82-8
4-Isopropyltoluene	99-87-6
Methylene chloride	75-09-2
Naphthalene	91-20-3
n-Propylbenzene	103-65-1
Styrene	100-42-5
1,1,1,2-Tetrachloroethane	630-20-6
1,1,2,2-Tetrachloroethane	79-34-5
Tetrachloroethene	127-18-4
Toluene	108-88-3
1,2,3-Trichlorobenzene	87-61-6
1,2,4-Trichlorobenzene	120-82-1
1,1,1-Trichloroethane	71-55-6
1,1,2-Trichloroethane	79-00-5
Trichloroethene	79-01-6
Trichlorofluoromethane	75-69-4
1,2,3-Trichloropropane	96-18-4
1,2,4-Trimethylbenzene	95-63-6
1,3,5-Trimethylbenzene	108-67-8
Vinyl chloride	75-01-4
o-Xylene	95-47-6
m-Xylene	108-38-3
p-Xylene	106-42-3

1.2 Method detection limits (MDLs) (3) are compound and instrument dependent and vary from approximately 0.02-0.35 µg/L. The applicable concentration range of this method is primarily column dependent and is approximately 0.02 to 200 µg/L for the wide-bore thick-film columns. Narrow-bore thin-film columns may have a capacity which limits the range to about 0.02 to 20 µg/L. Analytes that are inefficiently purged from water will not be detected when present at low concentrations, but they can be measured with acceptable accuracy and precision when present in sufficient amounts.

1.3 Analytes that are not separated chromatographically, but which have different mass spectra and non-interfering quantitation ions, can be identified and measured in the same calibration mixture or water sample (Sect 11.6.2). Analytes which have very similar mass spectra cannot be individually identified and measured in the same calibration mixture or water sample unless they have different retention times (Sect.11.6.3). Coeluting compounds with very similar mass spectra, typically many structural isomers, must be reported as an isomeric group or pair. Two of the three isomeric xylenes and two of the three dichlorobenzenes are examples of structural isomers that may not be resolved on the capillary column, and if not, must be reported as isomeric pairs.

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are acceptable interfaces. Any interface can be used if the performance specifications described in this method can be achieved. The end of the transfer line after the interface, or the end of the analytical column if no interface is used, should be placed within a few mm of the MS ion source.

6.3.3.2 The narrow bore column 3 cannot accept the thermal desorption gas flow, and a cryogenic interface is required. This interface (Tekmar Model 1000 or equivalent) condenses the desorbed sample components at liquid nitrogen temperature, and allows the helium gas to pass through to an exit. The condensed components are frozen in a narrow band on an uncoated fused silica precolumn. When all components have been desorbed from the trap, the interface is rapidly heated under a stream of carrier gas to transfer the analytes to the analytical column. The end of the analytical column should be placed with a few mm of the MS ion source. A potential problem with this interface is blockage of the interface by frozen water from the trap. This condition will result in a major loss in sensitivity and chromatographic resolution.

6.3.4 The mass spectrometer must be capable of electron ionization at a nominal electron energy of 70 eV. The spectrometer must be capable of scanning from 35 to 260 amu with a complete scan cycle time (including scan overhead) of 2 sec or less. (Scan cycle time = Total MS data acquisition time in seconds divided by number of scans in the chromatogram). The spectrometer must produce a mass spectrum that meets all criteria in Table 3 when 25 ng or less of 4-bromofluorobenzene (BFB) is introduced into the GC. An average spectrum across the BFB GC peak may be used to test instrument performance.

6.3.5 An interfaced data system is required to acquire, store, reduce, and output mass spectral data. The computer software should have the capability of processing stored GC/MS data by recognizing a GC peak within any given retention time window, comparing the mass spectra from the GC peak with spectral data in a user-created data base, and generating a list of tentatively identified compounds with their retention times and scan numbers. The software must allow integration of the ion abundance of any specific ion between specified time or scan number limits. The software should also allow calculation of response factors as defined in Sect. 9.2.6 (or construction of a second or third order regression calibration curve), calculation of response factor statistics (mean and standard deviation), and calculation of concentrations of analytes using either the calibration curve or the equation in Sect. 12.

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form, 1,2-dibromoethane,tetrachloroethene, trichloroethene, and vinyl chloride. Pure standard materials and stock standard solutions of these compounds should be handled in a hood. A NIOSH/MESA approved toxic gas respirator should be worn when the analyst handles high concentrations of these toxic compounds.

6. APPARATUS AND EQUIPMENT

6.1 SAMPLE CONTAINERS -- 60-mL to 120-mL screw cap vials (Pierce #19832 or equivalent) each equipped with a PTFE-faced silicone septum (Pierce #12718 or equivalent). Prior to use, wash vials and septa with detergent and rinse with tap and distilled water. Allow the vials and septa to air dry at room temperature, place in a 105°C oven for 1 hr, then remove and allow to cool in an area known to be free of organics.

