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**SEVENTH SAMPLING REPORT
SEPTEMBER 1992
TUTU WELLS SITE
ST. THOMAS, U.S. VIRGIN ISLANDS**

December 1992

Prepared for

Tutu Environmental Investigation Committee
San Juan, Puerto Rico

Prepared by

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December 18, 1992

Geraghty & Miller, Inc. is submitting this report to the Tutu Environmental Investigation Committee for work performed at the Tutu Wells Site in St. Thomas, U.S. Virgin Islands. The report was prepared in conformance with Geraghty & Miller's strict quality assurance/quality control procedures to ensure that the report meets industry standards in terms of the methods used and the information presented. If you have any questions or comments concerning this report, please contact one of the individuals listed below.

Respectfully submitted,

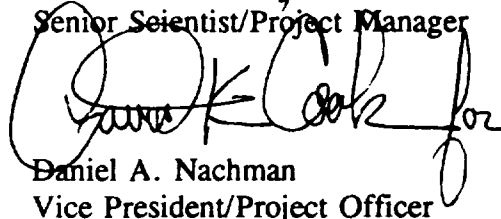
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**SEVENTH SAMPLING REPORT
SEPTEMBER 1992
TUTU WELLS SITE
ST. THOMAS, U.S. VIRGIN ISLANDS**

INTRODUCTION

In April 1990, Geraghty & Miller, Inc. was retained by the Tutu Environmental Investigation Committee (TEIC), which is comprised of Texaco Caribbean Inc. (Texaco) and Esso U.S. Virgin Islands (Esso), to prepare a sampling, analysis, and monitoring plan (SAMP) for the Tutu Wells Site, St. Thomas, U.S. Virgin Islands. This report for the seventh sampling event (September 1992) at the Tutu Wells Site was prepared in accordance with the Administrative Order (AO), effective March 22, 1990, and with the requirements detailed in the "Sampling, Analysis, and Monitoring Plan for Wells, Tutu Wells Site, St. Thomas, U.S. Virgin Islands," prepared in September 1990 (Geraghty & Miller, Inc. 1990). The SAMP was approved by the U.S. Environmental Protection Agency (USEPA) in its September 21, 1990 letter to the TEIC. (USEPA 1990a).

The first three ground-water sampling events were performed in September/October 1990, February 1991, and June 1991. Geraghty & Miller and Soil Tech Corporation, Inc. (Soil Tech) of San Juan, Puerto Rico, implemented the sampling activities. For each of these three sampling events, Geraghty & Miller prepared reports (Geraghty & Miller, Inc. 1991a, 1991b, and 1991c) that were submitted to the USEPA and the U.S. Virgin Islands Department of Planning and Natural Resources (DPNR).

Due to cumulative quality control (QC) problems caused by the previous laboratory, Geraghty & Miller recommended that Enseco East Incorporated (Enseco) of Somerset, New Jersey be retained as the laboratory subcontractor after the third sampling event (Geraghty & Miller, Inc. 1991c). A meeting was held with the USEPA on July 15, 1991 to discuss the new laboratory and to clarify the sampling and analytical procedures. A revised SAMP (Geraghty & Miller, Inc. 1991d), which was submitted to the USEPA in September 1991, incorporated clarifications of the sampling and analytical procedures and included the change in the analytical

laboratory. The revised SAMP (Geraghty & Miller, Inc. 1991d) became effective prior to the fourth sampling event, which took place in October 1991 (Geraghty & Miller, Inc. 1991e). The fifth sampling event was conducted in February 1992 (Geraghty & Miller, Inc. 1992a), and the sixth sampling event was conducted in May 1992 (Geraghty & Miller, Inc. 1992b).

The objectives of the SAMP (Geraghty & Miller, Inc. 1990) and the revised SAMP (Geraghty & Miller, Inc. 1991d) 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 particular water supply wells in the vicinity of Route 38 within the Tutu Wells Site (see Figure 1).

SAMPLING AND ANALYTICAL PROCEDURES

The seventh sampling event was conducted from September 14 through 17, 1992 by Soil Tech and Geraghty & Miller. Ms. Ana Gloria Ramos, Designated Coordinator for TEIC, was present throughout the sampling event.

Sampling and analysis were performed as described in the revised SAMP (Geraghty & Miller, Inc. 1991d), with the exception of the few deviations outlined later in this section. Table 1 lists the sample locations and analytical parameters for the September 1992 sampling. In brief, the wells were sampled and analyzed for the Target Compound List (TCL) volatile organic compounds (VOCs) in accordance with a modified version of USEPA Method 524.2, Revision 3.0 (USEPA 1989) to achieve lower detection levels. All analyses were performed using contract laboratory protocol (CLP) procedures. Enseco performed the laboratory analyses.

TECHNICAL METHODOLOGY

All 14 samples (13 wells and one blind replicate) obtained during the September 1992 sampling event were collected utilizing the permanent pumps and piping systems installed in the wells, with the exception of the samples from the Gassett supply well. The Gassett well, which

is not equipped with a permanent pump, was purged using a submersible pump powered by a portable generator. After 1,040 gallons (approximately 3.9 well volumes) were purged from the Gassett well, the submersible pump was removed and a sample was collected using a Teflon bailer.

Sample names shown on the tables that require explanation are as follows:

- One blind field replicate sample, labelled "Ruben," was collected during the sampling event and on the validated data tables was renamed "Ramsay FR," indicating this sample was a field replicate taken from the Ramsay well.
- Matrix spike (MS) and matrix spike duplicate (MSD) samples were collected from the Steele well. These samples were labelled "Steele MS" and "Steele MSD."
- On September 15, 1992, the distilled and deionized water provided by Enseco was used to prepare an equipment blank and a water blank. The equipment blank sample was collected by rinsing the distilled and deionized water through the clean Teflon bailer, which was later used to sample the Gassett well. The water blank was collected by pouring the distilled and deionized water from the laboratory-supplied containers into the sample containers. The equipment blank and the water blank were analyzed for TCL VOCs.

Trip blank samples were prepared by Enseco and shipped to Soil Tech with the other sample vials. The objective of a trip blank is to measure potential cross-contamination of samples during vial preparation, shipment, and analysis. A trip blank sample (five 40-milliliter vials) was included in each shipment of samples from the Tutu Wells Site to Enseco. Trip blank samples were analyzed for TCL VOCs.

Geraghty & Miller validated the analytical data in accordance with the USEPA Standard Operating Procedures (SOP) No. HW-6, January 1992, for organic compounds (USEPA 1992).

The data validation summary is provided in Appendix A. The VOC parameters detected in ground-water samples collected during the seventh sampling event (September 1992) are summarized in Table 2. The complete VOC validated data for the seventh sampling event are presented in Table 3. Details of the sampling and analysis procedures, data validation requirements, and reporting requirements are provided in the revised SAMP (Geraghty & Miller, Inc. 1991d).

PROCEDURAL DEVIATIONS

Deviations from the scope of work and procedures during the seventh sampling event are explained below.

1. The VIHA I and VIHA II wells were not sampled due to inoperable pumps.
2. Due to the presence of air bubbles in the trip blanks received from Enseco, all trip blank samples were refilled on-site using the distilled, deionized analyte-free water provided by Enseco.
3. The Matthias well was not sampled because, after several attempts to obtain access for sampling, the property owner did not agree to supply access.
4. The Harthman III well was not sampled because of construction activities in the new Tutu Shopping Plaza site. The well is presently being used for a dust control system used during the construction operations.
5. The following wells were resampled because the laboratory reported air bubbles in the original sample vials: La Place (9/17/92), and Eglin I, II, and III (9/16/92).

6. The following wells were resampled the day they were collected (9/16/92) because the sampling crew observed air bubbles in the original sample vials before shipment to the laboratory: Harthman II, and Tillet.

DATA VALIDATION

The organic data have been evaluated according to USEPA Region II SOP No. HW-6, Revision No. 8 (USEPA 1992), in conjunction with the USEPA Draft National Functional Guidelines for Organic Data Review (USEPA 1991) and the appropriate corresponding methodology. Because the VOC analyses were not performed in accordance with the CLP Statement of Work (SOW) for organic analysis (USEPA 1990b), the SOP for organic data review is not directly applicable. However the SOP was used, along with USEPA Method 524.2, Revision 3.0 (USEPA 1989) and the additional QC requirements outlined in the revised SAMP (Geraghty & Miller, Inc. 1991d), to conform to the USEPA Region II data validation protocol (USEPA 1992). All of the data have been tabulated and assigned the appropriate qualifier codes, if required. A discussion of the data validation findings is provided in Appendix A.

The QC deficiencies are minor, therefore, the data are usable with minor qualifications. Sample data have not been rejected when qualified as estimated due to more than one deficiency. All of the organic data generated for the samples are valid and usable.

ORGANIC ANALYTICAL RESULTS

VOCs were analyzed according to USEPA Method 524.2, Revision 3.0 (USEPA 1989). All VOC analyses were performed within the required holding time, as shown in Table 4, with the exception of the Tillet DL sample, which was reanalyzed with a secondary dilution (DL) 19 days outside the 7-day holding time. Therefore, the result for 1,2-dichloroethene (1,2-DCE) (reported as sum of cis- and trans-isomers) is qualified as estimated using the "J" qualifier. VOCs were detected in various blanks, and associated ground-water samples were qualified as

appropriate. Table 5 presents a summary of VOC-contaminated blanks and associated ground-water samples. Table 6 presents the complete validated VOC data results for the first seven sampling events (September/October 1990, February 1991, June 1991, October 1991, February 1992, May 1992, and September 1992). A summary of detected VOCs for these seven sampling events is presented in Table 7. In a comparison of applicable or relevant and appropriate requirements (ARARS) with detected analytes in ground water (see Table 8), VOCs were detected at concentrations above the USEPA drinking water standards (see Table 9) in samples collected from the following supply wells: Eglin I, Eglin II, Eglin III, Four Winds I, Four Winds II, Harthman II, Harvey, LaPlace, Ramsay, Smith, Steel, and Tillett.

VOCs constitute the main group of constituents of concern at the Tutu Wells Site. The compounds that were consistently detected in samples were 1,2-DCE; trichloroethene (TCE); and PCE. PCE was detected in all samples except the Gassett sample. The PCE concentrations range from 10 parts per billion (ppb) in the Harthman II sample to 260 ppb in the Harvey sample. TCE was detected in all samples except the Gassett sample, and concentrations range from 0.89 ppb in the Ramsay FR sample to 62 ppb in the Tillett sample. 1,2-DCE was detected in all samples except the Gassett sample. The 1,2-DCE concentrations range from 1.4 ppb in the Ramsay sample to 290 ppb in the Tillett sample.

The other VOCs detected in the September sampling event were vinyl chloride, methylene chloride, acetone, carbon disulfide, chloroform, bromodichloromethane, benzene, toluene, ethylbenzene, and xylene. Vinyl chloride was detected only in the Steele sample at a concentration of 3.3 ppb. Carbon disulfide was detected only in the Ramsay sample at an estimated concentration of 0.15 ppb. Trace concentrations of chloroform were detected in six samples (Four Winds I, Four Winds II, La Place, Ramsay, Ramsay FR, and Tillett) ranging from an estimated concentration of 1 ppb in the Four Winds II sample to an estimated concentration of 3.6 ppb in the Tillett sample, probably the by-product of spills or leaks from water treatment systems using chlorine as a disinfectant. Bromodichloromethane was detected only in the Ramsay well at a concentration of 0.94 ppb (average of Ramsay and Ramsay FR samples).

Methylene chloride and acetone were both detected in the Harvey and Tillett samples; however these compounds were also detected in the laboratory blank. Because methylene chloride and acetone are common laboratory contaminants, Geraghty & Miller believes that these results do not represent actual ground-water quality in the Harvey and Tillett wells.

Petroleum constituents such as benzene, toluene, ethylbenzene, and xylenes (BTEX) have not been detected in the majority of the wells. Benzene was detected in two samples, La Place and Tillett, at an estimated concentration of 0.29 ppb and at a concentration of 7 ppb, respectively. Toluene was detected in two samples, Eglin II and Tillett, at estimated concentrations of 0.081 ppb and 0.5 ppb, respectively. Ethylbenzene was detected only in the Tillett sample at an estimated concentration of 1.5 ppb. Total xylenes were detected only in the La Place well at an estimated concentration of 0.85 ppb.

Other than one occurrence of benzene at 7 ppb, only three VOCs (1,2-DCE, TCE, and PCE) have been detected at concentrations above 4 ppb. 1,2-DCE and TCE are potential degradation products of PCE. Graphs showing the concentrations of 1,2-DCE, TCE, and PCE in selected wells from September 1990 through September 1992 are presented on Figures 2 through 7. These graphs illustrate the variation of 1,2-DCE, TCE, and PCE concentrations throughout the seven sampling events at the Tutu Wells Site. Of these three chlorinated organic compounds, TCE has generally been detected at the lowest concentration, with 1,2-DCE and PCE usually being reported at higher concentrations than TCE. With the exception of the Eglin III, Ramsay, Harvey, and Smith wells, 1,2-DCE is the VOC that has been present at the highest concentration in wells sampled at the Tutu Wells Site (see Figures 2 through 7).

To better evaluate the occurrence of PCE relative to its potential breakdown products, the relative percent of PCE was calculated for analytical results from September 1990 through September 1992 (see Figures 8 through 13). The relative percent of PCE was calculated by dividing the concentration of PCE by the sum of the concentrations of 1,2-DCE, TCE, and PCE. The calculated values for relative percent of PCE are shown in Table 10. The relative percent of PCE at most well locations has been below 45 percent. However, the relative percent of PCE

for the Ramsay and Harvey well samples usually exceeded 80 percent (see Figures 8 and 11). The relative percent of PCE for the Smith well samples was between 68 and 85 percent (see Figure 13). For the other wells, shown on Figures 9, 10, and 12, the relative percent of PCE ranged between 20 and 50 percent. Because 1,2-DCE and TCE are potential degradation products of PCE, the high relative percent of PCE at the Ramsay, Harvey, and Smith wells may indicate proximity to a source of PCE. The further the distance downgradient from a PCE source and the more time PCE is exposed to degradation processes in the aquifer, the greater the likelihood that the relative percent of PCE will decrease as PCE is degraded into 1,2-DCE and TCE. Alternatively, proximity to sources of 1,2-DCE or TCE ground-water contamination may result in a reduction of the relative percent of PCE.

RECOMMENDATIONS

The September 1992 sampling results meet the prescribed objectives of the revised SAMP (Geraghty & Miller, Inc. 1991d). Geraghty & Miller recommends that the revised SAMP (Geraghty & Miller, Inc. 1991d) continue to be followed, but that the revisions discussed below be implemented.

- The eighth sampling event (scheduled to begin on the week of March 22, 1993) should only include analysis for TCL VOCs, using USEPA Method 524.2, Revision 3.0 (USEPA 1989) following CLP protocol.
- The eighth sampling event should only include the wells listed in Table 11.

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- U.S. Environmental Protection Agency (USEPA). 1990b. USEPA Contract Laboratory Program, Statement of Work for Organic Analysis, Multi-Media, Multi-Concentration, SOW No. 3/90 including Rev. 12/90 and 2/91, March 1990.
- U.S. Environmental Protection Agency (USEPA). 1991. Draft National Functional Guidelines for Organic Data Review, Multi-Media, Multi-Concentration (OLM01.0), December 1990, revised June 1991.

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- U.S. Environmental Protection Agency (USEPA). 1992. Contract Laboratory Program (CLP) Organics Data Review and Preliminary Review, Region II Standard Operating Procedure No. HW-6, Revision No. 8, January 1992.
- U.S. Geological Survey (USGS). 1954. Eastern St. Thomas, Virgin Islands. 7.5-minute Topographic Quadrangle Map.

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#PR00801-D2/SEVENTH.RPT

Table 1. List of Sample Locations and Analytical Parameters for the Seventh Sampling Event, September 1992, Tutu Wells Site, St. Thomas, U.S. Virgin Islands.

Sample ID	Proposed Analytes
Eglin I	TCL VOCs
Eglin II	TCL VOCs
Eglin III	TCL VOCs
Four Winds I	TCL VOCs
Four Winds II	TCL VOCs
Gassett	TCL VOCs
Harthman II	TCL VOCs
Harvey	TCL VOCs
LaPlace	TCL VOCs
Ramsay	TCL VOCs
Smith	TCL VOCs
Steele	TCL VOCs
Tillett	TCL VOCs

TCL Target compound list.

VOCs Volatile organic compounds.

VOC analysis was performed using modified USEPA Method 524.2, Revision 3.0 (USEPA 1989).

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Table 2. Summary of Detected Volatile Organic Compounds in Ground-Water Samples Collected in September 1992 at the Tutu Wells Site, St. Thomas, U.S. Virgin Islands.

Analyte	Sample ID: Eglin I	Eglin II	Eglin III	Four Winds I	Four Winds II	Harthman II	Harvey	LaPlace	Ramsay	Ramsay FR	Smith	Steele	Tillett
	Date: 16-Sep-92	16-Sep-92	16-Sep-92	15-Sep-92	15-Sep-92	16-Sep-92	14-Sep-92	17-Sep-92	15-Sep-92	15-Sep-92	16-Sep-92	14-Sep-92	16-Sep-92
1,2-Dichloroethene (cis/trans)	12	11	32	170	99	11	49	130	1.4	1.4	60	140	290
Trichloroethene	4.5	4.7	13	21	10	2.3	46	22	0.94	0.89	21	33	62
Tetrachloroethene	11	11	34	78	38	10	260	67	16	16	170	65	140
Toluene	NA	0.081 J	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.5 J
Chloroform	NA	NA	NA	1.6 J	1 J	NA	NA	1.4 J	2.9	2.8	NA	NA	3.6 J
Methylene chloride	NA	NA	NA	NA	NA	NA	11 B	NA	NA	NA	NA	NA	16 B
Acetone	NA	NA	NA	NA	NA	NA	28 BJ	NA	NA	NA	NA	NA	85 BJ
Benzene	NA	NA	NA	NA	NA	NA	NA	0.29 J	NA	NA	NA	NA	7
Xylenes (total)	NA	NA	NA	NA	NA	NA	NA	0.85 J	NA	NA	NA	NA	NA
Carbon disulfide	NA	NA	NA	NA	NA	NA	NA	NA	0.15 J	NA	NA	NA	NA
Bromodichloromethane	NA	NA	NA	NA	NA	NA	NA	NA	0.98	0.89	NA	NA	NA
Vinyl chloride	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	3.3	NA
Ethylbenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1.5 J

Analyte concentrations in micrograms per liter (parts per billion [ppb]).

Analyses were performed by Enseco-East of Somerset, New Jersey, using USEPA Method 524.2, Revision 3.0.

B Analyte is detected in the laboratory blank.

J Result is detected below the reporting limit and/or is an estimated concentration.

FR Field replicate of previous sample.

NA Not applicable.

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Table 2. Summary of Detected Volatile Organic Compounds in Ground-Water Samples Collected in September 1992 at the Tutu Wells Site, St. Thomas, U.S. Virgin Islands.

Analyte	Sample ID: Field Blank	Trip Blank	Trip Blank	Trip Blank	Trip Blank
	Date: 15-Sep-92	14-Sep-92	15-Sep-92	16-Sep-92	17-Sep-92
1,2-Dichloroethene (cis/trans)	NA	NA	NA	NA	NA
Trichloroethene	NA	NA	NA	NA	NA
Tetrachloroethene	NA	NA	NA	NA	NA
Toluene	NA	NA	NA	NA	0.074 J
Chloroform	0.11 J	NA	NA	0.15 J	NA
Methylene chloride	0.44 JB	0.73 B	0.65 BJ	0.89 B	1.6 B
Acetone	NA	NA	NA	NA	NA
Benzene	NA	NA	NA	NA	NA
Xylenes (total)	NA	NA	NA	NA	NA
Carbon disulfide	0.096 J	NA	NA	0.92	NA
Bromodichloromethane	NA	NA	NA	NA	NA
Vinyl chloride	NA	NA	NA	NA	NA
Ethylbenzene	NA	NA	NA	NA	NA

Analyte concentrations in micrograms per liter (parts per billion [ppb]).

Analyses were performed by Enseco-East of Somerset, New Jersey, using USEPA Method 524.2, Revision 3.0.

B Analyte is detected in the laboratory blank.

J Result is detected below the reporting limit and/or is an estimated concentration.

FR Field replicate of previous sample.

NA Not applicable.

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Table 3. Concentrations of Volatile Organic Compounds in Ground-Water Samples Collected in September 1992 at the Tutu Wells Site, St. Thomas, U.S. Virgin Islands.