6.2 PURGE AND TRAP SYSTEM -- The purge and trap system consists of three separate pieces of equipment: purging device, trap, and desorber. Systems are commercially available from several sources that meet all of the following specifications.

6.2.1 The all glass purging device (Figure 1) should be designed to accept 25-mL samples with a water column at least 5 cm deep. A smaller (5-mL) purging device is recommended if the GC/MS system has adequate sensitivity to obtain the method detection limits required. Gaseous volumes above the sample must be kept to a minimum (< 15 mL) to eliminate dead volume effects. A glass frit should be installed at the base of the sample chamber so the purge gas passes through the water column as finely divided bubbles with a diameter of < 3 mm at the origin. Needle spargers may be used, however, the purge gas must be introduced at a point about 5 mm from the base of the water column.

6.2.2 The trap (Figure 2) must be at least 25 cm long and have an inside diameter of at least 0.105 in. Starting from the inlet, the trap should contain 1.0 cm of methyl silicone coated packing and the following amounts of adsorbents: 1/3 of 2,6-diphenylene oxide polymer, 1/3 of silica gel, and 1/3 of coconut charcoal. If it is not necessary to determine dichlorodifluoromethane, the charcoal can be eliminated and the polymer increased to fill 2/3 of the trap. Before initial use, the trap should be conditioned overnight at 180°C by backflushing with an inert gas flow of at least 20 mL/min. Vent the trap effluent to the room, not to the analytical column. Prior to daily use, the trap should be conditioned for 10 min at 180°C with backflushing. The trap may be vented to the analytical column during daily conditioning; however, the column must be run through the temperature program prior to analysis of samples.

6.2.3 The use of the methyl silicone coated packing is recommended, but not mandatory. The packing serves a dual purpose of protecting the Tenax adsorbant from aerosols, and also of

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flask three times only. Discard the contents contained in the neck of the flask. Aqueous standards are not stable in a volumetric flask and should be discarded after 1 hr unless transferred to a sample bottle and sealed immediately.

8. SAMPLE COLLECTION, PRESERVATION, AND STORAGE

8.1 SAMPLE COLLECTION, DECHLORINATION, AND PRESERVATION

8.1.1 Collect all samples in duplicate. If samples contain residual chlorine, and measurements of the concentrations of disinfection by-products (trihalomethanes, etc.) at the time of sample collection are desired, add about 25 mg of ascorbic acid to the sample bottle before filling. Fill sample bottles to overflowing, but take care not to flush out the rapidly dissolving ascorbic acid. No air bubbles should pass through the sample as the bottle is filled, or be trapped in the sample when the bottle is sealed. Adjust the pH of the duplicate samples to <2 by carefully adding one drop of 1:1 HCl for each 20 mL of sample volume. Seal the sample bottles, PFTE-face down, and shake vigorously for 1 min.

8.1.2 When sampling from a water tap, open the tap and allow the system to flush until the water temperature has stabilized (usually about 10 min). Adjust the flow to about 500 mL/min and collect duplicate samples from the flowing stream.

8.1.3 When sampling from an open body of water, fill a 1-quart wide-mouth bottle or 1-liter beaker with sample from a representative area, and carefully fill duplicate sample bottles from the 1-quart container.

8.1.4 The samples must be chilled to 4°C on the day of collection and maintained at that temperature until analysis. Field samples that will not be received at the laboratory on the day of collection must be packaged for shipment with sufficient ice to ensure that they will be at 4°C on arrival at the laboratory.

8.2 SAMPLE STORAGE

8.2.1 Store samples at 4°C until analysis. The sample storage area must be free of organic solvent vapors.

8.2.2 Analyze all samples within 14 days of collection. Samples not analyzed within this period must be discarded and replaced.

8.3 FIELD REAGENT BLANKS

8.3.1 Duplicate field reagent blanks must be handled along with each sample set, which is composed of the samples collected from the same general sample site at approximately the same time. At the laboratory, fill field blank sample bottles with reagent

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sources (for example, Matheson, Ideal Gas Products, and Scott Gases).

7.2.5 Ascorbic acid -- ACS reagent grade, granular.

7.3 STOCK STANDARD SOLUTIONS -- These solutions may be purchased as certified solutions or prepared from pure standard materials using the following procedures. One of these solutions is required for every analyte of concern, every surrogate, and the internal standard. A useful working concentration is about 1-5 mg/mL.

7.3.1 Place about 9.8 mL of methanol into a 10-mL ground-glass stoppered volumetric flask. Allow the flask to stand, unstoppered, for about 10 min or until all alcohol-wetted surfaces have dried and weigh to the nearest 0.1 mg.

7.3.2 If the analyte is a liquid at room temperature, use a 100-µL syringe and immediately add two or more drops of reference standard to the flask. Be sure that the reference standard falls directly into the alcohol without contacting the neck of the flask. If the analyte is a gas at room temperature, fill a 5-mL valved gas-tight syringe with the standard to the 5.0-mL mark, lower the needle to 5 mm above the methanol meniscus, and slowly inject the standard into the neck area of the flask. The gas will rapidly dissolve in the methanol.

7.3.3 Reweigh, dilute to volume, stopper, then mix by inverting the flask several times. Calculate the concentration in µg/µL from the net gain in weight. When compound purity is certified at 96% or greater, the weight can be used without correction to calculate the concentration of the stock standard.

7.3.4 Store stock standard solutions in 15-mL bottles equipped with PTFE-lined screw caps. Methanol solutions prepared from liquid analytes are stable for at least 4 weeks when stored at 4°C. Methanol solutions prepared from gaseous analytes are not stable for more than 1 week when stored at <0°C; at room temperature, they must be discarded after 1 day.

7.4 PRIMARY DILUTION STANDARDS -- Use stock standard solutions to prepare primary dilution standard solutions that contain all the analytes of concern and the surrogates (but not the internal standard!) in methanol. The primary dilution standards should be prepared at concentrations that can be easily diluted to prepare aqueous calibration solutions that will bracket the working concentration range. Store the primary dilution standard solutions with minimal headspace and check frequently for signs of deterioration or evaporation, especially just before preparing calibration solutions. Storage times described for stock standard solutions in Sect. 7.4.4 also apply to primary dilution standard solutions.

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9.3.6.7 Replace any components that allow analytes to come into contact with hot metal surfaces.

9.3.6.8 Replace the MS electron multiplier, or any other faulty components.

9.4 Optional calibration for vinyl chloride using a certified gaseous mixture of vinyl chloride in nitrogen can be accomplished by the following steps.

9.4.1 Fill the purging device with 25.0 mL (or 5-mL) of reagent water or aqueous calibration standard.

9.4.2 Start to purge the aqueous mixture. Inject a known volume (between 100 and 2000 µL) of the calibration gas (at room temperature) directly into the purging device with a gas tight syringe. Slowly inject the gaseous sample through a septum seal at the top of the purging device at 2000 µL/min. If the injection of the standard is made through the aqueous sample inlet port, flush the dead volume with several mL of room air or carrier gas. Inject the gaseous standard before 5 min of the 11-min purge time have elapsed.

9.4.3 Determine the aqueous equivalent concentration of vinyl chloride standard, in µg/L, injected with the equation:

$$S = 0.102\ (C)(V)$$

where S = Aqueous equivalent concentration of vinyl chloride standard in µg/L;
C = Concentration of gaseous standard in ppm (v/v);
V = Volume of standard injected in milliliters.

10. QUALITY CONTROL

10.1 Quality control (QC) requirements are the initial demonstration of laboratory capability followed by regular analyses of laboratory reagent blanks, field reagent blanks, and laboratory fortified blanks. The laboratory must maintain records to document the quality of the data generated. Additional quality control practices are recommended.

10.2 Initial demonstration of low system background. Before any samples are analyzed, it must be demonstrated that a laboratory reagent blank (LRB) is reasonably free of contamination that would prevent the determination of any analyte of concern. Sources of background contamination are glassware, purge gas, sorbants, and equipment. Background contamination must be reduced to an acceptable level before proceeding with the next section. In general, background from method analytes should be below the method detection limit.

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compounds are recognized, system maintenance is required. See Sect. 9.3.6.

9.2.5 If all performance criteria are met, purge an aliquot of each of the other CAL solutions using the same GC/MS conditions.

9.2.6 Calculate a response factor (RF) for each analyte, surrogate, and isomer pair for each CAL solution using the internal standard fluorobenzene. Table 1 contains suggested quantitation ions for all compounds. This calculation is supported in acceptable GC/MS data system software (Sect. 6.3.4), and many other software programs. RF is a unitless number, but units used to express quantities of analyte and internal standard must be equivalent.

$$RF = \frac{(A_x)(Q_{is})}{(A_{is})(Q_x)}$$

where: A_x = integrated abundance of the quantitation ion of the analyte.
A_{is} = integrated abundance of the quantitation ion of the internal standard.
Q_x = quantity of analyte purged in ng or concentration units.
Q_{is} = quantity of internal standard purged in ng or concentration units.

9.2.6.1 For each analyte and surrogate, calculate the mean RF from the analyses of the CAL solutions. Calculate the standard deviation (SD) and the relative standard deviation (RSD) from each mean: RSD = 100 (SD/M). If the RSD of any analyte or surrogate mean RF exceeds 20%, either analyze additional aliquots of appropriate CAL solutions to obtain an acceptable RSD of RFs over the entire concentration range, or take action to improve GC/MS performance. See Sect. 9.2.7.