Analyte	Sample ID: Eglin I	Eglin II	Eglin III	Four Winds I	Four Winds II	Gassett	Harthman II	Harvey	LaPlace	Ramsay	Ramsay FR	Smith	Steele
Date:	16-Sep-92	16-Sep-92	16-Sep-92	15-Sep-92	15-Sep-92	15-Sep-92	16-Sep-92	14-Sep-92	17-Sep-92	15-Sep-92	15-Sep-92	16-Sep-92	14-Sep-92
Chloromethane	0.5 U	0.5 U	0.5 U	2.5 Uu	2 Uu	0.5 U	0.5 U	5 Uu	2 Uu	0.5 U	0.5 U	2.5 Uu	2 Uu
Bromomethane	0.5 U	0.5 U	0.5 U	2.5 U	2 U	0.5 U	0.5 U	5 U	2 U	0.5 U	0.5 U	2.5 U	2 U
Vinyl chloride	0.5 U	0.5 U	0.5 U	2.5 U	2 U	0.5 U	0.5 U	5 U	2 U	0.5 U	0.5 U	2.5 U	3.3
Chloroethane	0.5 U	0.5 U	0.5 U	2.5 U	2 U	0.5 U	0.5 U	5 U	2 U	0.5 U	0.5 U	2.5 U	2 U
Methylene chloride	0.5 U	0.74 U	1.8 U	4.4 U	2.8 U	0.52 U	0.73 U	11 B	6.9 U	0.5 U	0.52 U	5 U	3.7 U
Acetone	2 UJ	2 UJ	2 UJ	10 UJ	8 UJ	2 UJ	2 UJ	28 BJ	8 UJ	2 UJ	2 UJ	10 UJ	8 UJ
Carbon disulfide	0.5 U	0.5 U	0.5 U	2.5 U	2 U	0.5 U	0.5 U	5 U	2 U	0.15 J	0.5 U	2.5 U	2 U
1,1-Dichloroethene	0.5 U	0.5 U	0.5 U	2.5 U	2 U	0.5 U	0.5 U	5 U	2 U	0.5 U	0.5 U	2.5 U	2 U
1,1-Dichloroethane	0.5 U	0.5 U	0.5 U	2.5 U	2 U	0.5 U	0.5 U	5 U	2 U	0.5 U	0.5 U	2.5 U	2 U
1,2-Dichloroethene (cis/trans)	12	11	32	170	99	0.5 U	11	49	130	1.4	1.4	60	140
Chloroform	0.5 U	0.5 U	0.5 U	1.6 J	1 J	0.5 U	0.5 U	5 U	1.4 J	2.9	2.8	0.5 U	2 U
1,2-Dichloroethane	0.5 U	0.5 U	0.5 U	2.5 U	2 U	0.5 U	0.5 U	5 U	2 U	0.5 U	0.5 U	2.5 U	2 U
2-Butanone	2 U	2 U	2 U	10 U	8 U	2 U	2 U	20 U	8 U	2 U	2 U	10 U	8 U
1,1,1-Trichloroethane	0.5 U	0.5 U	0.5 U	2.5 U	2 U	0.5 U	0.5 U	5 U	2 U	0.5 U	0.5 U	2.5 U	2 U
Carbon tetrachloride	0.5 U	0.5 U	0.5 U	2.5 U	2 U	0.5 U	0.5 U	5 U	2 U	0.5 U	0.5 U	2.5 U	2 U
Bromodichloromethane	0.5 U	0.5 U	0.5 U	2.5 U	2 U	0.5 U	0.5 U	5 U	2 U	0.98	0.89	2.5 U	2 U
1,2-Dichloropropane	0.5 U	0.5 U	0.5 U	2.5 U	2 U	0.5 U	0.5 U	5 U	2 U	0.5 U	0.5 U	2.5 U	2 U
trans-1,3-Dichloropropene	0.5 U	0.5 U	0.5 U	2.5 U	2 U	0.5 U	0.5 U	5 U	2 U	0.5 U	0.5 U	2.5 U	2 U
Trichloroethene	4.5	4.7	13	21	10	0.5 U	2.3	46	22	0.94	0.89	21	33
Dibromochloromethane	0.5 U	0.5 U	0.5 U	2.5 U	2 U	0.5 U	0.5 U	5 U	2 U	0.5 U	0.5 U	2.5 U	2 U
1,1,2-Trichloroethane	0.5 U	0.5 U	0.5 U	2.5 U	2 U	0.5 U	0.5 U	5 U	2 U	0.5 U	0.5 U	2.5 U	2 U
Benzene	0.5 U	0.5 U	0.5 U	2.5 U	2 U	0.5 U	0.5 U	5 U	0.29 J	0.5 U	0.5 U	2.5 U	2 U
cis-1,3-Dichloropropene	0.5 U	0.5 U	0.5 U	2.5 U	2 U	0.5 U	0.5 U	5 U	2 U	0.5 U	0.5 U	2.5 U	2 U
Bromoform	0.5 U	0.5 UJ	0.5 UJ	2.5 UJ	2 UJ	0.5 UJ	0.5 UJ	5 U	2 U	0.5 UJ	0.5 UJ	2.5 U	2 U
4-Methyl-2-pentanone	2 U	2 U	2 U	10 U	8 U	2 U	2 U	20 U	8 U	2 U	2 U	10 U	8 U
2-Hexanone	R	R	R	R	R	R	R	R	R	R	R	R	R
1,1,2,2-Tetrachloroethane	0.5 UJ	0.5 U	0.5 U	2.5 U	2 U	0.5 U	0.5 U	5 UJ	2 U	0.5 U	0.5 U	2.5 UJ	2 UJ
Tetrachloroethene	11	11	34	78	38	0.5 U	10	260	67	16	16	170	65
Toluene	0.5 U	0.081 J	0.5 U	2.5 U	2 U	0.5 U	0.5 U	5 U	0.63 UJ	0.5 U	0.5 U	2.5 U	2 U
Chlorobenzene	0.5 U	0.5 U	0.5 U	2.5 U	2 U	0.5 U	0.5 U	5 U	2 UJ	0.5 U	0.5 U	2.5 U	2 U
Ethylbenzene	0.5 U	0.5 U	0.5 U	2.5 U	2 U	0.5 U	0.5 U	5 U	2 UJ	0.5 U	0.5 U	2.5 U	2 U
Styrene	0.5 U	0.5 U	0.5 U	2.5 U	2 U	0.5 U	0.5 U	5 U	2 U	0.5 U	0.5 U	2.5 U	2 U
Xylenes (total)	0.5 U	0.5 U	0.5 U	2.5 U	2 U	0.5 U	0.5 U	5 U	0.85 J	0.5 U	0.5 U	2.5 U	2 U

Analyte concentrations in micrograms per liter (parts per billion [ppb]).

Analyses were performed by Enseco-East of Somerset, New Jersey, using USEPA Method 524.2, Revision 3.0.

B Analyte is detected in the laboratory blank.

J Result is detected below the reporting limit and/or is an estimated concentration.

U Compound or element analyzed for, but not detected at the corresponding reporting limit.

u All reporting limits raised due to high levels of target analytes.

R Result rejected.

FR Field replicate of previous sample.

Table 3. Concentrations of Volatile Organic Compounds in Ground-Water Samples Collected in September 1992 at the Tutu Wells Site, St. Thomas, U.S. Virgin Islands.

Analyte	Sample ID: Tillet	Field Blank	Trip Blank	Trip Blank	Trip Blank	Trip Blank
Date:	16-Sep-92	15-Sep-92	14-Sep-92	15-Sep-92	16-Sep-92	17-Sep-92
Chloromethane	5 Uu	0.5 U	0.5 U	R	0.5 U	0.5 U
Bromomethane	5 U	0.5 U	0.5 U	R	0.5 U	0.5 U
Vinyl chloride	5 U	0.5 U	0.5 U	R	0.5 U	0.5 U
Chloroethane	5 U	0.5 U	0.5 U	R	0.5 U	0.5 U
Methylene chloride	16 B	0.44 JB	0.73 B	0.65 BJ	0.89 B	1.6 B
Acetone	85 BJ	2 UJ	2 UJ	R	2 UJ	2 UJ
Carbon disulfide	5 U	0.096 J	0.5 U	R	0.92	0.5 U
1,1-Dichloroethene	5 U	0.5 U	0.5 U	R	0.5 U	0.5 U
1,1-Dichloroethane	5 U	0.5 U	0.5 U	R	0.5 U	0.5 U
1,2-Dichloroethene (cis/trans)	290	0.5 U	0.5 U	R	0.5 U	0.5 U
Chloroform	3.6 J	0.11 J	0.5 U	R	0.15 J	0.5 U
1,2-Dichloroethane	5 U	0.5 U	0.5 U	R	0.5 U	0.5 U
2-Butanone	20 U	2 U	2 U	R	2 U	2 U
1,1,1-Trichloroethane	5 U	0.5 U	0.5 U	R	0.5 U	0.5 U
Carbon tetrachloride	5 U	0.5 U	0.5 U	R	0.5 U	0.5 U
Bromodichloromethane	5 U	0.5 U	0.5 U	R	0.5 U	0.5 U
1,2-Dichloropropane	5 U	0.5 U	0.5 U	R	0.5 U	0.5 U
trans-1,3-Dichloropropene	5 U	0.5 U	0.5 U	R	0.5 U	0.5 U
Trichloroethene	62	0.5 U	0.5 U	R	0.5 U	0.5 U
Dibromochloromethane	5 U	0.5 U	0.5 U	R	0.5 U	0.5 U
1,1,2-Trichloroethane	5 U	0.5 U	0.5 U	R	0.5 U	0.5 U
Benzene	7	0.5 U	0.5 U	R	0.5 U	0.5 U
cis-1,3-Dichloropropene	5 U	0.5 U	0.5 U	R	0.5 U	0.5 U
Bromoform	5 U	0.5 U	0.5 U	R	0.5 UJ	0.5 U
4-Methyl-2-pentanone	20 U	2 U	2 U	R	2 U	2 U
2-Hexanone	R	R	R	R	R	R
1,1,2,2-Tetrachloroethane	5 UJ	0.5 UJ	0.5 UJ	R	0.5 U	0.5 U
Tetrachloroethene	140	0.5 U	0.5 U	R	0.5 U	0.5 U
Toluene	0.5 J	0.5 U	0.5 U	R	0.5 U	0.074 J
Chlorobenzene	5 U	0.5 U	0.5 U	R	0.5 U	0.5 U
Ethylbenzene	1.5 J	0.5 U	0.5 U	R	0.5 U	0.5 U
Styrene	5 U	0.5 U	0.5 U	R	0.5 U	0.5 U
Xylenes (total)	5 U	0.5 U	0.5 U	R	0.5 U	0.5 U

Analyte concentrations in micrograms per liter (parts per billion [ppb]).

Analyses were performed by Enseco-East of Somerset, New Jersey, using USEPA Method 524.2, Revision 3.0.

B Analyte is detected in the laboratory blank.

J Result is detected below the reporting limit and/or is an estimated concentration.

J Compound or element analyzed for, but not detected at the corresponding reporting limit.

J All reporting limits raised due to high levels of target analytes.

J Result rejected.

R Field replicate of previous sample.

TUT 003 0383

GERAGHTY & MILLER, INC.

Table 4. Volatile Organic Analysis Holding Time Summary, Seventh Quarter Sampling Event, September 1992, Tutu Wells Site, St. Thomas, U.S. Virgin Islands.

Sample Identifier	Matrix	Preserved	Date Collected	Date Received	Date Analyzed	Days from Collection to Analysis	Days Holding Time Exceeded
Eglin I	Aqueous	No	16-Sep-92	17-Sep-92	19-Sep-92	3	0
Eglin II	Aqueous	No	16-Sep-92	17-Sep-92	20-Sep-92	4	0
Eglin III	Aqueous	No	16-Sep-92	17-Sep-92	20-Sep-92	4	0
Four Winds I	Aqueous	Yes	15-Sep-92	17-Sep-92	20-Sep-92	5	0
Four Winds II	Aqueous	Yes	15-Sep-92	17-Sep-92	20-Sep-92	5	0
Gassett	Aqueous	Yes	15-Sep-92	16-Sep-92	20-Sep-92	5	0
Hartman II	Aqueous	No	16-Sep-92	17-Sep-92	20-Sep-92	4	0
Harvey	Aqueous	No	14-Sep-92	15-Sep-92	19-Sep-92	5	0
LaPlace	Aqueous	No	17-Sep-92	18-Sep-92	25-Sep-92	8	1
Ramsay	Aqueous	Yes	15-Sep-92	16-Sep-92	20-Sep-92	5	0
Ramsay FR	Aqueous	Yes	15-Sep-92	16-Sep-92	20-Sep-92	5	0
Smith	Aqueous	No	16-Sep-92	17-Sep-92	19-Sep-92	3	0
Steele	Aqueous	No	14-Sep-92	15-Sep-92	19-Sep-92	5	0
Tillett	Aqueous	No	16-Sep-92	17-Sep-92	19-Sep-92	3	0
Field Blank (09/15/92)	Aqueous	Yes	15-Sep-92	16-Sep-92	19-Sep-92	4	0
Trip Blank (09/14/92)	Aqueous	Yes	14-Sep-92	15-Sep-92	19-Sep-92	5	0
Trip Blank (09/15/92)	Aqueous	Yes	15-Sep-92	16-Sep-92	19-Sep-92	4	0
Trip Blank (09/16/92)	Aqueous	Yes	16-Sep-92	17-Sep-92	20-Sep-92	4	0
Trip Blank (09/17/92)	Aqueous	Yes	17-Sep-92	18-Sep-92	25-Sep-92	8	0

FR Field replicate.

PR00801-DV3/tbla1.wk3

Table 5. Summary of Volatile Organic Compound Contaminated Blanks and Associated Ground – Water Samples, Seventh Quarter Sampling Event, September 1992, Tutu Wells Site, St. Thomas, U.S. Virgin Islands.

Blank Identifier (Date Sampled or File I.D.)	Date Analyzed	Associated Sample(s)
Method Blank (A4627)	09/19/92	Steele, Harvey, Tillet, Smith, Eglin I
Method Blank (A4653)	09/20/92	Four Winds I, Four Winds II, Ramsay, Gassett, Ramsay FR, Eglin II, Eglin III, Harthman II
Method Blank (A4786)	09/25/92	LaPlace
Trip Blank (09/14/92)	09/19/92	Steele, Harvey
Trip Blank (09/15/92)	09/19/92	Four Winds I, Four Winds II, Ramsay, Gassett, Ramsay FR
Trip Blank (09/16/92)	09/20/92	Tillet, Smith, Eglin I, Eglin II, Eglin III, Harthman II
Trip Blank (09/17/92)	09/25/92	LaPlace
Field Blank (09/15/92)	09/19/92	Gassett

I.D. Identification.
FR Field replicate.

PR00801 – DV3/tbla2.wk3

Table 6. Concentrations of Volatile Organic Compounds in Ground-Water Samples Collected from October 1990 to September 1992 at the Tutu Wells Site, St. Thomas, U.S. Virgin Islands.

Analyte	Sample ID: Eglin I	Eglin I	Eglin I	Eglin I	Eglin I	Eglin I	Eglin I
Date:	2-Oct-90	5-Feb-91	5-Jun-91	2-Oct-91	3-Feb-92	27-May-92	16-Sep-92
Chloromethane	R	2 UJ	R	1 U	0.5 U	0.5 U	0.5 U
Bromomethane	R	R	R	1 U	0.5 U	0.5 U	0.5 U
Vinyl chloride	R	R	R	1 U	0.5 U	0.5 U	0.5 U
Chloroethane	R	R	R	1 U	0.5 U	0.5 U	0.5 U
Methylene chloride	R	1 U	R	1.1 U	0.5 U	0.5 U	0.5 U
Acetone	R	R	R	4 U	2 U	R	2 UJ
Carbon disulfide	R	1 UJ	R	1 U	0.5 U	0.5 U	0.5 U
1,1-Dichloroethene	R	1 U	R	1 U	0.5 U	0.5 U	0.5 U
1,1-Dichloroethane	R	1 U	R	1 U	0.5 U	0.5 U	0.5 U
1,2-Dichloroethene (cis/trans)	68 J	60 J	68 DJ	45	17	13	12
Chloroform	R	1 U	R	0.1 J	0.5 U	0.05 J	0.5 U
1,2-Dichloroethane	R	1 UJ	R	1 U	0.5 U	0.5 U	0.5 U
2-Butanone	R	R	R	4 U	2 U	2 U	2 U
1,1,1-Trichloroethane	R	1 UJ	R	1 U	0.5 U	0.5 U	0.5 U
Carbon tetrachloride	R	1 U	R	1 U	0.5 U	0.5 U	0.5 U
Bromodichloromethane	R	1 UJ	R	1 U	0.5 U	0.5 U	0.5 U
1,2-Dichloropropane	R	1 U	R	1 U	0.5 U	0.5 U	0.5 U
cis-1,3-Dichloropropene	R	1 U	R	1 U	0.5 U	0.5 U	0.5 U
Trichloroethene	10 J	8	10 J	7.5	7	6.3	4.5
Dibromochloromethane	R	1 UJ	R	1 U	0.5 U	0.5 U	0.5 U
1,1,2-Trichloroethane	R	1 U	1 J	1 U	0.5 U	0.5 U	0.5 U
Benzene	R	1 UJ	R	1 U	0.5 U	0.5 U	0.5 U
trans-1,3-Dichloropropene	R	R	R	1 UJ	0.5 U	0.5 U	0.5 U
Bromoform	R	R	R	1 UJ	0.5 U	0.5 UJ	0.5 U
4-Methyl-2-pentanone	R	2 UJ	R	4 U	2 U	2 U	2 U
2-Hexanone	R	2 UJ	R	4 U	2 U	R	R
Tetrachloroethene	32 J	26	32 J	24	16	14	11
1,1,2,2-Tetrachloroethane	R	R	R	1 U	0.5 U	0.5 U	0.5 UJ
Toluene	R	1 UJ	R	1 U	0.06 J	0.06 J	0.5 U
Chlorobenzene	R	1 U	R	1 U	0.5 U	0.5 U	0.5 U
Ethylbenzene	R	1 UJ	R	1 U	0.5 U	0.5 U	0.5 U
Styrene	R	1 UJ	R	1 U	0.5 U	0.5 U	0.5 U
Xylenes (total)	R	1 J	R	1 U	0.5 U	0.5 U	0.5 U

Analyte concentrations in micrograms per liter (parts per billion [ppb]).

Analyses were performed by Ceimic Corp. of Narragansett, RI, or Enseco-East of Somerset, NJ, using standard U.S. Environmental Protection Agency methodology.

D Analyte identified at a secondary dilution.

J Result is detected below the reporting limit and/or is an estimated concentration.

U Compound or element analyzed for, but not detected at the corresponding reporting limit.

R Result rejected.

Table 6. Concentrations of Volatile Organic Compounds in Ground-Water Samples Collected from September 1990 to September 1992 at the Tutu Wells Site, St. Thomas, U.S. Virgin Islands.

Analyte	Sample ID: Eglin II	Eglin II	Eglin II	Eglin II	Eglin II	Eglin II	Eglin II
Date:	27-Sep-90	5-Feb-91	5-Jun-91	2-Oct-91	3-Feb-92	27-May-92	16-Sep-92
Chloromethane	10 UJ	2 UJ	R	1.2 U	0.5 U	0.5 U	0.5 U
Bromomethane	10 UJ	R	R	1.2 U	0.5 U	0.5 U	0.5 U
Vinyl chloride	10 UJ	R	R	1.2 U	0.5 U	0.5 U	0.5 U
Chloroethane	10 UJ	R	R	1.2 U	0.5 UJ	0.5 U	0.5 U
Methylene chloride	5 UJ	1 U	R	1.8 U	0.5 U	0.5 U	0.74 U
Acetone	R	R	R	5 U	2 U	2 UJ	2 UJ
Carbon disulfide	5 UJ	1 UJ	R	5 U	0.5 U	0.5 U	0.5 U
1,1-Dichloroethene	5 UJ	1 U	R	1.2 U	0.5 U	0.5 U	0.5 U
1,1-Dichloroethane	5 UJ	1 U	R	1.2 U	0.5 U	0.5 U	0.5 U
1,2-Dichloroethene (cis/trans)	120 J	72 DJ	130 DJ	67	20	31	11
Chloroform	5 UJ	1 U	R	0.12 J	0.5 U	0.09 J	0.5 U
1,2-Dichloroethane	5 UJ	1 UJ	R	1.2 U	0.5 U	0.5 U	0.5 U
2-Butanone	R	R	R	5 U	2 U	2 U	2 U
1,1,1-Trichloroethane	5 UJ	1 UJ	R	1.2 U	0.5 U	0.5 U	0.5 U
Carbon tetrachloride	5 UJ	1 U	R	1.2 U	0.5 U	0.5 U	0.5 U
Bromodichloromethane	5 UJ	1 UJ	R	1.2 U	0.5 U	0.5 U	0.5 U
1,2-Dichloropropane	5 UJ	1 U	R	1.2 U	0.5 U	0.5 U	0.5 U
cis-1,3-Dichloropropene	5 UJ	1 U	R	1.2 U	0.5 U	0.5 U	0.5 U
Trichloroethene	22 J	19	19 J	18	6.7	14	4.7
Dibromochloromethane	5 UJ	1 UJ	R	1.2 U	0.5 U	0.5 U	0.5 U
1,1,2-Trichloroethane	5 UJ	1 U	R	1.2 U	0.5 U	0.5 U	0.5 U
Benzene	5 UJ	1 UJ	R	1.2 U	0.5 U	0.07 J	0.5 U
trans-1,3-Dichloropropene	5 UJ	R	R	1.2 UJ	0.5 U	0.5 U	0.5 U
Bromoform	5 UJ	R	R	1.2 UJ	0.5 UJ	0.5 UJ	0.5 UJ
4-Methyl-2-pentanone	10 UJ	2 UJ	R	5 U	2 U	2 U	2 U
2-Hexanone	R	2 UJ	R	5 U	2 U	R	R
Tetrachloroethene	71 J	34 DJ	61 DJ	54	16	36	11
1,1,2,2-Tetrachloroethane	5 UJ	R	R	1.2 U	0.5 U	0.5 U	0.5 U
Toluene	5 UJ	1 UJ	R	1.2 U	0.5 U	0.5 U	0.081 J
Chlorobenzene	5 UJ	1 U	R	1.2 U	0.5 U	0.5 U	0.5 U
Ethylbenzene	5 UJ	1 UJ	R	1.2 U	0.5 U	0.5 U	0.5 U
Styrene	5 UJ	1 UJ	R	1.2 U	0.5 U	0.5 U	0.5 U
Xylenes (total)	5 UJ	1 UJ	R	1.2 U	0.5 U	0.5 U	0.5 U

Analyte concentrations in micrograms per liter (parts per billion [ppb]).

Analyses were performed by Ceimic Corp. of Narragansett, RI, or Enseco-East of Somerset, NJ, using standard U.S. Environmental Protection Agency methodology.