9.2.7 As an alternative to calculating mean response factors and applying the RSD test, use the GC/MS data system software or other available software to generate a second or third order regression calibration curve.

9.3 Continuing calibration check. Verify the MS tune and initial calibration at the beginning of each 8-hr work shift during which analyses are performed using the following procedure.

9.3.1 Introduce into the GC (either by purging a laboratory reagent blank or making a syringe injection) 25 ng of BFB and acquire a mass spectrum that includes data for m/z 35-260. If the spectrum does not meet all criteria (Table 2), the MS must be

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11.3 GAS CHROMATOGRAPHY/MASS SPECTROMETRY -- Acquire and store data over the mass range 35-260 with a total cycle time (including scan overhead time) of 2 sec or less. Cycle time must be adjusted to measure five or more spectra during the elution of each GC peak. Several alternative temperature programs can be used.

11.3.1 Single ramp linear temperature program for wide bore columns 1 and 2 with a jet separator. Adjust the helium carrier gas flow rate to about 15 mL/min. The column temperature is reduced 10°C and held for 5 min from the beginning of desorption, then programmed to 160°C at 6°C/min, and held until all components have eluted.

11.3.2 Multi-ramp linear temperature program for wide bore column 2 with the open split interface. Adjust the helium carrier gas flow rate to about 4.6 mL/min. The column temperature is reduced 10°C and held for 6 min from the beginning of desorption, then heated to 70°C at 10°/min, heated to 120°C at 5°/min, heated to 180° at 8°/min, and held at 180° until all compounds have eluted.

11.3.3 Single ramp linear temperature program for narrow bore column 3 with a cryogenic interface. Adjust the helium carrier gas flow rate to about 4 mL/min. The column temperature is reduced 10°C and held for 5 min from the beginning of vaporization from the cryogenic trap, programmed at 6°C/min for 10 min, then 15°C/min for 5 min to 145°C, and held until all components have eluted.

11.4 TRAP RECONDITIONING -- After desorbing the sample for 4 min, recondition the trap by returning the purge and trap system to the purge mode. Wait 15 sec, then close the syringe valve on the purging device to begin gas flow through the trap. Maintain the trap temperature at 180°C. After approximately 7 min, turn off the trap heater and open the syringe valve to stop the gas flow through the trap. When the trap is cool, the next sample can be analyzed.

11.5 TERMINATION OF DATA ACQUISITION -- When all the sample components have eluted from the GC, terminate MS data acquisition. Use appropriate data output software to display full range mass spectra and appropriate plots of ion abundance as a function of time. If any ion abundance exceeds the system working range, dilute the sample aliquot in the second syringe with reagent water and analyze the diluted aliquot.

11.6 IDENTIFICATION OF ANALYTES -- Identify a sample component by comparison of its mass spectrum (after background subtraction) to a reference spectrum in the user-created data base. The GC retention time of the sample component should be within three standard deviations of the mean retention time of the compound in the calibration mixture.

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10.5 Laboratory reagent blanks. With each batch of samples processed as a group within a work shift, analyze a laboratory reagent blank to determine the background system contamination. A FRB (Sect. 10.7) may be used in place of a LRB.

10.6 With each batch of samples processed as a group within a work shift, analyze a single laboratory fortified blank (LFB) containing each analyte of concern at a concentration as determined in 10.3. If more than 20 samples are included in a batch, analyze one LFB for every 20 samples. Use the procedures described in 10.3.3 to evaluate the accuracy of the measurements, and to estimate whether the method detection limits can be obtained. If acceptable accuracy and method detection limits cannot be achieved, the problem must be located and corrected before further samples are analyzed. Add these results to the on-going control charts to document data quality.

10.7 With each set of field samples a field reagent blank (FRB) should be analyzed. The results of these analyses will help define contamination resulting from field sampling and transportation activities. If the FRB shows unacceptable contamination, a LRB must be measured to define the source of the impurities.

10.8 At least quarterly, replicates of laboratory fortified blanks should be analyzed to determine the precision of the laboratory measurements. Add these results to the on-going control charts to document data quality.

10.9 At least quarterly, analyze a quality control sample (QCS) from an external source. If measured analyte concentrations are not of acceptable accuracy, check the entire analytical procedure to locate and correct the problem source.

10.10 Sample matrix effects have not been observed when this method is used with distilled water, reagent water, drinking water, and ground water. Therefore, analysis of a laboratory fortified sample matrix (LFM) is not required. It is recommended that sample matrix effects be evaluated at least quarterly using the QCS described in 10.9.

10.11 Numerous other quality control measures are incorporated into other parts of this procedure, and serve to alert the analyst to potential problems.