- D) Analyte identified at a secondary dilution.
 I) Result is detected below the reporting limit and/or is an estimated concentration.
 U) Compound or element analyzed for, but not detected at the corresponding reporting limit.
 < Result rejected.

Table 6. Concentrations of Volatile Organic Compounds in Ground-Water Samples Collected from September 1990 to September 1992 at the Tutu Wells Site, St. Thomas, U.S. Virgin Islands.

Analyte	Sample ID: Eglin III	Eglin III	Eglin III	Eglin III	Eglin III	Eglin III	Eglin III
Date:	27-Sep-90	5-Feb-91	5-Jun-91	2-Oct-91	3-Feb-92	28-May-92	16-Sep-92
Chloromethane	10 UJ	2 UJ	1 UJ	0.5 U	0.5 U	0.5 U	0.5 U
Bromomethane	10 UJ	R	1 UJ	0.5 U	0.5 U	0.5 U	0.5 U
Vinyl chloride	10 UJ	R	1 UJ	0.5 U	0.5 U	0.5 U	0.5 U
Chloroethane	10 UJ	R	1 UJ	0.5 U	0.5 U	0.5 U	0.5 U
Methylene chloride	10 UJ	1 U	0.5 UJ	0.5 U	0.5 U	0.5 U	1.8 U
Acetone	22 J	R	2 UJ	2 U	2 U	2 U	2 UJ
Carbon disulfide	5 UJ	1 UJ	0.5 UJ	2 U	0.5 U	0.5 U	0.5 U
1,1-Dichloroethene	5 UJ	1 U	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U
1,1-Dichloroethane	5 U	1 U	0.5 UJ	0.05 J	0.5 U	0.5 U	0.5 U
1,2-Dichloroethene (cis/trans)	52 J	45 J	69 DJ	51	39	31	32
Chloroform	5 U	1 U	0.5 UJ	0.11 J	0.09 J	0.07 J	0.5 U
1,2-Dichloroethane	5 UJ	1 UJ	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U
2-Butanone	R	R	R	2 U	2 U	2 UJ	2 U
1,1,1-Trichloroethane	5 U	1 UJ	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U
Carbon tetrachloride	5 U	1 U	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U
Bromodichloromethane	5 UJ	1 UJ	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dichloropropane	5 UJ	1 U	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U
cis-1,3-Dichloropropene	5 UJ	1 U	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U
Trichloroethene	14	11	15 J	12	16	14	13
Dibromochloromethane	5 UJ	1 UJ	0.5 UJ	0.5 UJ	0.5 U	0.5 U	0.5 U
1,1,2-Trichloroethane	5 UJ	1 U	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U
Benzene	5 UJ	1 UJ	0.5 UJ	0.05 J	0.5 U	0.5 U	0.5 U
trans-1,3-Dichloropropene	5 UJ	R	0.5 UJ	0.5 UJ	0.5 U	0.5 U	0.5 U
Bromoform	5 UJ	R	0.5 UJ	0.5 UJ	0.5 UJ	0.5 U	0.5 UJ
4-Methyl-2-pentanone	10 UJ	2 UJ	1 UJ	2 U	2 U	2 U	2 U
2-Hexanone	R	2 UJ	1 UJ	2 U	2 U	R	R
Tetrachloroethene	44 J	35	40 J	36	41 D	39	34
1,1,2,2-Tetrachloroethane	5 UJ	R	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U
Toluene	5 UJ	1 UJ	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U
Chlorobenzene	5 UJ	1 U	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U
Ethylbenzene	5 UJ	1 UJ	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U
Styrene	5 UJ	1 UJ	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U
Xylenes (total)	5 UJ	1 UJ	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U

Analyte concentrations in micrograms per liter (parts per billion [ppb]).

Analyses were performed by Cimic Corp. of Narragansett, RI, or Enseco-East of Somerset, NJ, using standard U.S. Environmental Protection Agency methodology.

D Analyte identified at a secondary dilution.

J Result is detected below the reporting limit and/or is an estimated concentration.

U Compound or element analyzed for, but not detected at the corresponding reporting limit.

R Result rejected.

Table 6. Concentrations of Volatile Organic Compounds in Ground-Water Samples Collected from October 1991 to September 1992 at the Tutu Wells Site, St. Thomas, U.S. Virgin Islands.

Analyte	Sample ID: Four Winds		
	I	I	I
Date:	2-Oct-91	4-Feb-92	15-Sep-92
Chloromethane	0.5 U	0.5 U	2.5 Uu
Bromomethane	0.5 U	0.5 U	2.5 U
Vinyl chloride	0.5 U	0.22 J	2.5 U
Chloroethane	0.5 U	0.5 U	2.5 U
Methylene chloride	0.5 U	0.5 U	4.4 U
Acetone	2 U	2 U	10 UJ
Carbon disulfide	2 U	0.5 U	2.5 U
1,1-Dichloroethene	0.5 U	0.5 U	2.5 U
1,1-Dichloroethane	0.5 U	0.5 U	2.5 U
1,2-Dichloroethene (cis/trans)	89 D	150 D	170
Chloroform	0.28 J	1.2	1.6 J
1,2-Dichloroethane	0.5 U	0.5 U	2.5 U
2-Butanone	2 U	2 U	10 U
1,1,1-Trichloroethane	0.5 U	0.5 U	2.5 U
Carbon tetrachloride	0.5 U	0.5 U	2.5 U
Bromodichloromethane	0.5 U	0.09 J	2.5 U
1,2-Dichloropropane	0.5 U	0.5 U	2.5 U
trans-1,3-Dichloropropene	0.5 UJ	0.5 U	2.5 U
Trichloroethene	9.8	21	21
Dibromochloromethane	0.5 UJ	0.5 U	2.5 U
1,1,2-Trichloroethane	0.5 U	0.5 U	2.5 U
Benzene	0.33 J	0.8	2.5 U
cis-1,3-Dichloropropene	0.5 U	0.5 U	2.5 U
Bromoform	0.5 UJ	0.5 U	2.5 UJ
4-Methyl-2-pentanone	2 U	2 U	10 U
2-Hexanone	2 U	2 U	R
1,1,2,2-Tetrachloroethane	0.5 U	0.5 U	2.5 U
Tetrachloroethene	36	75 D	78
Toluene	0.5 U	0.5 U	2.5 U
Chlorobenzene	0.5 U	0.5 U	2.5 U
Ethylbenzene	0.5 U	0.5 U	2.5 U
Styrene	0.5 U	0.5 U	2.5 U
Xylenes (total)	0.5 U	0.5 U	2.5 U

Analyte concentrations in micrograms per liter (parts per billion [ppb]).

Analyses were performed by Cimic Corp. of Narragansett, RI, or Ensco-East of Somerset, NJ, using standard U.S. Environmental Protection Agency methodology.

- D Analyte identified at a secondary dilution.
 J Result is detected below the reporting limit and/or is an estimated concentration.
 U Compound or element analyzed for, but not detected at the corresponding reporting limit.
 n All reporting limits raised due to high levels of target analytes.
 R Result rejected.

Table 6. Concentrations of Volatile Organic Compounds in Ground-Water Samples Collected from September 1990 to September 1992 at the Tutu Wells Site, St. Thomas, U.S. Virgin Islands.

Analyte	Sample ID: Four Winds II	Four Winds II FR	Four Winds II	Four Winds II	Four Winds II	Four Winds II	Four Winds II
Date:	26-Sep-90	26-Sep-90	5-Feb-91	5-Jun-91	2-Oct-91	4-Feb-92	15-Sep-92
Chloromethane	5 UJ	5 UJ	2 U	1 UJ	5 U	2.5 UJ	2 Uu
Bromomethane	5 UJ	5 UJ	2 UJ	1 UJ	5 U	2.5 U	2 U
Vinyl chloride	5 UJ	5 UJ	2 UJ	1 UJ	5 U	2.5 U	2 U
Chloroethane	5 UJ	5 UJ	2 UJ	1 UJ	5 U	2.5 U	2 U
Methylene chloride	14 UJ	10 UJ	1 U	0.5 UJ	5 U	2.5 U	2.8 U
Acetone	R	R	R	R	20 U	10 U	8 UJ
Carbon disulfide	2 UJ	2 UJ	1 UJ	0.5 UJ	20 U	2.5 U	2 U
1,1-Dichloroethene	2 UJ	2 UJ	1 U	0.5 UJ	5 U	2.5 U	2 U
1,1-Dichloroethane	2 UJ	2 UJ	1 U	0.5 UJ	5 U	2.5 U	2 U
1,2-Dichloroethene (cis/trans)	75 J	61 J	230 D	130 DJ	190	130	99
Chloroform	2 UJ	2 UJ	1 U	0.5 UJ	5 U	0.5 J	1 J
1,2-Dichloroethane	2 UJ	2 UJ	1 U	0.5 UJ	5 U	2.5 U	2 U
2-Butanone	R	R	R	R	20 U	10 U	8 U
1,1,1-Trichloroethane	2 UJ	2 UJ	1 U	0.5 UJ	5 U	2.5 U	2 U
Carbon tetrachloride	2 UJ	2 UJ	1 U	0.5 UJ	5 U	2.5 U	2 U
Bromodichloromethane	2 UJ	2 UJ	1 U	0.5 UJ	5 U	2.5 U	2 U
1,2-Dichloropropane	2 UJ	2 UJ	1 U	0.5 UJ	5 U	2.5 U	2 U
cis-1,3-Dichloropropene	2 UJ	2 UJ	1 U	0.5 UJ	5 U	2.5 U	2 U
Trichloroethene	6 J	4 J	21	12 J	25	15	10
Dibromochloromethane	2 UJ	2 UJ	1 U	0.5 UJ	5 U	2.5 U	2 U
1,1,2-Trichloroethane	2 UJ	2 UJ	1 U	0.5 UJ	5 U	2.5 U	2 U
Benzene	2 UJ	2 UJ	1 UJ	0.5 UJ	5 U	2.7	2 U
trans-1,3-Dichloropropene	2 UJ	2 UJ	R	0.5 UJ	5 UJ	2.5 U	2 U
Bromoform	2 UJ	2 UJ	1 U	0.5 UJ	5 UJ	2.5 U	2 UJ
4-Methyl-2-pentanone	5 UJ	5 UJ	2 UJ	1 UJ	20 U	10 U	8 U
2-Hexanone	R	R	2 UJ	1 UJ	20 U	10 U	R
Tetrachloroethene	25 J	18 J	90 D	34 DJ	80	2.5 U	38
1,1,2,2-Tetrachloroethane	2 UJ	2 UJ	1 U	0.5 UJ	5 U	2.5 U	2 U
Toluene	2 UJ	2 UJ	1 UJ	0.5 UJ	5 U	2.5 U	2 U
Chlorobenzene	2 UJ	2 UJ	1 UJ	0.5 UJ	5 U	2.5 U	2 U
Ethylbenzene	2 UJ	2 UJ	1 UJ	0.5 UJ	5 U	2.5 U	2 U
Styrene	2 UJ	2 UJ	1 UJ	0.5 UJ	5 U	2.5 U	2 U
Xylenes (total)	2 UJ	2 UJ	1 UJ	0.5 UJ	5 U	0.4 J	2 U

Analyte concentrations in micrograms per liter (parts per billion [ppb]).

Analyses were performed by Ceimic Corp. of Narragansett, RI, or Enseco-East of Somerset, NJ, using standard U.S. Environmental Protection Agency methodology.

- U Analyte identified at a secondary dilution.
- J Result is detected below the reporting limit and/or is an estimated concentration.
- D Compound or element analyzed for, but not detected at the corresponding reporting limit.
- R All reporting limits raised due to high levels of other analytes.
- J All reporting limits raised due to high levels of target analytes.
- R Result rejected.
- R Field replicate of previous sample.

Table 6. Concentrations of Volatile Organic Compounds in Ground-Water Samples Collected from February 1991 to September 1992 at the Tutu Wells Site, St. Thomas, U.S. Virgin Islands.

Analyte	Sample ID: Gassett	Gassett	Gassett	Gassett	Gassett FR	Gassett	Gassett
Date:	5-Feb-91	4-Jun-91	1-Oct-91	4-Feb-92	4-Feb-92	27-May-92	15-Sep-92
Chloromethane	2 U	2 UJ	0.5 U	0.99	0.5 U	0.5 U	0.5 U
Bromomethane	2 U	1 UJ	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Vinyl chloride	2 U	1 UJ	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Chloroethane	R	1 UJ	0.5 U	0.5 U	0.5 UJ	0.5 U	0.5 U
Methylene chloride	1 U	2 UJ	0.5 U	0.5 U	0.5 U	0.5 U	0.52 U
Acetone	R	10 UJ	2 U	2 U	2 U	2 UJ	2 UJ
Carbon disulfide	1 UJ	0.5 UJ	2 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1-Dichloroethene	1 U	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1-Dichloroethane	1 U	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dichloroethene (cis/trans)	1 U	0.5 UJ	0.5 U	0.11 J	0.5 U	0.5 U	0.5 U
Chloroform	1 U	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dichloroethane	1 U	1 UJ	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
2-Butanone	R	R	2 U	2 U	2 U	2 U	2 U
1,1,1-Trichloroethane	1 U	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Carbon tetrachloride	1 U	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Bromodichloromethane	1 U	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dichloropropane	1 U	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
cis-1,3-Dichloropropene	R	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Trichloroethene	1	0.5 UJ	0.11 J	0.09 J	0.5 U	0.06 J	0.5 U
Dibromochloromethane	1 U	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1,2-Trichloroethane	1 U	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Benzene	1 U	0.5 UJ	0.5 U	0.06 J	0.07 J	0.5 U	0.5 U
trans-1,3-Dichloropropene	1 U	0.5 UJ	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U
Bromoform	1 U	0.5 UJ	0.5 UJ	0.5 U	0.5 U	0.5 UJ	0.5 UJ
4-Methyl-2-pentanone	2 UJ	1 UJ	2 U	2 U	2 U	2 U	2 U
2-Hexanone	2 UJ	1 UJ	2 U	2 U	2 U	R	R
Tetrachloroethene	1 U	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1,2,2-Tetrachloroethane	1 U	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Toluene	44 D	0.5 UJ	0.5 U	0.78 U	0.76 U	0.5 U	0.5 U
Chlorobenzene	1 U	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Ethylbenzene	1 U	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Styrene	1 U	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Xylenes (total)	1 U	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U

Analyte concentrations in micrograms per liter (parts per billion [ppb]).

Analyses were performed by Cimic Corp. of Narragansett, RI or Ensco-East of Somerset, NJ, using standard U.S. Environmental Protection Agency methodology.

D Analyte identified at a secondary dilution.

J Result is detected below the reporting limit and/or is an estimated concentration.

U Compound or element analyzed for, but not detected at the corresponding reporting limit.

R Result rejected.

FR Field replicate of previous sample

Table 6. Concentrations of Volatile Organic Compounds in Ground-Water Samples Collected from September 1990 to September 1992 at the Tutu Wells Site, St. Thomas, U.S. Virgin Islands.

Analyte	Sample ID: Harthman II	Harthman II	Harthman II	Harthman II	Harthman II	Harthman II FR	Harthman II
Date:	26-Sep-90	5-Feb-91	4-Jun-91	1-Oct-91	3-Feb-92	3-Feb-92	16-Sep-92
Chloromethane	2 UJ	2 U	1 UJ	0.5 U	0.5 U	0.5 U	0.5 U
Bromomethane	2 U	2 U	1 UJ	0.5 U	0.5 U	0.5 U	0.5 U
Vinyl chloride	2 U	2 U	1 UJ	0.5 U	0.5 U	0.5 U	0.5 U
Chloroethane	2 UJ	2 U	1 UJ	0.5 U	0.5 UJ	0.5 UJ	0.5 U
Methylene chloride	1 UJ	1 U	0.5 UJ	0.5 U	0.5 U	0.5 U	0.73 U
Acetone	R	R	R	2 U	2 U	2 U	2 UJ
Carbon disulfide	1 UJ	1 UJ	0.5 UJ	2 U	0.5 U	0.5 U	0.5 U
1,1-Dichloroethene	1 UJ	1 U	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U
1,1-Dichloroethane	1 UJ	1 U	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dichloroethene (cis/trans)	5 J	5 J	6 J	3.1	0.19 J	4.2	11
Chloroform	1 UJ	1 U	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dichloroethane	1 UJ	1 U	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U
2-Butanone	R	R	R	2 U	2 U	2 U	2 U
1,1,1-Trichloroethane	1 UJ	1 U	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U
Carbon tetrachloride	1 UJ	1 U	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U
Bromodichloromethane	1 U	1 U	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dichloropropane	1 UJ	1 U	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U
cis-1,3-Dichloropropene	1 UJ	R	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U
Trichloroethene	1 J	2	1 J	0.77	0.08 J	0.95	2.3
Dibromochloromethane	1 UJ	1 U	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U
1,1,2-Trichloroethane	1 UJ	1 U	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U
Benzene	1 UJ	1 U	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U
trans-1,3-Dichloropropene	1 UJ	1 U	0.5 UJ	0.5 UJ	0.5 U	0.5 U	0.5 U
Bromoform	1 UJ	1 U	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ
4-Methyl-2-pentanone	2 UJ	2 UJ	1 UJ	2 U	2 U	2 U	2 U
2-Hexanone	R	2 UJ	1 UJ	2 U	2 U	2 U	R
Tetrachloroethene	7 J	9	7 J	4.7	1.2	5.3	10
1,1,2,2-Tetrachloroethane	1 UJ	1 U	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U
Toluene	1 UJ	1 U	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U
Chlorobenzene	1 UJ	1 U	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U
Ethylbenzene	1 U	1 U	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U
Styrene	1 U	1 U	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U
Xylenes (total)	1 U	1 U	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U

Analyte concentrations in micrograms per liter (parts per billion [ppb]).

Analyses were performed by Cimic Corp. of Narragansett, RI, or Enseco-East of Somerset, NJ, using standard U.S. Environmental Protection Agency methodology.

J Result is detected below the reporting limit and/or is an estimated concentration.
 U Compound or element analyzed for, but not detected at the corresponding reporting limit.
 R Result rejected.

TUT 003 0392

Table 6. Concentrations of Volatile Organic Compounds in Ground-Water Samples Collected from September 1990 to September 1992 at the Tutu Wells Site, St. Thomas, U.S. Virgin Islands.

Analyte	Sample ID: Harvey	Harvey	Harvey	Harvey	Harvey	Harvey	Harvey
Date:	26-Sep-90	5-Feb-91	4-Jun-91	2-Oct-91	3-Feb-92	28-May-92	14-Sep-92
Chloromethane	100 U	200 U	1 U	0.5 U	0.5 U	6.2 u	5 Uu
Bromomethane	100 U	200 U	1 U	0.5 U	0.5 U	6.2 U	5 U
Vinyl chloride	100 UJ	200 U	3	2.1	2.2	6.2 U	5 U
Chloroethane	100 U	200 U	1 U	0.5 U	0.5 U	6.2 U	5 U
Methylene chloride	150 UJ	100 U	7 U	0.5 U	0.5 U	6.2 U	11 B
Acetone	R	200 U	R	2 U	2 U	25 U	28 BJ
Carbon disulfide	50 UJ	100 U	0.5 U	2 U	0.5 U	6.2 U	5 U
1,1-Dichloroethene	50 UJ	100 U	0.5 U	0.5 U	0.06 J	6.2 U	5 U
1,1-Dichloroethane	50 U	100 U	0.5 U	0.5 U	0.5 U	6.2 U	5 U
1,2-Dichloroethene (cis/trans)	50 UJ	160	80 DJ	38	39	41	49
Chloroform	50 U	100 U	0.5 U	0.15 J	0.1 J	6.2 U	5 U
1,2-Dichloroethane	50 UJ	100 U	0.5 U	0.5 U	0.5 U	6.2 U	5 U
2-Butanone	R	200 U	R	2 U	2 U	25 UJ	20 U
1,1,1-Trichloroethane	50 U	100 U	0.5 U	0.5 U	0.5 U	6.2 U	5 U
Carbon tetrachloride	50 U	100 U	0.5 UJ	0.5 U	0.5 U	6.2 U	5 U
Bromodichloromethane	50 UJ	100 U	0.5 U	0.5 U	0.5 U	6.2 U	5 U
1,2-Dichloropropane	50 U	100 U	0.5 U	0.5 U	0.5 U	6.2 U	5 U
cis-1,3-Dichloropropene	50 UJ	100 U	0.5 U	0.5 U	0.5 U	6.2 U	5 U
Trichloroethene	50 U	60 J	36 DJ	25	23	29	46
Dibromochloromethane	50 U	100 U	0.5 U	0.5 UJ	0.5 U	6.2 U	5 U
1,1,2-Trichloroethane	50 U	100 U	0.5 U	0.5 U	0.5 U	6.2 U	5 U
Benzene	50 U	100 U	0.5 UJ	0.5 U	0.5 U	6.2 U	5 U
trans-1,3-Dichloropropene	50 U	100 U	0.5 U	0.5 UJ	0.5 U	6.2 U	5 U
Bromoform	50 UJ	100 U	0.5 U	0.5 UJ	0.5 UJ	6.2 U	5 U
4-Methyl-2-pentanone	100 UJ	200 U	1 U	2 U	2 U	25 U	20 U
2-Hexanone	R	200 U	1 U	2 U	2 U	R	R
Tetrachloroethene	890 J	1500	530 DEJ	670 D	500 D	350	260
1,1,2,2-Tetrachloroethane	50 UJ	100 U	0.5 U	0.5 U	0.5 U	6.2 U	5 UJ
Toluene	50 U	100 U	0.5 UJ	0.5 U	0.06 J	6.2 U	5 U
Chlorobenzene	50 U	100 U	0.5 UJ	0.5 U	0.5 U	6.2 U	5 U
Ethylbenzene	50 U	100 U	0.5 UJ	0.5 U	0.5 U	6.2 U	5 U
Styrene	50 U	100 U	0.5 UJ	0.5 U	0.5 U	6.2 U	5 U
Nylenes (total)	50 UJ	100 U	0.5 UJ	0.5 U	0.5 U	6.2 U	5 U

Analyte concentrations in micrograms per liter (parts per billion [ppb]).

Analyses were performed by Ceimic Corp. of Narragansett, RI, or Enseco-East of Somerset, NJ, using standard U.S. Environmental Protection Agency methodology.

B Analyte is detected in the laboratory blank.

D Analyte identified at a secondary dilution.

J Concentration exceeds calibration range.

J Result is detected below the reporting limit and/or is an estimated concentration.

U Compound or element analyzed for, but not detected at the corresponding reporting limit.

U All reporting limits raised due to high levels of target analytes.

R Result rejected

Table 6. Concentrations of Volatile Organic Compounds in Ground-Water Samples Collected from October 1990 to September 1992 at the Tutu Wells Site, St. Thomas, U.S. Virgin Islands.

	Sample ID: LaPlace	LaPlace	LaPlace FR	LaPlace	LaPlace FR	LaPlace	LaPlace	LaPlace FR	LaPlace	LaPlace	
Analyte	Date:	2-Oct-90	5-Feb-91	5-Feb-91	6-Jun-91	6-Jun-91	3-Oct-91	6-Feb-92	6-Feb-92	28-May-92	17-Sep-92
Chloromethane	R	2 U	2 U	1 UJ	1 UJ	2.5 U	0.5 U	0.5 U	2 u	2 Uu	
Bromomethane	R	2 U	2 U	1 UJ	1 UJ	2.5 U	0.5 U	0.5 U	2 U	2 U	
Vinyl chloride	R	2 U	2 U	1 UJ	1 UJ	2.5 U	0.5 U	0.5 U	2 U	2 U	
Chloroethane	R	R	R	1 UJ	1 UJ	2.5 U	0.5 U	0.5 U	2 U	2 U	
Methylene chloride	R	1 U	1 U	3 UJ	1 UJ	4.6	0.5 U	0.5 U	2 U	6.9 U	
Acetone	R	R	R	R	R	10 U	2 U	2 U	8 U	8 UJ	
Carbon disulfide	R	1 UJ	1 UJ	0.5 UJ	0.5 UJ	2.2 J	0.5 U	1.9 U	2 U	2 U	
1,1-Dichloroethene	R	1 U	1 U	0.5 U	0.5 UJ	2.5 U	0.5 U	0.5 U	2 U	2 U	
1,1-Dichloroethane	R	1 U	1 U	0.5 U	0.5 UJ	2.5 U	0.06 J	0.07 J	2 U	2 U	
1,2-Dichloroethene (cis/trans)	140 J	200 D	190 D	250 DEJ	170 DJ	170 D	140 D	140 D	100	130	
Chloroform	R	1	1 U	2	0.8 J	0.6 J	0.4 J	0.41 J	0.44 J	1.4 J	
1,2-Dichloroethane	R	1 U	1 U	0.5 U	0.5 UJ	2.5 U	0.5 U	0.5 U	2 U	2 U	
2-Butanone	R	R	R	R	R	10 U	2 U	2 U	8 UJ	8 U	
1,1,1-Trichloroethane	R	1 U	1 U	0.5 U	0.5 UJ	2.5 U	0.5 U	0.5 U	2 U	2 U	
Carbon tetrachloride	R	1 U	1 U	0.5 UJ	0.5 UJ	2.5 U	0.5 U	0.5 U	2 U	2 U	
Bromodichloromethane	R	1 U	1 U	0.5 U	0.5 UJ	2.5 U	0.5 U	0.5 U	2 U	2 U	
1,2-Dichloropropane	R	1 U	1 U	0.5 U	0.5 UJ	2.5 U	0.5 U	0.5 U	2 U	2 U	
cis-1,3-Dichloropropene	R	R	R	0.5 U	0.5 UJ	2.5 U	0.5 U	0.5 U	2 U	2 U	
Trichloroethene	24 J	32	31	31 D	32 J	30	23	23	19	22	
Dibromochloromethane	R	1 U	1 U	0.5 U	0.5 UJ	2.5 U	0.5 U	0.5 U	2 U	2 U	
1,1,2-Trichloroethane	R	1 U	1 U	5	0.5 UJ	2.5 U	0.5 U	0.5 U	2 U	2 U	
Benzene	R	1 U	1 U	0.5 U	0.5 UJ	2.5 U	0.15 J	0.14 J	2 U	0.29 J	
trans-1,3-Dichloropropene	R	1 U	1 U	0.5 U	0.5 UJ	2.5 UJ	0.5 U	0.5 U	2 U	2 U	
Bromoform	R	1 U	1 U	0.5 UJ	0.5 UJ	2.5 UJ	0.5 U	0.5 U	2 U	2 U	
4-Methyl-2-pentanone	R	2 UJ	2 UJ	1 U	1 UJ	10 U	2 U	2 U	8 U	8 U	
2-Hexanone	R	2 UJ	2 UJ	1 U	1 UJ	10 U	2 U	2 U	R	R	
Tetrachloroethene	98 J	110 D	100 D	88 DJ	64 DJ	100 D	84 D	81 D	60	67	
1,1,2,2-Tetrachloroethane	R	1 U	1 U	0.5 U	0.5 UJ	2.5 U	0.5 U	0.5 U	2 U	2 U	
Toluene	R	1 U	1 U	4 UJ	3 UJ	2.5 U	0.11 J	0.5 U	2 U	0.63 UJ	
Chlorobenzene	R	1 U	1 U	0.5 UJ	0.5 UJ	2.5 U	0.5 U	0.5 U	2 U	2 UJ	
Ethylbenzene	R	1 U	1 U	0.5 UJ	0.5 UJ	2.5 U	0.5 U	0.5 U	2 U	2 UJ	
Styrene	R	1 U	1 U	0.5 UJ	0.5 UJ	2.5 U	0.5 U	0.5 U	2 U	2 U	
Nylenes (total)	R	1 U	1 U	0.5 UJ	0.5 UJ	2.5 U	0.5 U	0.5 U	2 U	0.85 J	

Analyte concentrations in micrograms per liter (parts per billion [ppb]).

Analyses were performed by Ceimic Corp. of Narragansett, RI, or Enseco-East of Somerset, NJ, using standard U.S. Environmental Protection Agency methodology.

D Analyte identified at a secondary dilution.

E Concentration exceeds calibration range.

J Result is detected below the reporting limit and/or is an estimated concentration.

U Compound or element analyzed for, but not detected at the corresponding reporting limit.

R All reporting limits raised due to high levels of target analytes.

R Result rejected.

R Field replicate of previous sample.

Table 6. Concentrations of Volatile Organic Compounds in Ground-Water Samples Collected from October 1990 to September 1992 at the Tutu Wells Site, St. Thomas, U.S. Virgin Islands.

Analyte	Sample ID: Ramsay	Ramsay	Ramsay	Ramsay	Ramsay	Ramsay	Ramsay	Ramsay FR
Date:	1-Oct-90	5-Feb-91	5-Jun-91	1-Oct-91	4-Feb-92	28-May-92	15-Sep-92	15-Sep-92
Chloromethane	4 UJ	2 UJ	2 UJ	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Bromomethane	4 UJ	R	R	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Vinyl chloride	4 UJ	R	R	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Chloroethane	4 UJ	R	R	0.5 U	0.5 UJ	0.5 U	0.5 U	0.5 U
Methylene chloride	17 UJ	1 U	R	0.5 U	0.5 U	0.5 U	0.5 U	0.52 U
Acetone	R	R	15 J	2 U	2 U	2 UJ	2 UJ	2 UJ
Carbon disulfide	2 UJ	1 UJ	R	2 U	2 U	0.5 U	0.15 J	0.5 U
1,1-Dichloroethene	2 UJ	1 U	R	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1-Dichloroethane	2 UJ	1 U	R	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dichloroethene (cis/trans)	2 UJ	1 J	2 J	2.8	17	9.5	1.4	1.4
Chloroform	2 UJ	1 U	1 J	1.1	1.1	1.3	2.9	2.8
1,2-Dichloroethane	2 UJ	1 U	1 UJ	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
2-Butanone	R	R	R	2 U	2 U	2 U	2 U	2 U
1,1,1-Trichloroethane	2 UJ	1 U	R	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Carbon tetrachloride	2 UJ	1 U	R	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Bromodichloromethane	2 UJ	1 U	R	0.39 J	0.5	0.44 J	0.98	0.89
1,2-Dichloropropane	2 UJ	1 U	R	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
cis-1,3-Dichloropropene	2 UJ	R	R	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Trichloroethene	2 UJ	1	R	1.6	3.7	2.4	0.94	0.89
Dibromochloromethane	2 UJ	1 U	R	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1,2-Trichloroethane	2 UJ	1 U	R	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Benzene	2 UJ	1 U	R	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
trans-1,3-Dichloropropene	2 UJ	1 U	R	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U
Bromoform	2 UJ	1 U	R	0.5 UJ	0.5 U	0.5 UJ	0.5 UJ	0.5 UJ
4-Methyl-2-pentanone	4 UJ	2 UJ	R	2 U	2 U	2 U	2 U	2 U
2-Hexanone	R	R	R	2 U	2 U	R	R	R
Tetrachloroethene	3 J	16	16	19	23	20	16	16
1,1,2,2-Tetrachloroethane	2 UJ	1 U	R	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Toluene	2 UJ	1 U	R	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Chlorobenzene	2 UJ	1 U	R	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Ethylbenzene	2 UJ	1 U	R	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Styrene	2 UJ	1 U	R	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Xylenes (total)	2 UJ	1 U	R	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U

Analyte concentrations in micrograms per liter (parts per billion [ppb]).

Analyses were performed by Cimic Corp. of Narragansett, RI, or Enesco-East of Somerset, NJ, using standard U.S. Environmental Protection Agency methodology.

- J Result is detected below the reporting limit and/or is an estimated concentration.
 U Compound or element analyzed for, but not detected at the corresponding reporting limit.
 R Result rejected.
 FR Field replicate of previous sample.

Table 6. Concentrations of Volatile Organic Compounds in Ground-Water Samples Collected from September 1990 to September 1992 at the Tutu Wells Site, St. Thomas, U.S. Virgin Islands.

Analyte	Sample ID: Smith	Smith	Smith	Smith	Smith	Smith	Smith FR	Smith
Date:	25-Sep-90	5-Feb-91	6-Jun-91	3-Oct-91	5-Feb-92	28-May-92	28-May-92	16-Sep-92
Chloromethane	25 U	2 UJ	1 UJ	0.5 U	0.5 U	2.5 u	0.5 U	2.5 Uu
Bromomethane	25 U	R	1 UJ	0.5 U	0.5 U	2.5 U	0.5 U	2.5 U
Vinyl chloride	25 U	R	1 UJ	0.5 U	0.5 U	2.5 U	0.5 U	2.5 U
Chloroethane	25 U	R	1 UJ	0.5 U	0.5 UJ	2.5 U	0.5 U	2.5 U
Methylene chloride	12 UJ	1 U	1 UJ	0.5 U	0.5 U	2.5 U	0.5 U	5 U
Acetone	25 UJ	R	R	2 U	2 U	10 U	2 UJ	10 UJ
Carbon disulfide	12 UJ	1 UJ	0.5 UJ	2 U	0.5 U	2.5 U	0.5 U	2.5 U
1,1-Dichloroethene	12 UJ	1 U	0.5 UJ	0.5 U	0.5 U	2.5 U	0.5 U	2.5 U
1,1-Dichloroethane	12 U	1 U	0.5 UJ	0.06 J	0.06 J	2.5 U	0.5 U	2.5 U
1,2-Dichloroethene (cis/trans)	58	42 J	62 D	56 D	48 D	40	37	60
Chloroform	12 U	1 U	0.5 UJ	0.35 J	0.32 J	2.5 U	0.2 J	0.5 U
1,2-Dichloroethane	12 UJ	1 U	0.5 UJ	0.5 U	0.5 U	2.5 U	0.5 U	2.5 U
2-Butanone	25 UJ	R	R	2 U	2 U	10 UJ	2 U	10 U
1,1,1-Trichloroethane	12 U	1 U	0.5 UJ	0.5 U	0.5 U	2.5 U	0.5 U	2.5 U
Carbon tetrachloride	12 U	1 U	0.5 UJ	0.5 U	0.5 U	2.5 U	0.5 U	2.5 U
Bromodichloromethane	12 U	1 U	0.5 UJ	0.5 U	0.5 U	2.5 U	0.5 U	2.5 U
1,2-Dichloropropane	12 U	1 U	0.5 UJ	0.5 U	0.5 U	2.5 U	0.5 U	2.5 U
cis-1,3-Dichloropropene	12 U	1 U	0.5 UJ	0.5 U	0.5 U	2.5 U	0.5 U	2.5 U
Trichloroethene	20	23	26	20	21	15	14	21
Dibromochloromethane	12 U	1 U	0.5 UJ	0.5 UJ	0.5 U	2.5 U	0.5 U	2.5 U
1,1,2-Trichloroethane	12 U	5	0.5 UJ	0.5 U	0.5 U	2.5 U	0.5 U	2.5 U
Benzene	12 U	1 U	0.5 UJ	0.1 J	0.07 J	2.5 U	0.5 U	2.5 U
trans-1,3-Dichloropropene	R	R	0.5 UJ	0.5 UJ	0.5 U	2.5 U	0.5 U	2.5 U
Bromoform	12 UJ	1 U	0.5 UJ	0.5 UJ	0.5 U	2.5 U	0.5 UJ	2.5 U
4-Methyl-2-pentanone	25 UJ	2 UJ	1 UJ	2 U	2 U	10 U	2 U	10 U
2-Hexanone	25 UJ	2 UJ	1 UJ	2 U	2 U	R	R	R
Tetrachloroethene	330 J	160 J	190 D	250 D	230 D	140	150 D	170
1,1,2,2-Tetrachloroethane	12 UJ	1 U	0.5 UJ	0.5 U	0.5 U	2.5 U	0.5 U	2.5 UJ
Toluene	12 U	1 U	0.5 UJ	0.5 U	0.05 J	2.5 U	0.5 U	2.5 U
Chlorobenzene	12 U	1 U	0.5 UJ	0.5 U	0.5 U	2.5 U	0.5 U	2.5 U
Ethylbenzene	12 U	1 U	0.5 UJ	0.5 U	0.5 U	2.5 U	0.5 U	2.5 U
Styrene	12 U	1 UJ	0.5 UJ	0.5 U	0.5 U	2.5 U	0.5 U	2.5 U
Xylenes (total)	12 U	1 UJ	0.5 UJ	0.5 U	0.5 U	2.5 U	0.5 U	2.5 U

Analyte concentrations in micrograms per liter (parts per billion [ppb]).

Analyses were performed by Ceimic Corp. of Narragansett, RI or Enseco-East of Somerset, NJ, using standard U.S. Environmental Protection Agency methodology.

- (D) Analyte identified at a secondary dilution.
 (J) Result is detected below the reporting limit and/or is an estimated concentration.
 (J) Compound or element analyzed for, but not detected at the corresponding reporting limit.
 (J) All reporting limits raised due to high levels of target analytes.
 (J) Result rejected.
 (R) Field replicate of previous sample.

Table 6. Concentrations of Volatile Organic Compounds in Ground-Water Samples Collected from September 1990 to September 1992 at the Tutu Wells Site, St. Thomas, U.S. Virgin Islands.

Analyte	Sample ID: Steele	Steele	Steele	Steele	Steele	Steele	Steele
Date:	25-Sep-90	5-Feb-91	5-Jun-91	1-Oct-91	4-Feb-92	27-May-92	14-Sep-92
Chloromethane	17 UJ	10 U	1 UJ	0.5 U	2.5 Uj	1.2 U	2 Uu
Bromomethane	17 UJ	10 U	1 U	0.5 U	2.5 U	1.2 U	2 U
Vinyl chloride	17 UJ	10 U	4	2.5	1.4 J	2	3.3
Chloroethane	17 UJ	10 U	1 UJ	0.5 U	2.5 U	1.2 U	2 U
Methylene chloride	140 UJ	5 U	0.5 UJ	0.5 U	2.5 U	1.2 U	3.7 U
Acetone	R	10 U	R	2 U	10 UJ	R	8 UJ
Carbon disulfide	8 UJ	5 U	0.5 U	2 U	2.5 U	1.2 U	2 U
1,1-Dichloroethene	8 UJ	5 U	0.5 U	0.12 J	2.5 U	1.2 U	2 U
1,1-Dichloroethane	8 U	5 U	0.5 U	0.11 J	2.5 U	1.2 U	2 U
1,2-Dichloroethene (cis/trans)	120	44	180 DJ	150 D	110	150 D	140
Chloroform	8 UJ	5 U	0.5 U	0.5 U	2.5 U	1.2 U	2 U
1,2-Dichloroethane	8 UJ	5 U	0.5 U	0.5 U	2.5 U	1.2 U	2 U
2-Butanone	R	10 U	R	2 U	10 U	5 U	8 U
1,1,1-Trichloroethane	8 UJ	5 U	0.5 U	0.5 U	2.5 U	1.2 U	2 U
Carbon tetrachloride	8 U	5 U	0.5 U	0.5 U	2.5 U	1.2 U	2 U
Bromodichloromethane	8 U	5 U	0.5 U	0.5 U	2.5 U	1.2 U	2 U
1,2-Dichloropropane	8 U	5 U	0.5 U	0.5 U	2.5 U	1.2 U	2 U
cis-1,3-Dichloropropene	8 UJ	5 U	0.5 U	0.5 U	2.5 U	1.2 U	2 U
Trichloroethene	48	12	42 DJ	29	29	27	33
Dibromochloromethane	8 U	5 U	0.5 U	0.5 UJ	2.5 U	1.2 U	2 U
1,1,2-Trichloroethane	8 U	5 U	0.5 U	0.5 U	2.5 U	1.2 U	2 U
Benzene	8 U	5 U	0.5 U	0.08 J	2.5 U	1.2 U	2 U
trans-1,3-Dichloropropene	8 UJ	5 U	0.5 U	0.5 UJ	2.5 U	1.2 U	2 U
Bromoform	8 UJ	5 U	0.5 U	0.5 UJ	2.5 U	1.2 UJ	2 U
4-Methyl-2-pentanone	17 UJ	10 U	1 U	2 U	10 U	5 U	8 U
2-Hexanone	R	10 U	1 U	2 U	10 U	R	R
Tetrachloroethene	130 J	65	150 DJ	54 D	55	40	65
1,1,2,2-Tetrachloroethane	8 UJ	5 U	0.5 U	0.5 U	2.5 U	1.2 U	2 UJ
Toluene	8 U	5 U	0.5 UJ	0.5 U	2.5 U	1.2 U	2 U
Chlorobenzene	8 U	5 U	0.5 UJ	0.13 J	2.5 U	1.2 U	2 U
Ethylbenzene	8 U	5 U	0.5 UJ	0.5 U	2.5 U	1.2 U	2 U
Styrene	8 UJ	5 U	0.5 UJ	0.5 U	2.5 U	1.2 U	2 U
Xylenes (total)	8 UJ	5 U	0.5 UJ	0.5 U	2.5 U	1.2 U	2 U

Analyte concentrations in micrograms per liter (parts per billion [ppb]).

Analyses were performed by Ceimic Corp. of Narragansett, RI, or Enseco-East of Somerset, NJ, using standard U.S. Environmental Protection Agency methodology.

- D) Analyte identified at a secondary dilution.
 J) Result is detected below the reporting limit and/or is an estimated concentration.
 U) Compound or element analyzed for, but not detected at the corresponding reporting limit.
 : All reporting limits raised due to high levels of other analytes.
 : All reporting limits raised due to high levels of target analytes.
 R) Result rejected.

Table 6. Concentrations of Volatile Organic Compounds in Ground-Water Samples Collected from October 1990 to September 1992 at the Tutu Wells Site, St. Thomas, U.S. Virgin Islands.