11. PROCEDURE

11.1 SAMPLE INTRODUCTION AND PURGING

11.1.1 This method is designed for a 25-mL sample volume, but a smaller (5 mL) sample volume is recommended if the GC/MS system has adequate sensitivity to achieve the required method detection limits. Adjust the purge gas (nitrogen or helium) flow rate to 40 mL/min. Attach the trap inlet to the

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12.1.1 Calculate analyte and surrogate concentrations.

$$C_x = \frac{(A_x)(Q_{is})\ 1000}{(A_{is})\ RF\ V}$$

where: C_x = concentration of analyte or surrogate in µg/L in the water sample.
A_x = integrated abundance of the quantitation ion of the analyte in the sample.
A_{is} = integrated abundance of the quantitation ion of the internal standard in the sample.
Q_{is} = total quantity (in micrograms) of internal standard added to the water sample.
V = original water sample volume in mL.
RF = mean response factor of analyte from the initial calibration.

12.1.2 Alternatively, use the GC/MS system software or other available proven software to compute the concentrations of the analytes and surrogates from the second or third order regression curves.

12.1.3 Calculations should utilize all available digits of precision, but final reported concentrations should be rounded to an appropriate number of significant figures (one digit of uncertainty). Experience indicates that three significant figures may be used for concentrations above 99 µg/L, two significant figures for concentrations between 1- 99 µg/L, and one significant figure for lower concentrations.

12.1.4 Calculate the total trihalomethane concentration by summing the four individual trihalomethane concentrations in µg/L.

13. ACCURACY AND PRECISION

13.1 Single laboratory accuracy and precision data were obtained for the method analytes using laboratory fortified blanks with analytes at concentrations between 1 and 5 µg/L. Four sets of results were obtained using the three columns specified (Sect. 6.3.2) and the open split, cryogenic, and jet separator interfaces (Sect. 6.3.3). These data are shown in Tables 4-6.

13.2 With these data, method detection limits were calculated using the formula (2):

$$MDL = S\ t_{(n-1,1-alpha\ =\ 0.99)}$$

where:

$t_{(n-1,1-alpha\ =\ 0.99)}$ = Student's t value for the 99% confidence level with n-1 degrees of freedom,

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TABLE 1. MOLECULAR WEIGHTS AND QUANTITATION IONS FOR METHOD ANALYTES

Compound	MW[a]	Primary Quantitation Ion	Secondary Quantitation Ions
Internal standard			
Fluorobenzene	96	96	77
Surrogates			
4-Bromofluorobenzene	174	95	174,176
1,2-Dichlorobenzene-d4	150	152	115,150
Target Analytes			
Benzene	78	78	77
Bromobenzene	156	156	77,158
Bromochloromethane	128	128	49,130
Bromodichloromethane	162	83	85,127
Bromoform	250	173	175,252
Bromomethane	94	94	96
n-Butylbenzene	134	91	134
sec-Butylbenzene	134	105	134
tert-Butylbenzene	134	119	91
Carbon tetrachloride	152	117	119
Chlorobenzene	112	112	77,114
Chloroethane	64	64	66
Chloroform	118	83	85
Chloromethane	50	50	52
2-Chlorotoluene	126	91	126
4-Chlorotoluene	126	91	126
Dibromochloromethane	206	129	127
1,2-Dibromo-3-Chloropropane	234	75	155,157
1,2-Dibromoethane	186	107	109,188
Dibromomethane	172	93	95,174
1,2-Dichlorobenzene	146	146	111,148
1,3-Dichlorobenzene	146	146	111,148
1,4-Dichlorobenzene	146	146	111,148
Dichlorodifluoromethane	120	85	87
1,1-Dichloroethane	98	63	65,83
1,2-Dichloroethane	98	62	98
1,1-Dichloroethene	96	96	61,63
cis-1,2-Dichloroethene	96	96	61,98
trans-1,2-Dichloroethene	96	96	61,98
1,2-Dichloropropane	112	63	112
1,3-Dichloropropane	112	76	78
2,2-Dichloropropane	112	77	97
1,1-Dichloropropene	110	75	110,77

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TABLE 2. CHROMATOGRAPHIC RETENTION TIMES FOR METHOD ANALYTES ON THREE COLUMNS WITH FOUR SETS OF CONDITIONS[a]

Compound	Retention Time (min:sec) Column 1[b]	Column 2[b]	Column 2[c]	Column 3[d]
Internal standard				
Fluorobenzene	8:49	6:27	14:06	8:03
Surrogates				
4-Bromofluorobenzene	18:38	15:43	23:38	
1,2-Dichlorobenzene-d4	22:16	19:08	27:25	
Target Analytes				
Benzene	8:14	5:40	13:30	7:25
Bromobenzene	18:57	15:52	24:00	16:25
Bromochloromethane	6:44	4:23	12:22	5:38
Bromodichloromethane	10:35	8:29	15:48	9:20
Bromoform	17:56	14:53	22:46	15:42
Bromomethane	2:01	0:58	4:48	1:17
n-Butylbenzene	22:13	19:29	27:32	17:57
sec-Butylbenzene	20:47	18:05	26:08	17:28
tert-Butylbenzene	20:17	17:34	25:36	17:19
Carbon Tetrachloride	7:37	5:16	13:10	7:25
Chlorobenzene	15:46	13:01	20:40	14:20
Chloroethane	2:05	1:01		1:27
Chloroform	6:24	4:48	12:36	5:33
Chloromethane	1:38	0:44	3:24	0:58
2-Chlorotoluene	19:20	16:25	24:32	16:44
4-Chlorotoluene	19:30	16:43	24:46	16:49
Cyanogen chloride				1:03
Dibromochloromethane	14:23	11:51	19:12	12:48
1,2-Dibromo-3-Chloropropane	24:32	21:05		18:02
1,2-Dibromoethane	14:44	11:50	19:24	13:36
Dibromomethane	10:39	7:56	15:26	9:05
1,2-Dichlorobenzene	22:31	19:10	27:26	17:47
1,3-Dichlorobenzene	21:13	18:08	26:22	17:28
1,4-Dichlorobenzene	21:33	18:23	26:36	17:38
Dichlorodifluoromethane	1:33	0:42	3:08	0:53
1,1-Dichloroethane	4:51	2:56	10:48	4:02
1,2-Dichloroethane	8:24	5:50	13:38	7:00
1,1-Dichloroethene	2:53	1:34	7:50	2:20
cis-1,2-Dichloroethene	6:11	3:54	11:56	5:04
trans-1,2-Dichloroethene	3:59	2:22	9:54	3:32
1,2-Dichloropropane	10:05	7:40	15:12	8:56
1,3-Dichloropropane	14:02	11:19	18:42	12:29
2,2-Dichloropropane	6:01	3:48	11:52	5:19
1,1-Dichloropropene	7:49	5:17	13:06	7:10

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TABLE 3. ION ABUNDANCE CRITERIA FOR 4-BROMOFLUOROBENZENE (BFB)

Mass (M/z)	Relative Abundance Criteria
50	15 to 40% of mass 95
75	30 to 80% of mass 95
95	Base Peak, 100% Relative Abundance
96	5 to 9% of mass 95
173	< 2% of mass 174
174	> 50% of mass 95
175	5 to 9% of mass 174
176	> 95% but < 101% of mass 174
177	5 to 9% of mass 176

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TABLE 4. (Continued)

Compound	True Conc. Range (µg/L)	Mean Accuracy (% of True Value)	Rel. Std. Dev. (%)	Method Det. Limit (µg/L)
1,1,1,2-Tetrachloroethane	0.5-10	90	6.8	0.05
1,1,2,2-Tetrachloroethane	0.1-10	91	6.3	0.04
Tetrachloroethene	0.5-10	89	6.8	0.14
Toluene	0.5-10	102	8.0	0.11
1,2,3-Trichlorobenzene	0.5-10	109	8.6	0.03
1,2,4-Trichlorobenzene	0.5-10	108	8.3	0.04
1,1,1-Trichloroethane	0.5-10	98	8.1	0.08
1,1,2-Trichloroethane	0.5-10	104	7.3	0.10
Trichloroethene	0.5-10	90	7.3	0.19
Trichlorofluoromethane	0.5-10	89	8.1	0.08
1,2,3-Trichloropropane	0.5-10	108	14.4	0.32
1,2,4-Trimethylbenzene	0.5-10	99	8.1	0.13
1,3,5-Trimethylbenzene	0.5-10	92	7.4	0.05
Vinyl chloride	0.5-10	98	6.7	0.17
o-Xylene	0.1-31	103	7.2	0.11
m-Xylene	0.1-10	97	6.5	0.05
p-Xylene	0.5-10	104	7.7	0.13

[a]Data obtained by Robert W. Slater using column 1 with a jet separator interface and a quadrupole mass spectrometer (Sect. 11.3.1) with analytes divided among three solutions.

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TABLE 5. (Continued)

Compound	True Conc. (µg/L)	Mean Accuracy (% of True Value)	Rel. Std. Dev. (%)	Method Dect. Limit (µg/L)
n-Propylbenzene	0.1	99	6.6	0.06
Styrene	0.1	96	19.0	0.06
1,1,1,2-Tetrachloroethane	0.1	100	4.7	0.04
1,1,2,2-Tetrachloroethane	0.5	100	12.0	0.20
Tetrachloroethene	0.1	96	5.0	0.05
Toluene	0.1	100	5.9	0.08
1,2,3-Trichlorobenzene	0.1	98	8.9	0.04
1,2,4-Trichlorobenzene	0.1	91	16.0	0.20
1,1,1-Trichloroethane	0.1	100	4.0	0.04
1,1,2-Trichloroethane	0.1	98	4.9	0.03
Trichloroethene	0.1	96	2.0	0.02
Trichlorofluoromethane	0.1	97	4.6	0.07
1,2,3-Trichloropropane	0.1	96	6.5	0.03
1,2,4-Trimethylbenzene	0.1	96	6.5	0.04
1,3,5-Trimethylbenzene	0.1	99	4.2	0.02
Vinyl chloride	0.1	96	0.2	0.04
o-Xylene	0.1	94	7.5	0.06
m-Xylene	0.1	94	4.6	0.03
p-Xylene	0.1	97	6.1	0.06

[a]Data obtained by Caroline A. Madding using column 3 with a cryogenic interface and a quadrupole mass spectrometer (Sect 11.3.3).
[b]Reference 8.