Analyte	Sample ID: Tillett	Tillett FR	Tillett	Tillett	Tillett	Tillett FR	Tillett	Tillett	Tillett
Date:	2-Oct-90	2-Oct-90	5-Feb-91	5-Jun-91	2-Oct-91	2-Oct-91	5-Feb-92	29-May-92	16-Sep-92
Chloromethane	R	R	2 U	1 U	2.5 U	0.5 U	0.5 U	2.5 U	5 Uu
Bromomethane	R	R	2 U	1 U	2.5 U	0.5 U	0.5 U	2.5 U	5 U
Vinyl chloride	17 J	12 J	7	5	17 J	11 J	0.5 U	3.2	5 U
Chloroethane	R	R	2 U	1 U	2.5 U	0.5 U	0.5 U	2.5 U	5 U
Methylene chloride	R	R	1 U	5 U	2.5 U	0.5 U	0.5 U	2.5 U	16 B
Acetone	R	R	R	R	10 U	2 U	2 U	10 U	85 BJ
Carbon disulfide	R	R	1 UJ	0.5 U	10 U	2 U	0.5 U	2.5 UJ	5 U
1,1-Dichloroethene	R	R	1 U	0.5 U	2.5 U	0.5 U	0.5 U	2.5 U	5 U
1,1-Dichloroethane	R	R	1 U	0.5 U	2.5 U	0.5 U	0.5 U	2.5 U	5 U
1,2-Dichloroethene (cis/trans)	280 J	270 J	200 D	400 DEJ	150	140 D	23	470 DJ	290
Chloroform	R	R	1 U	0.9	2.5 U	0.5 U	5.3	1.2 J	3.6 J
1,2-Dichloroethane	R	R	1 U	0.5 U	2.5 U	0.5 U	0.5 U	2.5 U	5 U
2-Butanone	R	R	R	R	10 U	2 U	2 U	10 U	20 U
1,1,1-Trichloroethane	R	R	1 U	0.5 U	2.5 U	0.5 U	0.5 U	2.5 U	5 U
Carbon tetrachloride	R	R	1 U	0.5 UJ	2.5 U	0.5 U	0.5 U	2.5 U	5 U
Bromodichloromethane	R	R	1 U	0.5 U	2.5 U	0.5 U	0.5 U	2.5 U	5 U
1,2-Dichloropropane	R	R	1 U	0.5 U	2.5 U	0.5 U	0.5 U	2.5 U	5 U
cis-1,3-Dichloropropene	R	R	R	0.5 U	2.5 U	0.5 U	0.5 U	2.5 U	5 U
Trichloroethene	56 J	47 J	36	72 DJ	38	35	6.3	59	62
Dibromochloromethane	R	R	1 U	0.5 U	2.5 U	0.5 UJ	0.5 U	2.5 U	5 U
1,1,2-Trichloroethane	R	R	1 U	4	2.5 U	0.5 U	0.5 U	2.5 U	5 U
Benzene	32 J	26 J	27	3 J	71 J	58 DJ	1.7	0.8 J	7
trans-1,3-Dichloropropene	R	R	1 U	0.5 U	2.5 UJ	0.5 UJ	0.5 U	2.5 U	5 U
Bromoform	R	R	1 U	0.5 U	2.5 UJ	0.5 UJ	0.5 U	2.5 U	5 U
4-Methyl-2-pentanone	R	R	2 UJ	1 U	10 U	2 U	2 U	R	20 U
2-Hexanone	R	R	2 UJ	1 U	10 U	2 U	2 U	R	R
Tetrachloroethene	120 J	98 J	100 D	180 DJ	66	63 D	23	200	140
1,1,2,2-Tetrachloroethane	R	R	1 U	0.5 U	2.5 U	0.5 U	0.5 U	2.5 U	5 UJ
Toluene	R	R	1	0.8 J	3 J	2.1 J	0.05 J	2.5 U	0.5 J
Chlorobenzene	R	R	1 U	0.5 UJ	2.5 U	0.2 J	0.5 U	2.5 U	5 U
Ethylbenzene	R	R	1	0.5 UJ	17	14	0.5 U	2.5 U	1.5 J
Styrene	R	R	1 U	0.5 UJ	2.5 U	0.5 U	0.5 U	2.5 U	5 U
Xylenes (total)	R	R	1 U	0.5 UJ	3.6 J	2.7 J	0.5 U	2.5 U	5 U

Analyte concentrations in micrograms per liter (parts per billion [ppb]).

Analyses were performed by Cimic Corp. of Narragansett, RI or Enseco-East of Somerset, NJ, using standard U.S. Environmental Protection Agency methodology.

B Analyte is detected in the laboratory blank.

D Analyte identified at a secondary dilution.

E Concentration exceeds calibration range.

J Result is detected below the reporting limit and/or is an estimated concentration.

U Compound or element analyzed for, but not detected at the corresponding reporting limit.

U All reporting limits raised due to high levels of target analytes.

R Result rejected.

FR Field sample.

TUT 003 037B

Table 6. Concentrations of Volatile Organic Compounds in Ground-Water Samples Collected from June 1991 to September 1992 at the Tutu Wells Site, St. Thomas, U.S. Virgin Islands.

Analyte	Sample ID: Equipment Blank	Equipment Blank	Equipment Blank	Field Blank
Date:	4-Jun-91	4-Feb-92	27-May-92	15-Sep-92
Chloromethane	1 UJ	0.5 U	0.5 U	0.5 U
Bromomethane	1 UJ	0.5 U	0.5 U	0.5 U
Vinyl chloride	1 UJ	0.5 U	0.5 U	0.5 U
Chloroethane	1 UJ	0.5 UJ	0.5 U	0.5 U
Methylene chloride	1 J	7	12	0.44 JB
Acetone	7 J	7.6	2 UJ	2 UJ
Carbon disulfide	0.5 UJ	0.5 U	0.5 U	0.096 J
1,1-Dichloroethene	0.5 UJ	0.5 U	0.5 U	0.5 U
1,1-Dichloroethane	0.5 UJ	0.5 U	0.5 U	0.5 U
1,2-Dichloroethene (cis/trans)	0.5 UJ	0.5 U	0.5 U	0.5 U
Chloroform	43 UJ	0.5 U	0.5 U	0.11 J
1,2-Dichloroethane	1 J	0.5 U	0.5 U	0.5 U
2-Butanone	R	2 U	2 U	2 U
1,1,1-Trichloroethane	0.5 UJ	0.5 U	0.5 U	0.5 U
Carbon tetrachloride	0.5 UJ	0.5 U	0.5 U	0.5 U
Bromodichloromethane	14 UJ	0.5 U	0.5 U	0.5 U
1,2-Dichloropropane	0.5 UJ	0.5 U	0.5 U	0.5 U
cis-1,3-Dichloropropene	0.5 UJ	0.5 U	0.5 U	0.5 U
Trichloroethene	0.5 UJ	0.5 U	0.5 U	0.5 U
Dibromochloromethane	4 UJ	0.5 U	0.5 U	0.5 U
1,1,2-Trichloroethane	0.5 UJ	0.5 U	0.5 U	0.5 U
Benzene	0.5 UJ	0.5 U	0.5 U	0.5 U
trans-1,3-Dichloropropene	0.5 UJ	0.5 U	0.5 U	0.5 U
Bromoform	0.5 UJ	0.5 U	0.5 UJ	0.5 U
4-Methyl-2-pentanone	1 UJ	2 U	2 U	2 U
2-Hexanone	1 UJ	2 U	R	R
Tetrachloroethene	0.5 UJ	0.5 U	0.5 U	0.5 U
1,1,2,2-Tetrachloroethane	0.5 UJ	0.5 U	0.5 U	0.5 UJ
Toluene	0.5 UJ	0.5 U	0.5 U	0.5 U
Chlorobenzene	0.5 UJ	0.5 U	0.5 U	0.5 U
Ethylbenzene	0.5 UJ	0.5 U	0.5 U	0.5 U
Styrene	0.5 UJ	0.5 U	0.5 U	0.5 U
Xylenes (total)	0.5 UJ	0.1 J	0.5 U	0.5 U

Analyte concentrations in micrograms per liter (parts per billion [ppb]).

Analyses were performed by Ceimic Corp. of Narragansett, RI, or Enseco-East of Somerset, NJ, using standard U.S. Environmental Protection Agency methodology.

- B Analyte is detected in the laboratory blank.
 J Result is detected below the reporting limit and/or is an estimated concentration.
 U Compound or element analyzed for, but not detected at the corresponding reporting limit.
 R Result rejected.

Table 6. Concentrations of Volatile Organic Compounds in Ground-Water Samples Collected from September 1990 to September 1992 at the Tutu Wells Site, St. Thomas, U.S. Virgin Islands.

Analyte	Sample ID: Trip Blank	Trip Blank	Trip Blank	Trip Blank	Trip Blank	Trip Blank	Trip Blank	Trip Blank	Trip Blank	Trip Blank	Trip Blank	Trip Blank	Trip Blank
Date:	24-Sep-90	25-Sep-90	26-Sep-90	27-Sep-90	1-Oct-90	2-Oct-90	3-Oct-90	4-Feb-91	5-Feb-91	6-Feb-91	7-Feb-91	4-Jun-91	5-Jun-91
Chloromethane	2 U	2 U	2 UJ	2 UJ	2 UJ	2 UJ	2 UJ	2 UJ	2 UJ	1 J	1 J	9 J	2 J
Bromomethane	2 U	2 U	2 UJ	2 UJ	2 UJ	2 UJ	2 UJ	R	R	2 U	2 U	1 UJ	1 UJ
Vinyl chloride	2 U	2 U	2 UJ	2 UJ	2 UJ	2 UJ	2 UJ	R	R	2 U	2 U	1 UJ	1 UJ
Chloroethane	2 U	2 U	2 UJ	2 UJ	2 UJ	2 UJ	2 UJ	R	R	2 U	2 U	1 UJ	1 UJ
Methylene chloride	25 J	34 J	24 J	16 J	13 J	14 J	1 UJ	2	3	2	2	0.8 J	1 UJ
Acetone	12 J	42 J	4 J	R	6 J	7 J	R	R	R	R	R	11 J	R
Carbon disulfide	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	0.5 UJ	0.5 UJ
1,1-Dichloroethene	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 U	1 U	1 U	1 U	0.5 U	0.5 UJ
1,1-Dichloroethane	1 UJ	1 UJ	1 U	1 U	1 UJ	1 UJ	1 UJ	1 U	1 U	1 U	1 U	0.5 U	0.5 UJ
1,2-Dichloroethene (cis/trans)	1 UJ	1 UJ	1 U	1 U	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 U	1 U	0.5 U	0.5 UJ
Chloroform	1 UJ	1 UJ	1 UJ	1 U	1 UJ	1 UJ	1 UJ	1 U	1 U	1 U	1 U	0.5 U	0.5 UJ
1,2-Dichloroethane	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 U	1 U	2	1 J
2-Butanone	R	R	R	R	R	R	R	R	R	R	R	R	R
1,1,1-Trichloroethane	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 U	1 U	0.5 U	0.5 UJ
Carbon tetrachloride	1 UJ	1 UJ	1 U	1 U	1 UJ	1 UJ	1 UJ	1 U	1 U	1 U	1 U	0.5 UJ	0.5 UJ
Bromodichloromethane	1 U	1 U	1 U	1 U	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 U	1 U	0.5 U	0.5 UJ
1,2-Dichloropropane	1 UJ	1 UJ	1 U	1 U	1 UJ	1 UJ	1 UJ	1 U	1 U	1 U	1 U	0.5 U	0.5 UJ
cis-1,3-Dichloropropene	1 U	1 U	1 UJ	1 U	1 UJ	1 UJ	1 UJ	1 U	1 U	R	R	0.5 U	0.5 UJ
Trichloroethene	1 UJ	1 UJ	1 U	1 U	1 UJ	1 UJ	1 UJ	1 U	1 U	1 U	1 U	0.5 U	0.5 UJ
Dibromochloromethane	1 UJ	1 UJ	1 U	1 U	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 U	1 U	0.5 U	0.5 UJ
1,1,2-Trichloroethane	1 UJ	1 UJ	1 U	1 UJ	1 UJ	1 UJ	1 UJ	1 U	1 U	1 U	1 U	0.5 U	0.5 UJ
Benzene	1 UJ	1 UJ	1 U	1 U	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 U	1 U	0.5 U	0.5 UJ
trans-1,3-Dichloropropene	1 UJ	1 UJ	1 UJ	1 UJ	R	R	1 UJ	R	R	1 U	1 U	0.5 U	0.5 UJ
Bromoform	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	R	R	1 U	1 U	0.5 UJ	0.5 UJ
4-Methyl-2-pentanone	2 UJ	2 UJ	1 UJ	2 UJ	2 UJ	2 UJ	2 UJ	2 UJ	2 U	2 U	2 U	1 U	1 UJ
2-Hexanone	R	R	R	R	R	R	R	2 UJ	2 UJ	2 UJ	2 UJ	1 U	1 UJ
Tetrachloroethene	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 U	1 U	1 U	1 U	0.5 U	0.5 UJ
1,1,2,2-Tetrachloroethane	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	R	R	1 U	1 U	0.5 U	0.5 UJ
Toluene	1 U	1 J	1 U	1 U	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 U	1 U	2	0.5 UJ
Chlorobenzene	1 UJ	1 UJ	1 U	1 U	1 UJ	1 UJ	1 UJ	1 U	1 U	1 U	1 U	0.5 U	5 UJ
Ethylbenzene	1 U	1 U	1 U	1 U	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 U	1 U	0.5 U	0.5 UJ
Styrene	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 U	1 U	0.5 U	0.5 UJ
Xylenes (total)	8	7	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 U	1 U	0.5 U	0.5 UJ

Analyte concentrations in micrograms per liter (parts per billion [ppb]).

Analyses were performed by Ceimic Corp. of Narragansett, RI, or Ensoco-East of Somerset, NJ, using standard U.S. Environmental Protection Agency methodology.

- B Analyte is detected in the laboratory blank.
 J Result is detected below the reporting limit and/or is an estimated concentration.
 U Compound or element analyzed for, but not detected at the corresponding reporting limit.
 R Result rejected

Table 6. Concentrations of Volatile Organic Compounds in Ground-Water Samples Collected from September 1990 to September 1992 at the Tutu Wells Site, St. Thomas, U.S. Virgin Islands.

Analyte	Date:	6-Jun-91	1-Oct-91	2-Oct-91	3-Oct-91	3-Feb-92	4-Feb-92	5-Feb-92	6-Feb-92	27-May-92	28-May-92	29-May-92	14-Sep-92	15-Sep-92
Chloromethane	6 J	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U	R
Bromomethane	1 UJ	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	R
Vinyl chloride	1 UJ	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	R
Chloroethane	1 UJ	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	R
Methylene chloride	0.9 J	0.5 U	0.6	0.17 J	0.29 J	0.33 J	0.29 J	0.33 J	1	0.46 J	1.1 U	0.73 B	0.65 BJ	
Acetone	8 J	2 U	3.2	2 U	2 U	2 U	2 U	2 U	2 UJ	2 UJ	2 U	2 UJ	2 UJ	R
Carbon disulfide	0.5 UJ	0.21 J	1.4 J	0.25 J	0.57	0.23 J	1.8	1	0.5 U	0.5 U	0.5 UJ	0.5 U	0.5 U	R
1,1-Dichloroethene	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	R
1,1-Dichloroethane	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	R
1,2-Dichloroethene (cis/trans)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	R
Chloroform	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	R
1,2-Dichloroethane	2	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	R
2-Butanone	R	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	R
1,1,1-Trichloroethane	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	R
Carbon tetrachloride	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	R
Bromodichloromethane	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	R
1,2-Dichloropropane	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	R
cis-1,3-Dichloropropene	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	R
Trichloroethene	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	R
Dibromochloromethane	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	R
1,1,2-Trichloroethane	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	R
Benzene	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	R
trans-1,3-Dichloropropene	0.5 U	0.5 UJ	0.5 UJ	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	R
Bromoform	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 U	0.5 U	0.5 UJ	0.5 UJ	0.5 UJ	0.5 U	0.5 U	R
4-Methyl-2-pentanone	1 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	R	2 U	2 U	R
2-Hexanone	0.8 J	2 U	2 U	2 U	2 U	2 U	2 U	2 U	R	R	R	R	R	R
Tetrachloroethene	0.5 U	0.5 U	0.1 J	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	R
1,1,2,2-Tetrachloroethane	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 UJ	R
Toluene	2	0.1 J	0.5 U	0.5 U	0.5 U	0.5 U	0.05 J	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	R
Chlorobenzene	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	R
Ethylbenzene	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	R
Styrene	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	R
Xylenes (total)	0.5 U	0.28 J	0.11 J	0.25 J	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	R

Analyte concentrations in micrograms per liter (parts per billion [ppb]).

Analyses were performed by Ceimic Corp. of Narragansett, RI, or Ensco-East of Somerset, NJ, using standard U.S. Environmental Protection Agency methodology.

B Analyte is detected in the laboratory blank.

J Result is detected below the reporting limit and/or is an estimated concentration.

U Compound or element analyzed for, but not detected at the corresponding reporting limit.

R Result rejected.

Table 6. Concentrations of Volatile Organic Compounds in Ground-Water Samples Collected from September 1990 to September 1992 at the Tutu Wells Site, St. Thomas, U.S. Virgin Islands.

Sample ID: Trip Blank Trip Blank			
Analyte	Date:	16-Sep-92	17-Sep-92
Chloromethane		0.5 U	0.5 U
Bromomethane		0.5 U	0.5 U
Vinyl chloride		0.5 U	0.5 U
Chloroethane		0.5 U	0.5 U
Methylene chloride		0.89 B	1.6 B
Acetone		2 UJ	2 UJ
Carbon disulfide		0.92	0.5 U
1,1-Dichloroethene		0.5 U	0.5 U
1,1-Dichloroethane		0.5 U	0.5 U
1,2-Dichloroethene (cis/trans)		0.5 U	0.5 U
Chloroform		0.15 J	0.5 U
1,2-Dichloroethane		0.5 U	0.5 U
2-Butanone		2 U	2 U
1,1,1-Trichloroethane		0.5 U	0.5 U
Carbon tetrachloride		0.5 U	0.5 U
Bromodichloromethane		0.5 U	0.5 U
1,2-Dichloropropane		0.5 U	0.5 U
cis-1,3-Dichloropropene		0.5 U	0.5 U
Trichloroethene		0.5 U	0.5 U
Dibromochloromethane		0.5 U	0.5 U
1,1,2-Trichloroethane		0.5 U	0.5 U
Benzene		0.5 U	0.5 U
trans-1,3-Dichloropropene		0.5 U	0.5 U
Bromoform		0.5 UJ	0.5 U
4-Methyl-2-pentanone		2 U	2 U
2-Hexanone		R	R
Tetrachloroethene		0.5 U	0.5 U
1,1,2,2-Tetrachloroethane		0.5 U	0.5 U
Toluene		0.5 U	0.074 J
Chlorobenzene		0.5 U	0.5 U
Ethylbenzene		0.5 U	0.5 U
Styrene		0.5 U	0.5 U
Xylenes (total)		0.5 U	0.5 U

Analyte concentrations in micrograms per liter (parts per billion [ppb]).

Analyses were performed by Ceimic Corp. of Narragansett, RI, or Enseco-East of Somerset, NJ, using standard U.S. Environmental Protection Agency methodology.

- B Analyte is detected in the laboratory blank.
 U Result is detected below the reporting limit and/or is an estimated concentration.
 U Compound or element analyzed for, but not detected at the corresponding reporting limit.
 R Result rejected.

Table 7. Summary of Detected Volatile Organic Compounds in Ground-Water Samples Collected from October 1990 to September 1992 at the Tutu Wells Site, St. Thomas, U.S. Virgin Islands.

Analyte	Sample ID: Eglin I	Eglin I	Eglin I	Eglin I	Eglin I	Eglin I	Eglin I
Date:	2-Oct-90	5-Feb-91	5-Jun-91	2-Oct-91	3-Feb-92	27-May-92	16-Sep-92
1,2-Dichloroethene (cis/trans)	68 J	60 J	68 DJ	45	17	13	12
Trichloroethene	10 J	8	10 J	7.5	7	6.3	4.5
Tetrachloroethene	32 J	26	32 J	24	16	14	11
Xylenes (total)	NA	1 J	NA	NA	NA	NA	NA
1,1,2-Trichloroethane	NA	NA	1 J	NA	NA	NA	NA
Chloroform	NA	NA	NA	0.1 J	NA	0.05 J	NA
Toluene	NA	NA	NA	NA	0.06 J	0.06 J	NA

Analyte concentrations in micrograms per liter (parts per billion [ppb]).

Analyses were performed by Ceimic Corp. of Narragansett, RI, or Enseco-East of Somerset, NJ, using standard U.S. Environmental Protection Agency methodology.

D Analyte identified at a secondary dilution.

J Result is detected below the reporting limit and/or is an estimated concentration.

NA Not applicable.

TUTU 003 0405

Table 7. Summary of Detected Volatile Organic Compounds in Ground-Water Samples Collected from September 1990 to September 1992 at the Tutu Wells Site, St. Thomas, U.S. Virgin Islands.

	Sample ID: Eglin II	Eglin II	Eglin II	Eglin II	Eglin II	Eglin II	Eglin II	
Analyte	Date:	27-Sep-90	5-Feb-91	5-Jun-91	2-Oct-91	3-Feb-92	27-May-92	16-Sep-92
1,2-Dichloroethene (cis/trans)	120 J	72 DJ	130 DJ	67	20	31	11	
Trichloroethene	22 J	19	19 J	18	6.7	14	4.7	
Tetrachloroethene	71 J	34 DJ	61 DJ	54	16	36	11	
Chloroform	NA	NA	NA	0.12 J	NA	0.09 J	NA	
Benzene	NA	NA	NA	NA	NA	0.07 J	NA	
Toluene	NA	NA	NA	NA	NA	NA	0.081 J	

Analyte concentrations in micrograms per liter (parts per billion [ppb]).

Analyses were performed by Ceumic Corp. of Narragansett, RI, or Enseco-East of Somerset, NJ, using standard U.S. Environmental Protection Agency methodology.

D Analyte identified at a secondary dilution.

J Result is detected below the reporting limit and/or is an estimated concentration.

NA Not applicable.

117 003 0404

Table 7. Summary of Detected Volatile Organic Compounds in Ground-Water Samples Collected from September 1990 to September 1992 at the Tutu Wells Site, St. Thomas, U.S. Virgin Islands.

	Sample ID: Eglin III							
		Eglin III	Eglin III	Eglin III	Eglin III	Eglin III	Eglin III	Eglin III
Analyte	Date:	27-Sep-90	5-Feb-91	5-Jun-91	2-Oct-91	3-Feb-92	28-May-92	16-Sep-92
Acetone		22 J	NA	NA	NA	NA	NA	NA
1,2-Dichloroethene (cis/trans)		52 J	45 J	69 DJ	51	39	31	32
Trichloroethene		14	11	15 J	12	16	14	13
Tetrachloroethene		44 J	35	40 J	36	41 D	39	34
1,1-Dichloroethane		NA	NA	NA	0.05 J	NA	NA	NA
Chloroform		NA	NA	NA	0.11 J	0.09 J	0.07 J	NA
Benzene		NA	NA	NA	0.05 J	NA	NA	NA

Analyte concentrations in micrograms per liter (parts per billion [ppb]).

Analyses were performed by Ceimic Corp. of Narragansett, RI, or Enseco-East of Somerset, NJ, using standard U.S. Environmental Protection Agency methodology.

D Analyte identified at a secondary dilution.

J Result is detected below the reporting limit and/or is an estimated concentration.

NA Not applicable.