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TABLE 6. (Continued)

Compound	No.[b]	Mean Accuracy (% of True Value, 2 µg/L Conc.)	RSD (%)	Mean Accuracy (% of True Value, 0.2 µg/L Conc.)	RSD (%)
1,2-Dichloropropane	20	102	2.2	103	2.9
1,3-Dichloropropane	21	92	3.7	93	3.2
2,2-Dichloropropane[c]					
1,1-Dichloropropene[c]					
cis-1,3-Dichloropropene[c]					
trans-1,3-Dichloropropene	25	96	1.7	99	2.1
Ethylbenzene	48	96	9.1	100	4.0
Hexachlorobutadiene	26	91	5.3	88	2.4
Isopropylbenzene	49	103	3.2	101	2.1
4-Isopropyltoluene	50	95	3.6	95	3.1
Methylene chloride	27	[e]		[e]	
Naphthalene	51	93	7.6	78	8.3
n-Propylbenzene	52	102	4.9	97	2.1
Styrene	53	95	4.4	104	3.1
1,1,1,2-Tetrachloroethane	28	99	2.7	95	3.8
1,1,2,2-Tetrachloroethane	29	101	4.6	84	3.6
Tetrachloroethene	30	97	4.5	92	3.3
Toluene	54	105	2.8	126	1.7
1,2,3-Trichlorobenzene	55	90	5.7	78	2.9
1,2,4-Trichlorobenzene	56	92	5.2	83	5.9
1,1,1-Trichloroethane	31	94	3.9	94	2.5
1,1,2-Trichloroethane	32	107	3.4	109	2.8
Trichloroethene	33	99	2.9	106	2.5
Trichlorofluoromethane	34	81	4.6	48	13.
1,2,3-Trichloropropane	35	97	3.9	91	2.8
1,2,4-Trimethylbenzene	57	93	3.1	106	2.2
1,3,5-Trimethylbenzene	58	88	2.4	97	3.2
Vinyl chloride	36	104	3.5	115	14.
o-Xylene	59	97	1.8	98	1.7
m-Xylene	60	[f]		[f]	
p-Xylene	61	98	2.3	103	1.4

[a]Data obtained by James W. Eichelberger using column 2 with the open split interface and an ion trap mass spectrometer (Sect. 11.3.2) with all method analytes in the same reagent water solution.
[b]Designation in Figures 1 and 2.
[c]Not measured; authentic standards were not available.
[d]Not found at 0.2 µg/L.
[e]Not measured; methylene chloride was in the laboratory reagent blank.
[f]m-xylene coelutes with and cannot be distinguished from its isomer p-xylene, No 61.

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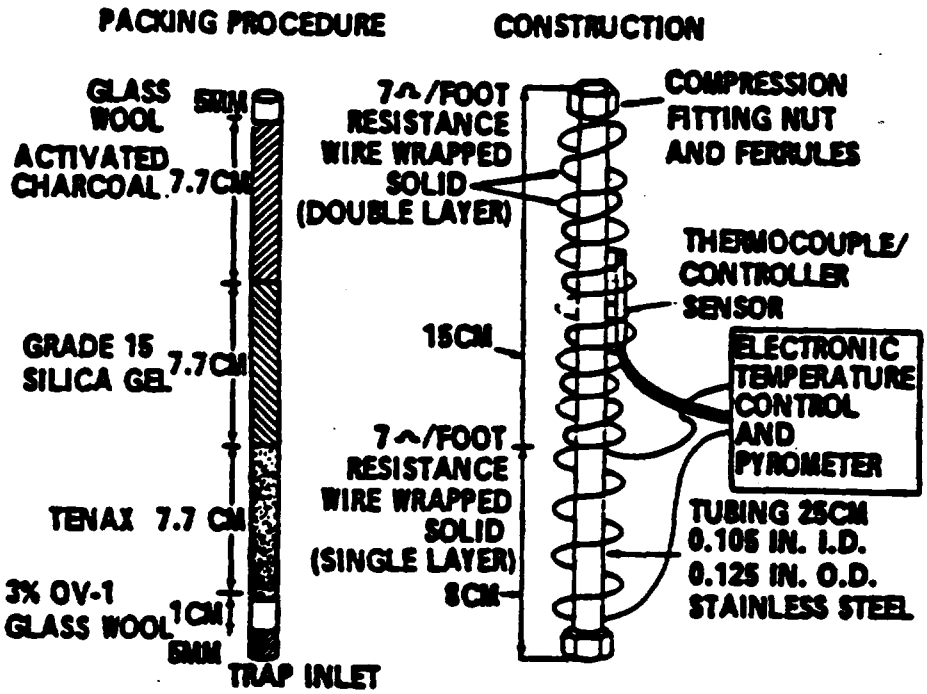