TUT 003 0405

Table 7. Summary of Detected Volatile Organic Compounds in Ground-Water Samples Collected from October 1991 to September 1992 at the Tutu Wells Site, St. Thomas, U.S. Virgin Islands.

Analyte	Sample ID: Four Winds		
	I	I	I
Date:	2-Oct-91	4-Feb-92	15-Sep-92
1,2-Dichloroethene (cis/trans)	89 D	150 D	170
Chloroform	0.28 J	1.2	1.6 J
Trichloroethene	9.8	21	21
Benzene	0.33 J	0.8	NA
Tetrachloroethene	36	75 D	78
Vinyl chloride	NA	0.22 J	NA
Bromodichloromethane	NA	0.09 J	NA

Analyte concentrations in micrograms per liter (parts per billion [ppb]).

Analyses were performed by Ceimic Corp. of Narragansett, RI, or Enseco-East of Somerset, NJ, using standard U.S. Environmental Protection Agency methodology.

D Analyte identified at a secondary dilution.

J Result is detected below the reporting limit and/or is an estimated concentration.

NA Not applicable.

TUT 003 0406

Table 7. Summary of Detected Volatile Organic Compounds in Ground-Water Samples Collected from September 1990 to September 1992 at the Tutu Wells Site, St. Thomas, U.S. Virgin Islands.

Analyte	Sample ID: Four Winds II	Four Winds II FR	Four Winds II	Four Winds II	Four Winds II	Four Winds II	Four Winds II
Date:	26-Sep-90	26-Sep-90	5-Feb-91	5-Jun-91	2-Oct-91	4-Feb-92	15-Sep-92
1,2-Dichloroethene (cis/trans)	75 J	61 J	230 D	130 DJ	190	130	99
Trichloroethene	6 J	4 J	21	12 J	25	15	10
Tetrachloroethene	25 J	18 J	90 D	34 DJ	80	NA	38
Chloroform	NA	NA	NA	NA	NA	0.5 J	1 J
Benzene	NA	NA	NA	NA	NA	2.7	NA
Xylenes (total)	NA	NA	NA	NA	NA	0.4 J	NA

Analyte concentrations in micrograms per liter (parts per billion [ppb]).

Analyses were performed by Cemic Corp. of Narragansett, RI, or Enseco-East of Somerset, NJ, using standard U.S. Environmental Protection Agency methodology.

D Analyte identified at a secondary dilution.
 J Result is detected below the reporting limit and/or is an estimated concentration.
 FR Field replicate of previous sample.
 NA Not applicable.

Table 7. Summary of Detected Volatile Organic Compounds in Ground-Water Samples Collected from February 1991 to May 1992 at the Tutu Wells Site, St. Thomas, U.S. Virgin Islands.

Analyte	Sample ID: Gassett	Gassett	Gassett	Gassett FR	Gassett
	Date: 5-Feb-91	1-Oct-91	4-Feb-92	4-Feb-92	27-May-92
Trichloroethene	I	0.11 J	0.09 J	NA	0.06 J
Toluene	44 D	NA	NA	NA	NA
Chloromethane	NA	NA	0.99	NA	NA
1,2-Dichloroethene (cis/trans)	NA	NA	0.11 J	NA	NA
Benzene	NA	NA	0.06 J	0.07 J	NA

Analyte concentrations in micrograms per liter (parts per billion [ppb]).

Analyses were performed by Cimic Corp. of Narragansett, RI, or Enseco-East of Somerset, NJ, using standard U.S. Environmental Protection Agency methodology.

D Analyte identified at a secondary dilution.

J Result is detected below the reporting limit and/or is an estimated concentration.

FR Field replicate of previous sample.

NA Not applicable.

TUT 003 0408

Table 7. Summary of Detected Volatile Organic Compounds in Ground-Water Samples Collected from September 1990 to September 1992 at the Tutu Wells Site, St. Thomas, U.S. Virgin Islands.

Analyte	Sample ID: Harthman II	Harthman II	Harthman II	Harthman II	Harthman II	Harthman II FR	Harthman II
Date:	26-Sep-90	5-Feb-91	4-Jun-91	1-Oct-91	3-Feb-92	3-Feb-92	16-Sep-92
1,2-Dichloroethene (cis/trans)	5 J	5 J	6 J	3.1	0.19 J	4.2	11
Trichloroethene	1 J	2	1 J	0.77	0.08 J	0.95	2.3
Tetrachloroethene	7 J	9	7 J	4.7	1.2	5.3	10

Analyte concentrations in micrograms per liter (parts per billion [ppb]).

Analyses were performed by Ceimic Corp. of Narragansett, RI, or Enseco-East of Somerset, NJ, using standard U.S. Environmental Protection Agency methodology.

J Result is detected below the reporting limit and/or is an estimated concentration.

TUT 003 0409

Table 7. Summary of Detected Volatile Organic Compounds in Ground-Water Samples Collected from September 1990 to September 1992 at the Tutu Wells Site, St. Thomas, U.S. Virgin Islands.

	Sample ID: Harvey	Harvey	Harvey	Harvey	Harvey	Harvey	Harvey	
Analyte	Date:	26-Sep-90	5-Feb-91	4-Jun-91	2-Oct-91	3-Feb-92	28-May-92	14-Sep-92
Tetrachloroethene	890 J	1500	530 DEJ	670 D	500 D	350	260	
1,2-Dichloroethene (cis/trans)	NA	160	80 DJ	38	39	41	49	
Trichloroethene	NA	60 J	36 DJ	25	23	29	46	
Vinyl chloride	NA	NA	3	2.1	2.2	NA	NA	
Chloroform	NA	NA	NA	0.15 J	0.1 J	NA	NA	
1,1-Dichloroethene	NA	NA	NA	NA	0.06 J	NA	NA	
Toluene	NA	NA	NA	NA	0.06 J	NA	NA	
Methylene chloride	NA	NA	NA	NA	NA	NA	11 B	
Acetone	NA	NA	NA	NA	NA	NA	28 BJ	

Analyte concentrations in micrograms per liter (parts per billion [ppb]).

Analyses were performed by Ceinic Corp. of Narragansett, RI, or Enseco-East of Somerset, NJ, using standard U.S. Environmental Protection Agency methodology.

B Analyte is detected in the laboratory blank.

D Analyte identified at a secondary dilution.

E Concentration exceeds calibration range.

J Result is detected below the reporting limit and/or is an estimated concentration.

NA Not applicable.

TUT 003 0410

Table 7. Summary of Detected Volatile Organic Compounds in Ground-Water Samples Collected from October 1990 to September 1992 at the Tutu Wells Site, St. Thomas, U.S. Virgin Islands.

Analyte	Date:	2-Oct-90	5-Feb-91	5-Feb-91	6-Jun-91	6-Jun-91	3-Oct-91	6-Feb-92	6-Feb-92	28-May-92	17-Sep-92
1,2-Dichloroethene (cis/trans)		140 J	200 D	190 D	250 DEJ	170 DJ	170 D	140 D	140 D	100	130
Trichloroethene		24 J	32	31	31 D	32 J	30	23	23	19	22
Tetrachloroethene		98 J	110 D	100 D	88 DJ	64 DJ	100 D	84 D	81 D	60	67
Chloroform		NA	1	NA	2	0.8 J	0.6 J	0.4 J	0.41 J	0.44 J	1.4 J
1,1,2-Trichloroethane		NA	NA	NA	5	NA	NA	NA	NA	NA	NA
Methylene chloride		NA	NA	NA	NA	NA	4.6	NA	NA	NA	NA
Carbon disulfide		NA	NA	NA	NA	NA	2.2 J	NA	NA	NA	NA
1,1-Dichloroethane		NA	NA	NA	NA	NA	NA	0.06 J	0.07 J	NA	NA
Benzene		NA	NA	NA	NA	NA	NA	0.15 J	0.14 J	NA	0.29 J
Toluene		NA	NA	NA	NA	NA	NA	0.11 J	NA	NA	NA
Xylenes (total)		NA	NA	NA	NA	NA	NA	NA	NA	NA	0.85 J

Analyte concentrations in micrograms per liter (parts per billion [ppb]).

Analyses were performed by Ceimic Corp. of Narragansett, RI, or Ensco-East of Somerset, NJ, using standard U.S. Environmental Protection Agency methodology.

D Analyte identified at a secondary dilution.

E Concentration exceeds calibration range.

J Result is detected below the reporting limit and/or is an estimated concentration.

FR Field replicate of previous sample.

NA Not applicable.

Table 7. Summary of Detected Volatile Organic Compounds in Ground-Water Samples Collected from October 1990 to September 1992 at the Tutu Wells Site, St. Thomas, U.S. Virgin Islands.

Analyte	Sample ID: Ramsay	Ramsay	Ramsay	Ramsay	Ramsay	Ramsay	Ramsay	Ramsay FR
Date:	1-Oct-90	5-Feb-91	5-Jun-91	1-Oct-91	4-Feb-92	28-May-92	15-Sep-92	15-Sep-92
Tetrachloroethene	3 J	16	16	19	23	20	16	16
1,2-Dichloroethene (cis/trans)	NA	1 J	2 J	2.8	17	9.5	1.4	1.4
Trichloroethene	NA	1	NA	1.6	3.7	2.4	0.94	0.89
Acetone	NA	NA	15 J	NA	NA	NA	NA	NA
Chloroform	NA	NA	1 J	1.1	1.1	1.3	2.9	2.8
Bromodichloromethane	NA	NA	NA	0.39 J	0.5	0.44 J	0.98	0.89
Carbon disulfide	NA	NA	NA	NA	NA	NA	0.15 J	NA

Analyte concentrations in micrograms per liter (parts per billion [ppb]).

Analyses were performed by Ceimic Corp. of Narragansett, RI, or Enseco-East of Somerset, NJ, using standard U.S. Environmental Protection Agency methodology.

J Result is detected below the reporting limit and/or is an estimated concentration.
 FR Field replicate of previous sample.
 NA Not applicable.

Table 7. Summary of Detected Volatile Organic Compounds in Ground-Water Samples Collected from September 1990 to September 1992 at the Tutu Wells Site, St. Thomas, U.S. Virgin Islands.

	Sample ID: Smith	Smith	Smith	Smith	Smith	Smith	Smith FR	Smith	
Analyte	Date:	25-Sep-90	5-Feb-91	6-Jun-91	3-Oct-91	5-Feb-92	28-May-92	28-May-92	16-Sep-92
1,2-Dichloroethene (cis/trans)	58	42 J	62 D	56 D	48 D	40	37	60	
Trichloroethene	20	23	26	20	21	15	14	21	
Tetrachloroethene	330 J	160 J	190 D	250 D	230 D	140	150 D	170	
1,1,2-Trichloroethane	NA	5	NA	NA	NA	NA	NA	NA	
1,1-Dichloroethane	NA	NA	NA	0.06 J	0.06 J	NA	NA	NA	
Chloroform	NA	NA	NA	0.35 J	0.32 J	NA	0.2 J	NA	
Benzene	NA	NA	NA	0.1 J	0.07 J	NA	NA	NA	
Toluene	NA	NA	NA	NA	0.05 J	NA	NA	NA	

Analyte concentrations in micrograms per liter (parts per billion [ppb]).

Analyses were performed by Ceimic Corp. of Narragansett, RI or Enseco-East of Somerset, NJ, using standard U.S. Environmental Protection Agency methodology.

D Analyte identified at a secondary dilution.

J Result is detected below the reporting limit and/or is an estimated concentration.

FR Field replicate of previous sample.

NA Not applicable.

Table 7. Summary of Detected Volatile Organic Compounds in Ground-Water Samples Collected from September 1990 to September 1992 at the Tutu Wells Site, St. Thomas, U.S. Virgin Islands.

	Sample ID: Steele							
		Steele	Steele	Steele	Steele	Steele	Steele	
Analyte	Date:	25-Sep-90	5-Feb-91	5-Jun-91	1-Oct-91	4-Feb-92	27-May-92	14-Sep-92
1,2-Dichloroethene (cis/trans)		120	44	180 DJ	150 D	110	150 D	140
Trichloroethene		48	12	42 DJ	29	29	27	33
Tetrachloroethene		130 J	65	150 DJ	54 D	55	40	65
Vinyl chloride		NA	NA	4	2.5	1.4 J	2	3.3
1,1-Dichloroethene		NA	NA	NA	0.12 J	NA	NA	NA
1,1-Dichloroethane		NA	NA	NA	0.11 J	NA	NA	NA
Benzene		NA	NA	NA	0.08 J	NA	NA	NA
Chlorobenzene		NA	NA	NA	0.13 J	NA	NA	NA

Analyte concentrations in micrograms per liter (parts per billion [ppb]).

Analyses were performed by Ceimic Corp. of Narragansett, RI, or Enseco-East of Somerset, NJ, using standard U.S. Environmental Protection Agency methodology.

D Analyte identified at a secondary dilution.

J Result is detected below the reporting limit and/or is an estimated concentration.

NA Not applicable.

TUT 003 0414

Table 7. Summary of Detected Volatile Organic Compounds in Ground-Water Samples Collected from October 1990 to September 1992 at the Tutu Wells Site, St. Thomas, U.S. Virgin Islands.

Analyte	Sample ID: Tillett	Tillett FR	Tillett	Tillett	Tillett	Tillett FR	Tillett	Tillett	Tillett	Tillett
Date:	2-Oct-90	2-Oct-90	5-Feb-91	5-Jun-91	2-Oct-91	2-Oct-91	5-Feb-92	29-May-92	16-Sep-92	
Vinyl chloride	17 J	12 J	7	5	17 J	11 J	NA	3.2	NA	
1,2-Dichloroethene (cis/trans)	280 J	270 J	200 D	400 DEJ	150	140 D	23	470 DJ	290	
Trichloroethene	56 J	47 J	36	72 DJ	38	35	6.3	59	62	
Benzene	32 J	26 J	27	3 J	71 J	58 DJ	1.7	0.8 J	7	
Tetrachloroethene	120 J	98 J	100 D	180 DJ	66	63 D	23	200	140	
Toluene	NA	NA	1	0.8 J	3 J	2.1 J	0.05 J	NA	0.5 J	
Ethylbenzene	NA	NA	1	NA	17	14	NA	NA	1.5 J	
Chloroform	NA	NA	NA	0.9	NA	NA	5.3	1.2 J	3.6 J	
1,1,2-Trichloroethane	NA	NA	NA	4	NA	NA	NA	NA	NA	
Xylenes (total)	NA	NA	NA	NA	3.6 J	2.7 J	NA	NA	NA	
Chlorobenzene	NA	NA	NA	NA	NA	0.2 J	NA	NA	NA	
Methylene chloride	NA	NA	NA	NA	NA	NA	NA	NA	16 B	
Acetone	NA	NA	NA	NA	NA	NA	NA	NA	85 BJ	

Analyte concentrations in micrograms per liter (parts per billion [ppb]).

Analyses were performed by Ceimic Corp. of Narragansett, RI or Enseco-East of Somerset, NJ, using standard U.S. Environmental Protection Agency methodology.

B Analyte is detected in the laboratory blank.

D Analyte identified at a secondary dilution.

E Concentration exceeds calibration range.

J Result is detected below the reporting limit and/or is an estimated concentration.

FR Field replicate of previous sample.

NA Not applicable.

TUT 003 0415

Table 7. Summary of Detected Volatile Organic Compounds in Ground-Water Samples Collected from June 1991 to September 1992 at the Tutu Wells Site, St. Thomas, U.S. Virgin Islands.

Analyte	Sample ID:	Equipment Blank	Equipment Blank	Equipment Blank	Field Blank
	Date:	4-Jun-91	4-Feb-92	27-May-92	15-Sep-92
Methylene chloride		1 J	7	12	0.44 JB
Acetone		7 J	7.6	NA	NA
1,2-Dichloroethane		1 J	NA	NA	NA
Xylenes (total)		NA	0.1 J	NA	NA
Carbon disulfide		NA	NA	NA	0.096 J
Chloroform		NA	NA	NA	0.11 J

Analyte concentrations in micrograms per liter (parts per billion [ppb]).

Analyses were performed by Ceimic Corp. of Narragansett, RI, or Enseco-East of Somerset, NJ, using standard U.S. Environmental Protection Agency methodology.

B Analyte is detected in the laboratory blank.

J Result is detected below the reporting limit and/or is an estimated concentration.

NA Not applicable.

TUT 003 0416

Table 7. Summary of Detected Volatile Organic Compounds in Ground-Water Samples Collected from September 1990 to September 1992 at the Tutu Wells Site, St. Thomas, U.S. Virgin Islands.

	Sample ID: Trip Blank	Trip Blank	Trip Blank	Trip Blank	Trip Blank	Trip Blank	Trip Blank	Trip Blank	Trip Blank	Trip Blank	Trip Blank	Trip Blank	Trip Blank	Trip Blank
Analyte	Date:	24-Sep-90	25-Sep-90	26-Sep-90	27-Sep-90	1-Oct-90	2-Oct-90	4-Feb-91	5-Feb-91	6-Feb-91	7-Feb-91	4-Jun-91	5-Jun-91	6-Jun-91
Methylene chloride		25 J	34 J	24 J	16 J	13 J	14 J	2	3	2	2	0.8 J	NA	0.9 J
Acetone		12 J	42 J	4 J	NA	6 J	7 J	NA	NA	NA	NA	11 J	NA	8 J
Xylenes (total)		8	7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Toluene		NA	1 J	NA	NA	NA	NA	NA	NA	NA	NA	2	NA	2
Chloromethane		NA	NA	NA	NA	NA	NA	NA	NA	1 J	1 J	9 J	2 J	6 J
1,2-Dichloroethane		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	2	1 J	2
2-Hexanone		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.8 J
Carbon disulfide		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Tetrachloroethene		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chloroform		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Analyte concentrations in micrograms per liter (parts per billion [ppb]).

Analyses were performed by Ceimic Corp. of Narragansett, RI, or Ensco-East of Somerset, NJ, using standard U.S. Environmental Protection Agency methodology.

J Analyte is detected in the laboratory blank.

Result is detected below the reporting limit and/or is an estimated concentration.

NA Not applicable.

Table 7. Summary of Detected Volatile Organic Compounds in Ground-Water Samples Collected from September 1990 to September 1992 at the Tutu Wells Site, St. Thomas, U.S. Virgin Islands.

	Sample ID: Trip Blank	Trip Blank	Trip Blank	Trip Blank	Trip Blank	Trip Blank	Trip Blank	Trip Blank	Trip Blank	Trip Blank	Trip Blank	Trip Blank	Trip Blank	Trip Blank
Analyte	Date:	1-Oct-91	2-Oct-91	3-Oct-91	3-Feb-92	4-Feb-92	5-Feb-92	6-Feb-92	27-May-92	28-May-92	14-Sep-92	15-Sep-92	16-Sep-92	17-Sep-92
Methylene chloride	NA	0.6	0.17 J	0.29 J	0.33 J	0.29 J	0.33 J	J	0.46 J	0.73 B	0.65 BJ	0.89 B	1.6 B	
Acetone	NA	3.2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
Xylenes (total)	0.28 J	0.11 J	0.25 J	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
Toluene	0.1 J	NA	NA	NA	0.05 J	NA	NA	NA	NA	NA	NA	NA	0.074 J	
Chloromethane	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
1,2-Dichloroethane	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
2-Hexanone	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
Carbon disulfide	0.21 J	1.4 J	0.25 J	0.57	0.23 J	1.8	1	NA	NA	NA	NA	0.92	NA	
Tetrachloroethene	NA	0.1 J	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
Chloroform	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.15 J	NA	

Analyte concentrations in micrograms per liter (parts per billion [ppb]).

Analyses were performed by Ceumic Corp. of Narragansett, RI, or Enseco-East of Somerset, NJ, using standard U.S. Environmental Protection Agency methodology.

B Analyte is detected in the laboratory blank.

J Result is detected below the reporting limit and/or is an estimated concentration.

NA Not applicable.

TUT 003 0410

Table 8. Comparison of Applicable or Relevant and Appropriate Requirements with Detected Analytes in Ground – Water Samples Collected in September 1992 at the Tutu Wells Site, St. Thomas, U.S. Virgin Islands.

Analyte	Sample Identifier	Collection Date	Result	Regulatory Limit(s)	Criterion
1,2–Dichloroethene (cis/trans)	Four Winds I	9/15/92	170	70	Primary MCL
	Four Winds II	9/15/92	99		
	Steele	9/14/92	140		
	Tillett	9/16/92	290		
	LaPlace	9/17/92	130		
Methylene chloride	Harvey	9/14/92	11 B	5	Primary MCL
	Tillett	9/16/92	16 B		
Tetrachloroethene	Eglin I	9/16/92	11	5	Primary MCL
	Eglin II	9/16/92	11		
	Eglin III	9/16/92	34		
	Four Winds I	9/15/92	78		
	Four Winds II	9/15/92	38		
	Hartman II	9/16/92	10		
	Harvey	9/14/92	260		
	LaPlace	9/17/92	67		
	Ramsay	9/15/92	16		
	Ramsay FR	9/15/92	16		
	Smith	9/16/92	170		
	Steele	9/14/92	65		
	Tillett	9/16/92	140		
Trichloroethene	Four Winds I	9/15/92	21	5	Primary MCL
	Four Winds II	9/15/92	10		
	Eglin III	9/16/92	13		
	Harvey	9/14/92	46		
	LaPlace	9/17/92	22		
	Smith	9/16/92	21		
	Steele	9/14/92	33		
	Tillett	9/16/92	62		
Vinyl chloride	Steele	9/14/92	3.3	2	Primary MCL

Analyte concentrations in micrograms per liter (parts per billion [ppb]).

B Analyte is detected in the laboratory blank.

J Result is detected below the reporting limit and/or is an estimated concentration.

FR Field replicate of indicated sample.

MCL Maximum contaminant level.

KJ:mcdisk-carar.wk3

Table 9. USEPA Maximum Contaminant Level Standards for Volatile Organic Compounds in Drinking Water.

Compound	Current MCL
Chloromethane	--
Bromomethane	--
Vinyl chloride	2
Choloroethane	--
Methylene chloride	5
Acetone	--
Carbon disulfide	--
1,1-Dichloroethene	7
1,1-Dichloroethane	--
cis-1,2-Dichloroethene *	70
trans-1,2-Dichloroethene *	100
Chloroform	--
1,2-Dichloroethane	5
2-Butanone	--
1,1,1-Trichloroethane	200
Carbon tetrachloride	5
Vinyl acetate	--
Bromodichloromethane	**
1,2-Dichloropropane	5

Maximum contaminant level (MCL) standard in micrograms per liter (parts per billion [ppb]).

USEPA U.S. Environmental Protection Agency.
 -- No MCL established for this compound.
 * Results reported as sum of cis- and trans-isomers.
 ** Sum of trihalomethanes MCL is 100 ppb.

KJ-MCL Disk/mcls.wk3

TUT 003 0420

Table 9. USEPA Maximum Contaminant Level Standards for Volatile Organic Compounds in Drinking Water.

Compound	Current MCL
trans-1,3-Dichloropropene	--
Trichloroethene	5
Dibromochloromethane	**
1,1,2-Trichloroethane	5
Benzene	5
cis-1,3-Dichloropropene	--
Bromoform	--
4-methyl-2-pentanone	--
2-Hexanone	--
1,1,2,2-Tetrachloroethane	--
Tetrachloroethene	5
Toluene	1,000
Chlorobenzene	100
Ethylbenzene	700
Styrene	100
Xylenes (total)	10,000

Maximum contaminant level (MCL) standard in micrograms per liter (parts per billion [ppb]).

USEPA U.S. Environmental Protection Agency.
 -- No MCL established for this compound.
 * Results reported as sum of cis- and trans-isomers.
 ** Sum of trihalomethanes MCL is 100 ppb.

KJ-MCL Disk/mcls.wk3

TUT 003 0421

Table 10. Calculated Values for Relative Percent of PCE for Selected Supply Well Samples from September 1990 through September 1992, Tutu Wells Site, St. Thomas, U.S. Virgin Islands.

Well	Date Sampled	Relative Percent of PCE	1,2-DCE	TCE	PCE
Ramsay *	October 1, 1990	100%	0	0	3
	February 5, 1991	89%	1	1	16
	June 5, 1991	89%	2		16
	October 1, 1991	81%	2.8	1.6	19
	February 4, 1992	53%	17	3.7	23
	May 28, 1992	63%	9.5	2.4	20
	September 15, 1992	87%	1.4	0.92	16
Tillett	October 2, 1990	25%	275	51.5	109
	February 5, 1991	30%	200	36	100
	June 5, 1991	28%	400	72	180
	October 2, 1991	26%	145	36.5	64.5
	February 5, 1992	44%	23	6.3	23
	May 29, 1992	27%	470	59	200
	September 16, 1992	28%	290	62	140
Eglin II	September 27, 1990	33%	120	22	71
	February 5, 1991	27%	72	19	34
	June 5, 1991	29%	130	19	61
	October 2, 1991	39%	67	18	54
	February 3, 1992	37%	20	6.7	16
	May 27, 1992	44%	31	14	36
	September 16, 1992	41%	11	4.7	11
Harvey	September 26, 1990	100%	0	0	890
	February 5, 1991	87%	160	60	1500
	June 4, 1991	82%	80	36	530
	October 2, 1991	91%	38	25	670
	February 3, 1992	89%	39	23	500
	May 28, 1992	83%	41	29	350
	September 14, 1992	73%	49	46	260

* Average of Ramsay and Ramsay FR samples
 Analyte concentrations in micrograms per liter (parts per billion [ppb]).

$$\text{Relative Percent of PCE} = \frac{[\text{PCE}]}{[\text{1,2-DCE}] + [\text{TCE}] + [\text{PCE}]}$$

[TCE] Concentration of TCE.
 [1,2-DCE] 1,2-Dichloroethene (total).
 [TCE] Trichloroethene.
 [PCE] Tetrachloroethene.

Table 10. Calculated Values for Relative Percent of PCE for Selected Supply Well Samples from September 1990 through September 1992, Tutu Wells Site, St. Thomas, U.S. Virgin Islands.

Well	Date Sampled	Relative Percent of PCE	1,2-DCE	TCE	PCE
LaPlace	October 2, 1990	37%	140	24	98
	February 5, 1991	32%	195	31.5	105
	June 6, 1991	24%	210	31.5	76
	October 3, 1991	33%	170	30	100
	February 6, 1992	34%	140	23	82.5
	May 28, 1992	34%	100	19	60
	September 17, 1992	31%	130	22	67
Smith	September 25, 1990	81%	58	20	330
	February 5, 1991	71%	42	23	160
	June 6, 1991	68%	62	26	190
	October 3, 1991	77%	56	20	250
	February 5, 1992	77%	48	21	230
	May 28, 1992	73%	38.5	14.5	145
	September 16, 1992	68%	60	21	170

Analyte concentrations in micrograms per liter (parts per billion [ppb]).

$$\text{Relative Percent of PCE} = \frac{[\text{PCE}]}{[\text{1,2-DCE}] + [\text{TCE}] + [\text{PCE}]}$$

[TCE] Concentration of TCE.
 [1,2-DCE] 1,2-Dichloroethene (total).
 [TCE] Trichloroethene.
 [PCE] Tetrachloroethene.

PR00801-d2/COMBINE.wk3

TUT 003 0423

Table 11. Proposed Sampling Locations and Analytical Parameters for the Eighth Sampling Event, March 1993, Tutu Wells Site, St. Thomas, U.S. Virgin Islands.

Well	Proposed Analytes
Eglin I	TCL VOCs
Eglin II	TCL VOCs
Eglin III	TCL VOCs
Four Winds I	TCL VOCs
Four Winds II	TCL VOCs
Gassett	TCL VOCs
Harthman II (if owner allows access)	TCL VOCs
Harthman III (if owner allows access)	TCL VOCs
Harvey	TCL VOCs
LaPlace	TCL VOCs
Matthias (if owner allows access)	TCL VOCs
Ramsay	TCL VOCs
Smith	TCL VOCs
Steele	TCL VOCs
Tillett	TCL VOCs
VIHA I or VIHA II (if possible)	TCL VOCs

TCL Target compound list.

VOCs Volatile organic compounds using USEPA Method 524.2, Revision 3.0 (USEPA 1989).

All analyses will be performed in accordance with the Revised Sampling, Analysis, and Monitoring Plan (SAMP) (Geraghty & Miller, Inc. 1991d).

TVD:lle:kb
PR00001-WP1/030593a.ltr

TUT 003 0424

Table 11. Proposed Sampling Locations and Analytical Parameters for the Seventh Sampling Event, ~~September 1992~~, Tutu Wells Site, St. Thomas, U.S. Virgin Islands.

March 1993

Well	Proposed Analytes
Eglin I	TCL VOCs
Eglin II	TCL VOCs
Eglin III	TCL VOCs
Four Winds I	TCL VOCs
Four Winds II	TCL VOCs
Gassett	TCL VOCs
Harthman II (if owner allows access)	TCL VOCs
Harthman III (if owner allows access)	TCL VOCs
Harvey	TCL VOCs
LaPlace	TCL VOCs
Matthias (if owner allows access)	TCL VOCs
Ramsay	TCL VOCs
Smith	TCL VOCs
Steele	TCL VOCs
Tillett	TCL VOCs
VIHA I or VIHA II (if possible)	TCL VOCs

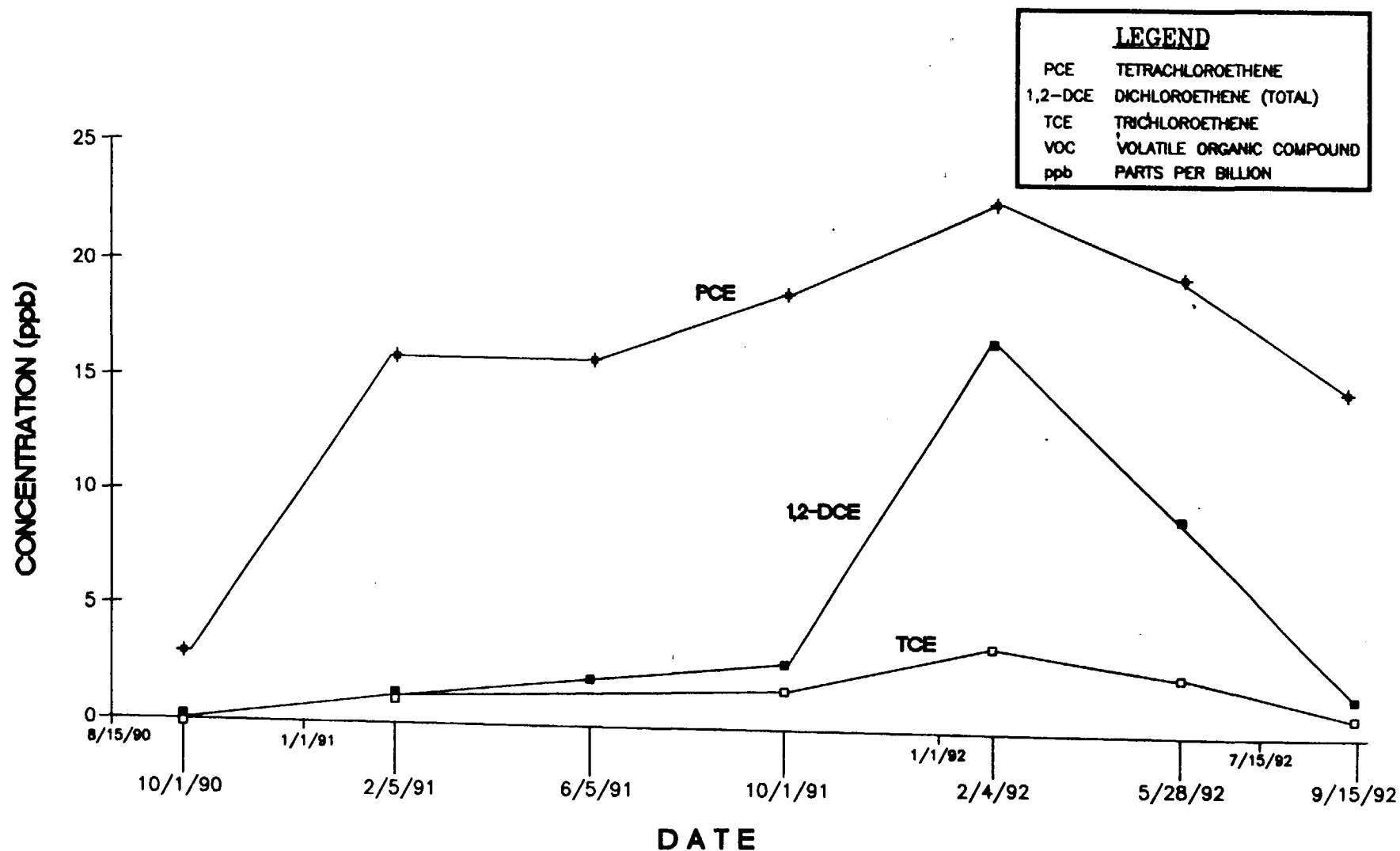
TCL Target compound list.

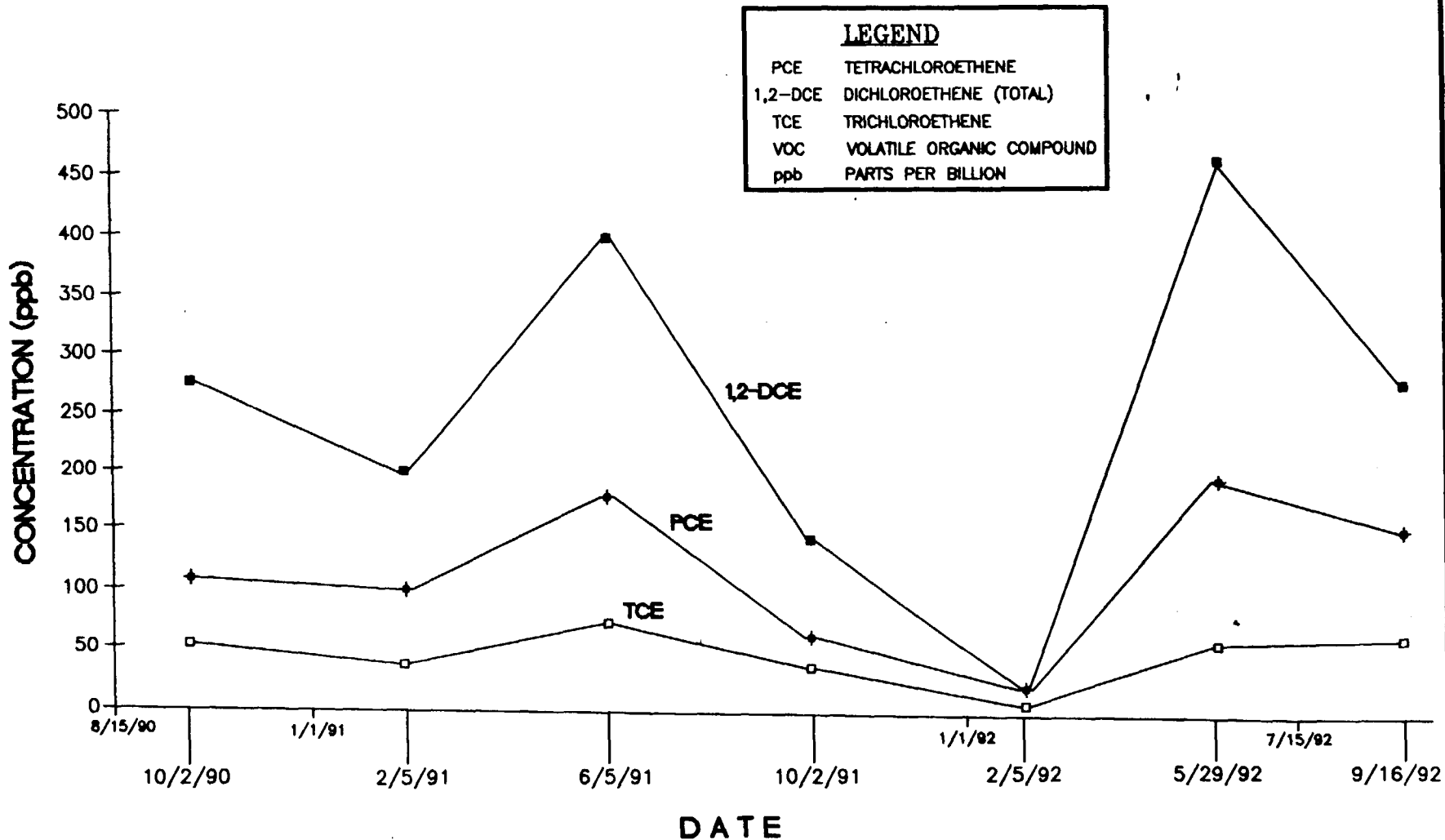
VOCs Volatile organic compounds using USEPA Method 524.2, Revision 3.0 (USEPA 1989).

All analyses will be performed in accordance with the Revised Sampling, Analysis, and Monitoring Plan (SAMP) (Geraghty & Miller, Inc. 1991d).

CM:df
#PR00801-D2/SEVENTH.RPT

TUT 003 0425





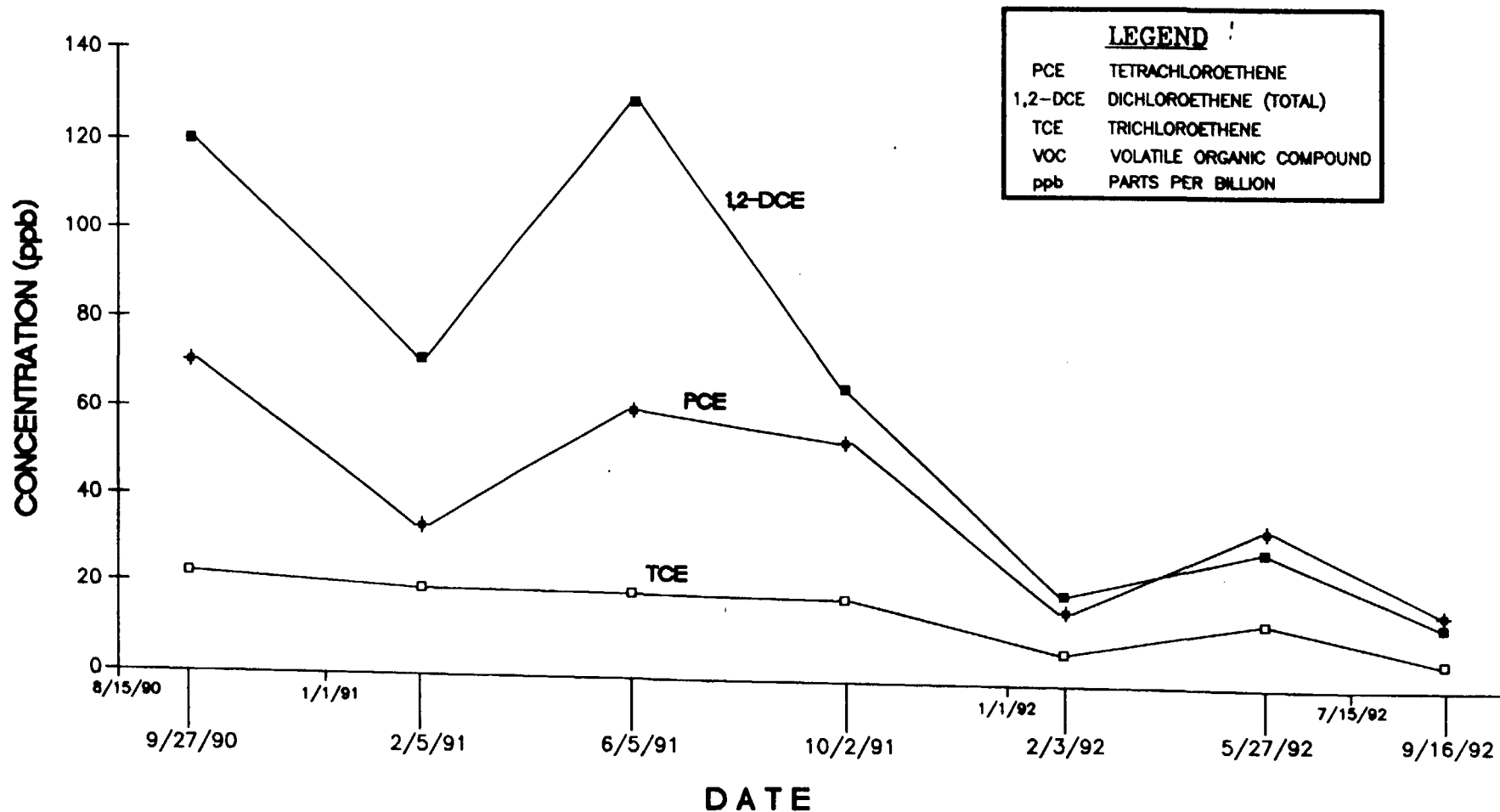
GERAGHTY
& MILLER, INC.
Environmental Services

CHLORINATED VOC CONCENTRATIONS FOR TILLET WELLS SAMPLES
SEPTEMBER 1990 THROUGH SEPTEMBER 1992

TUTU WELLS SITE
ST. THOMAS, U.S. VIRGIN ISLANDS

FIGURE

3



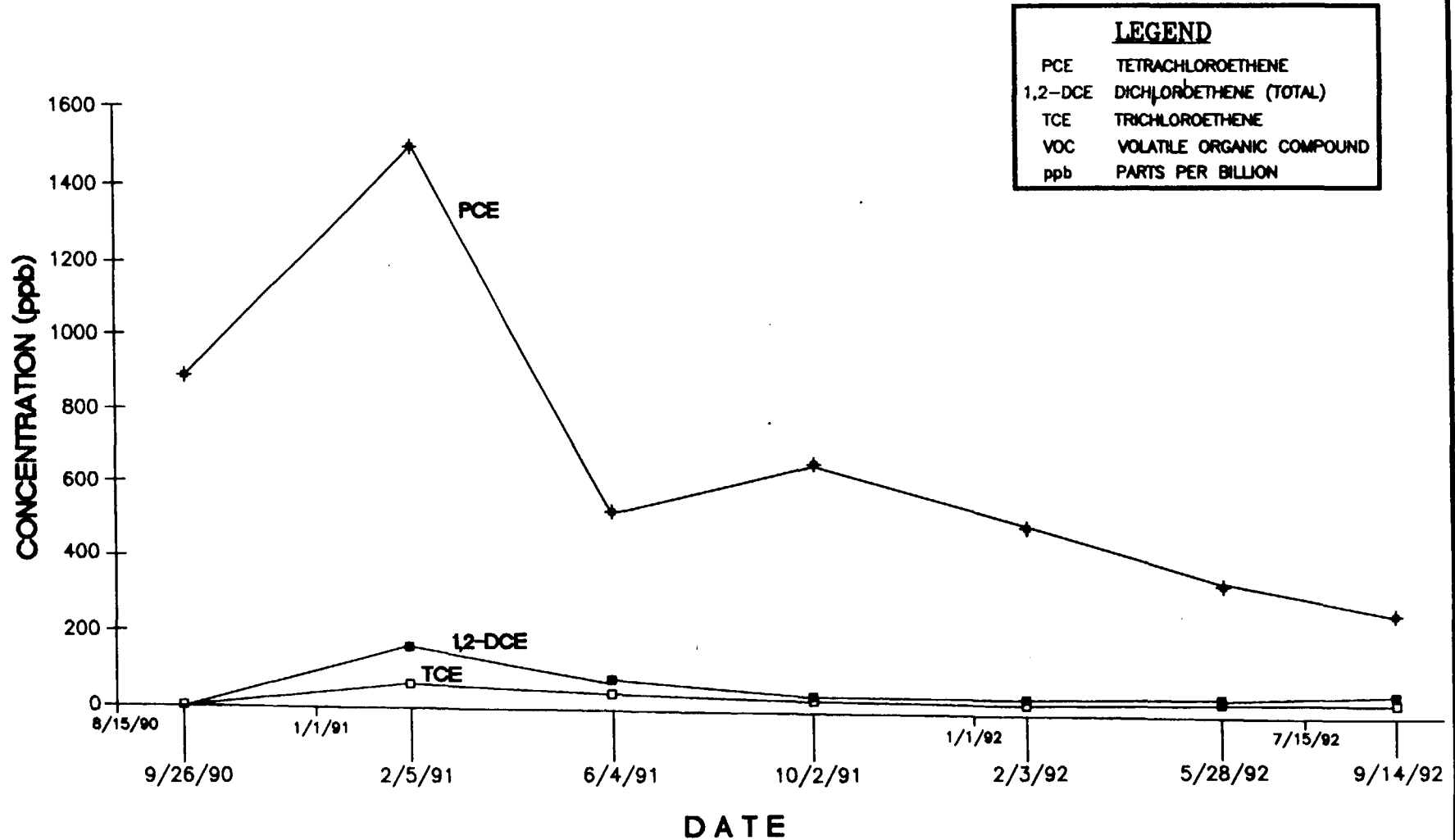
**GERAGHTY
& MILLER, INC.**
Environmental Services