FIGURE 2. TRAP PACKINGS AND CONSTRUCTION TO INCLUDE DESORB CAPABILITY

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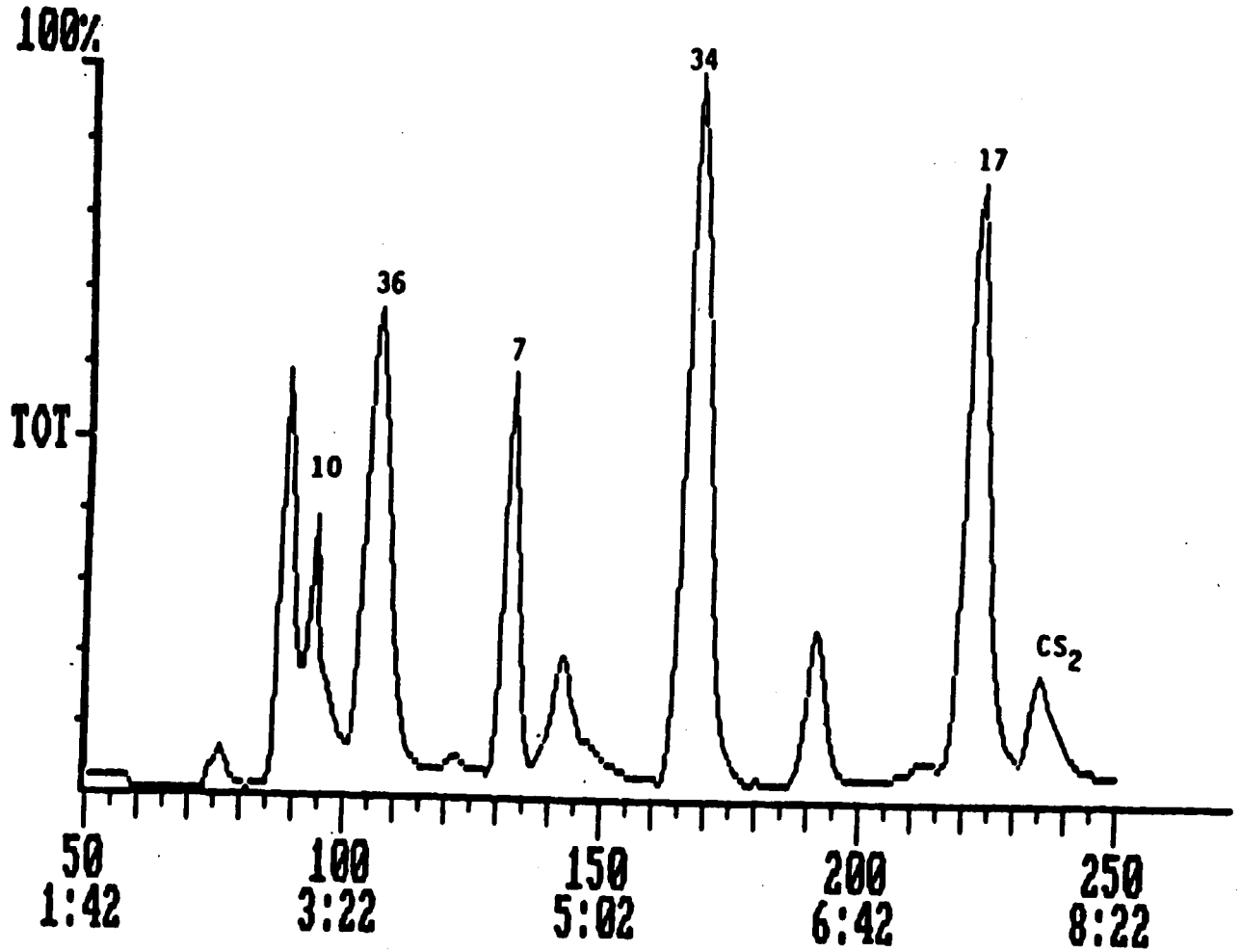
FIGURE 4. AMPLIFIED FIRST EIGHT MINUTES OF A TOTAL ION CURRENT CHROMATOGRAM FROM A VOLATILE COMPOUND CALIBRATION MIXTURE CONTAINING 25 ng (5 µg/L) OF EACH COMPONENT. THE COMPOUND IDENTIFICATION NUMBERS ARE GIVEN IN TABLE 6.



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