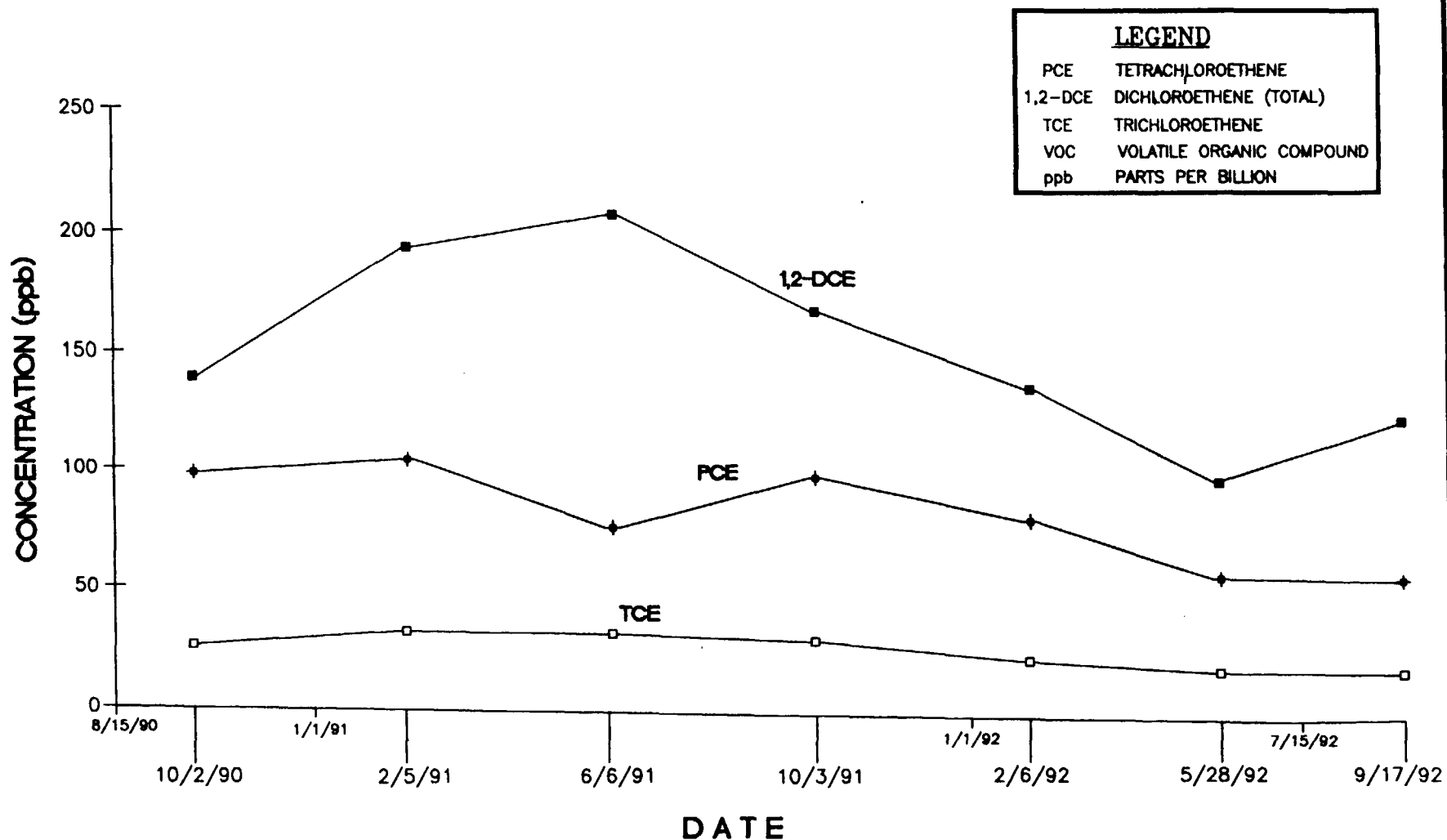
**CHLORINATED VOC CONCENTRATIONS FOR EGLIN II WELL SAMPLES
SEPTEMBER 1990 THROUGH SEPTEMBER 1992**

TUTU WELLS SITE
ST. THOMAS, U.S. VIRGIN ISLANDS

FIGURE

4





GERAGHTY & MILLER, INC.
Environmental Services

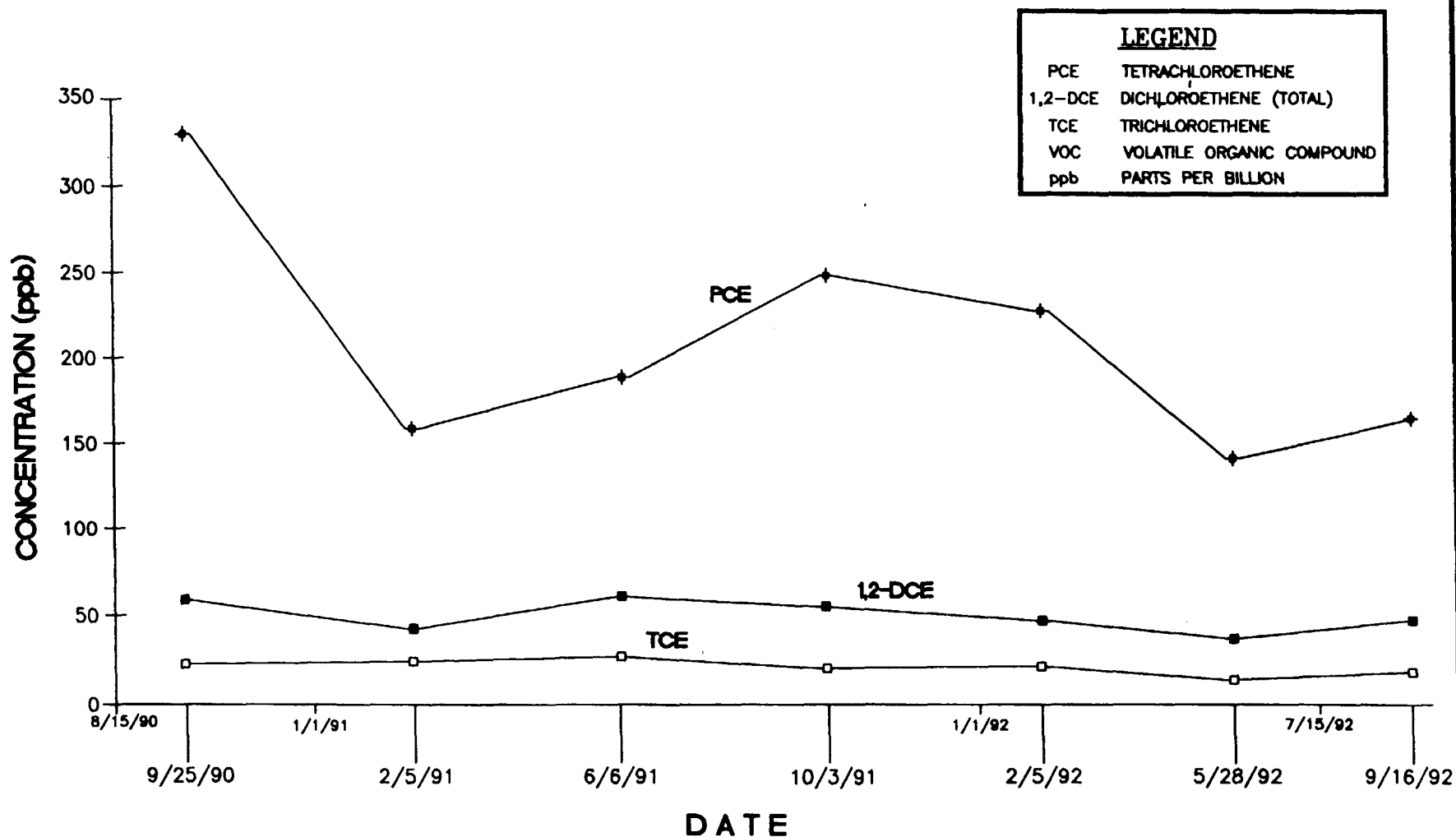
**CHLORINATED VOC CONCENTRATIONS FOR LAPLACE WELL SAMPLES
SEPTEMBER 1990 THROUGH SEPTEMBER 1992**

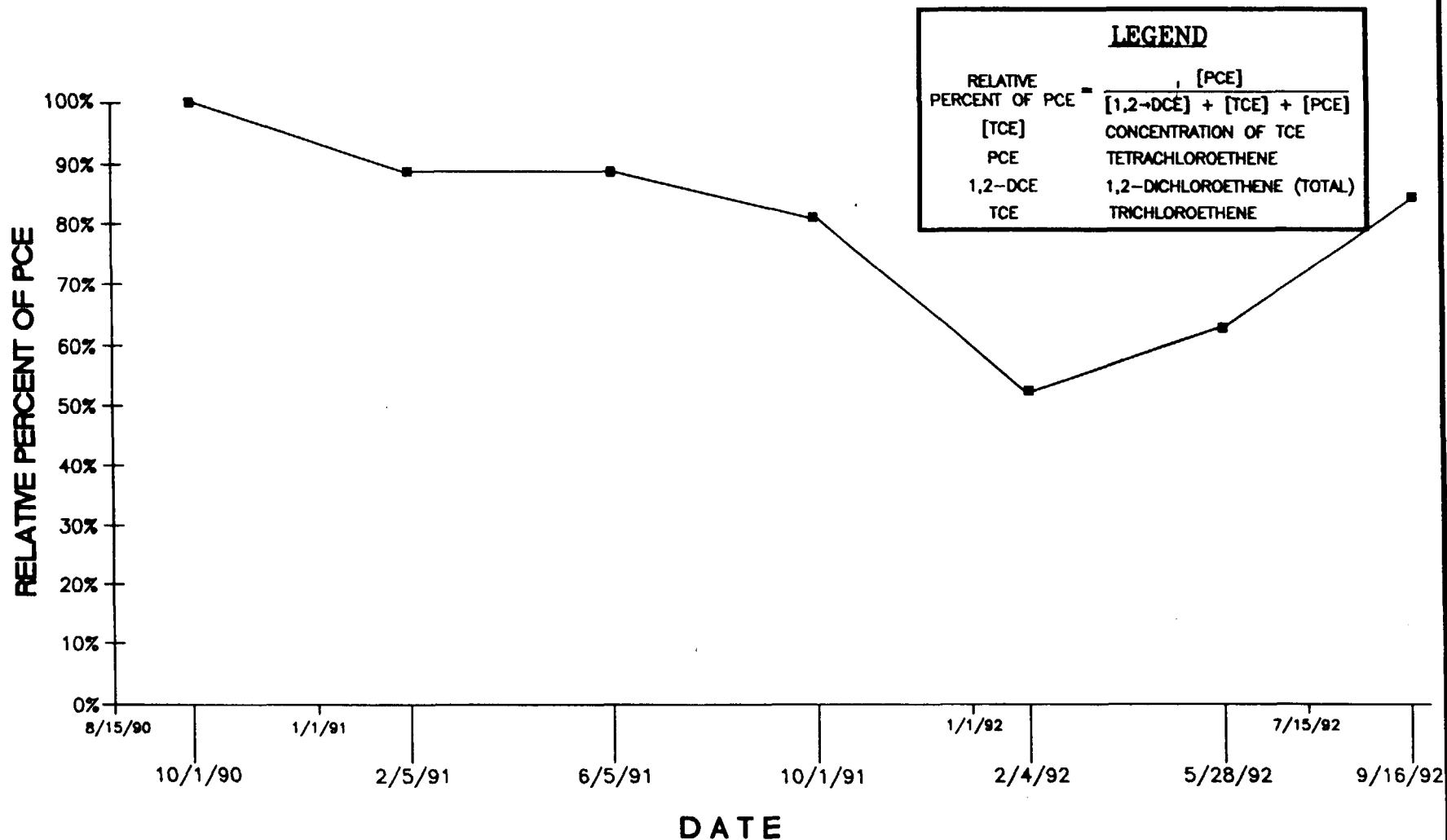
TUTU WELLS SITE
ST. THOMAS, U.S. VIRGIN ISLANDS

FIGURE

6

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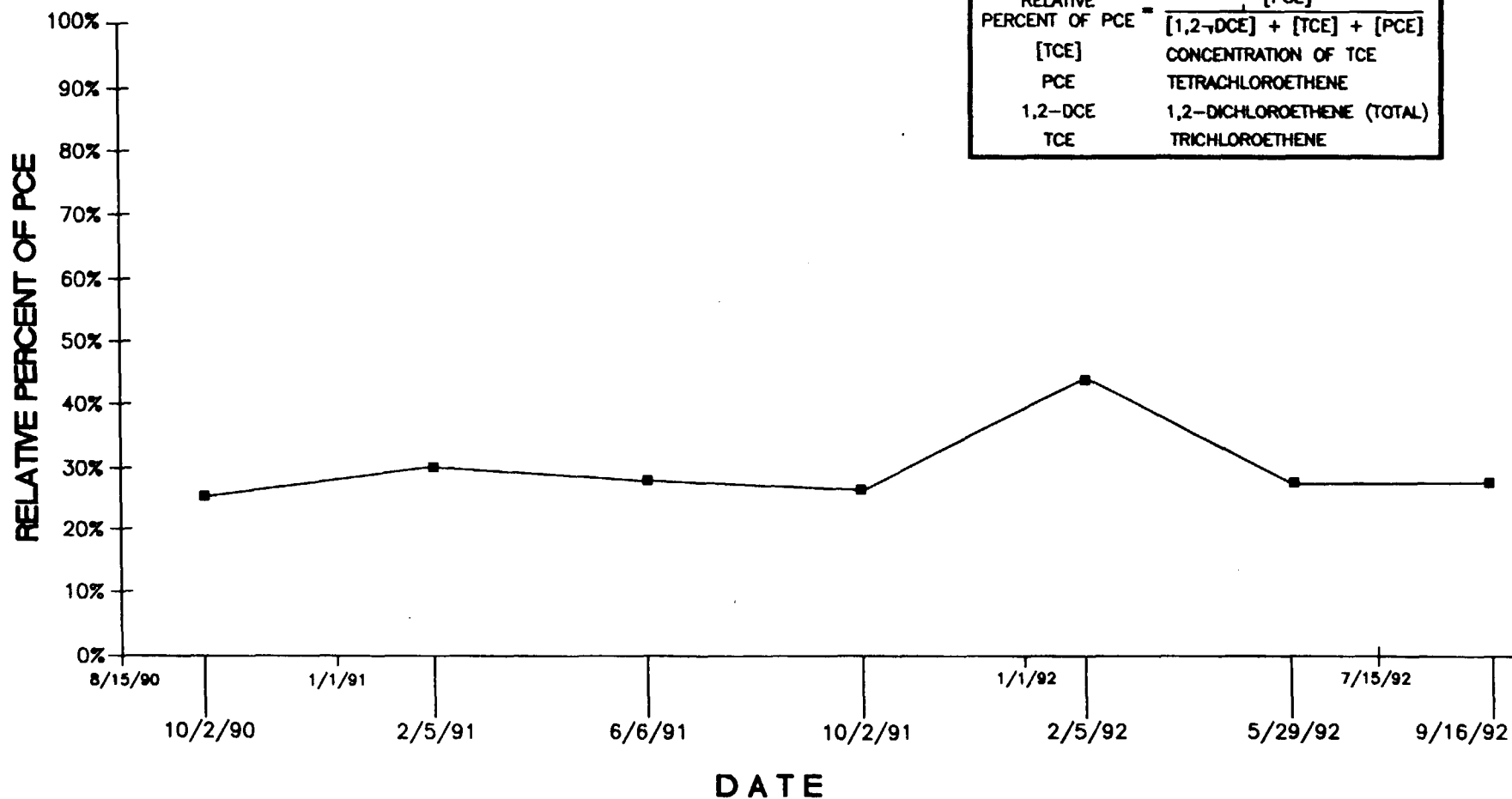
**GERAGHTY
& MILLER, INC.**
Environmental Services

**RELATIVE PERCENT OF PCE IN RAMSAY WELL SAMPLES
SEPTEMBER 1990 THROUGH SEPTEMBER 1992**

TUTU WELLS SITE
ST. THOMAS, U.S. VIRGIN ISLANDS

FIGURE

8



**GERAGHTY
& MILLER, INC.**
Environmental Services

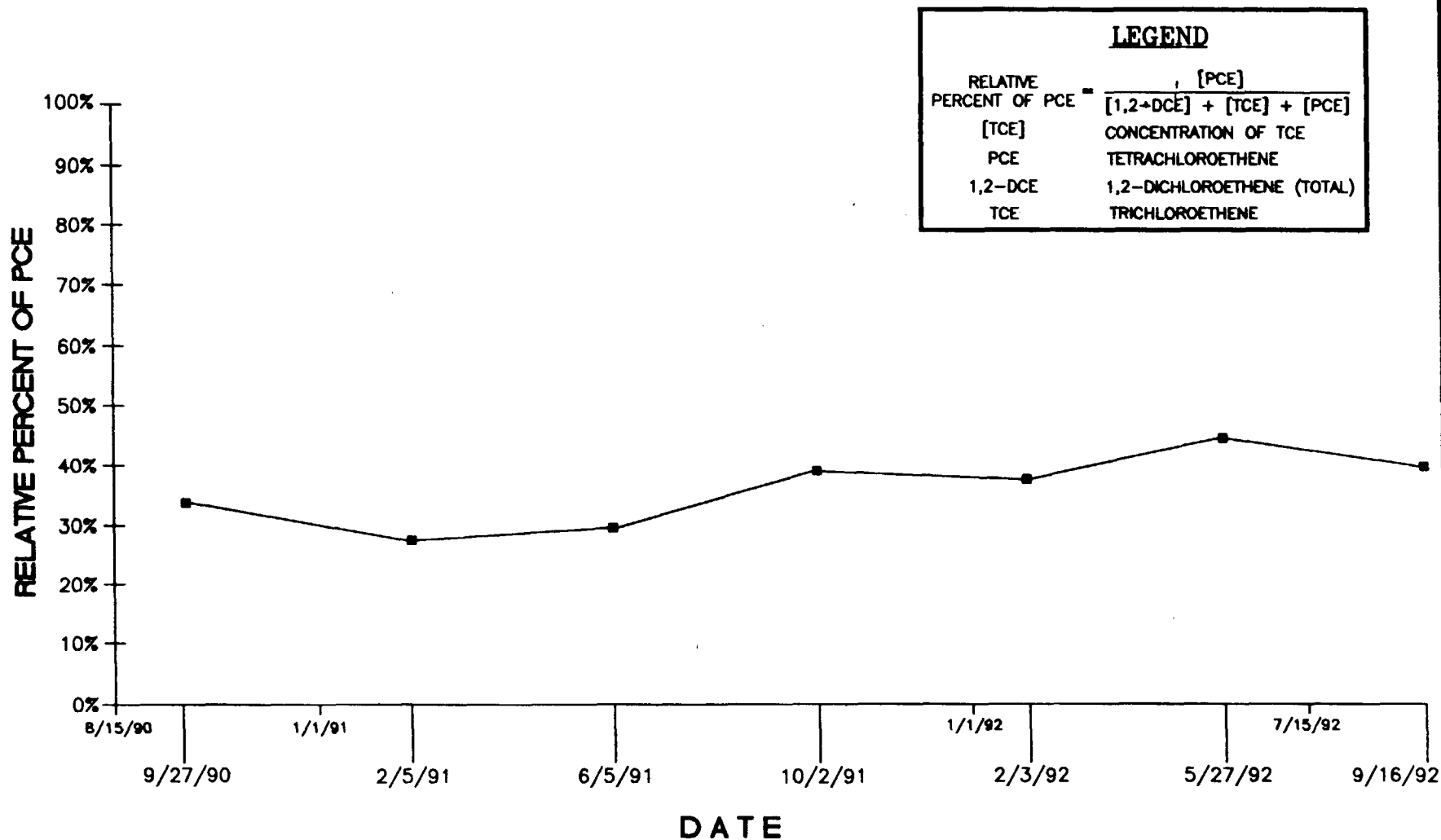
**RELATIVE PERCENT OF PCE IN TILLETT WELL SAMPLES
SEPTEMBER 1990 THROUGH SEPTEMBER 1992**

TUTU WELLS SITE
ST. THOMAS, U.S. VIRGIN ISLANDS

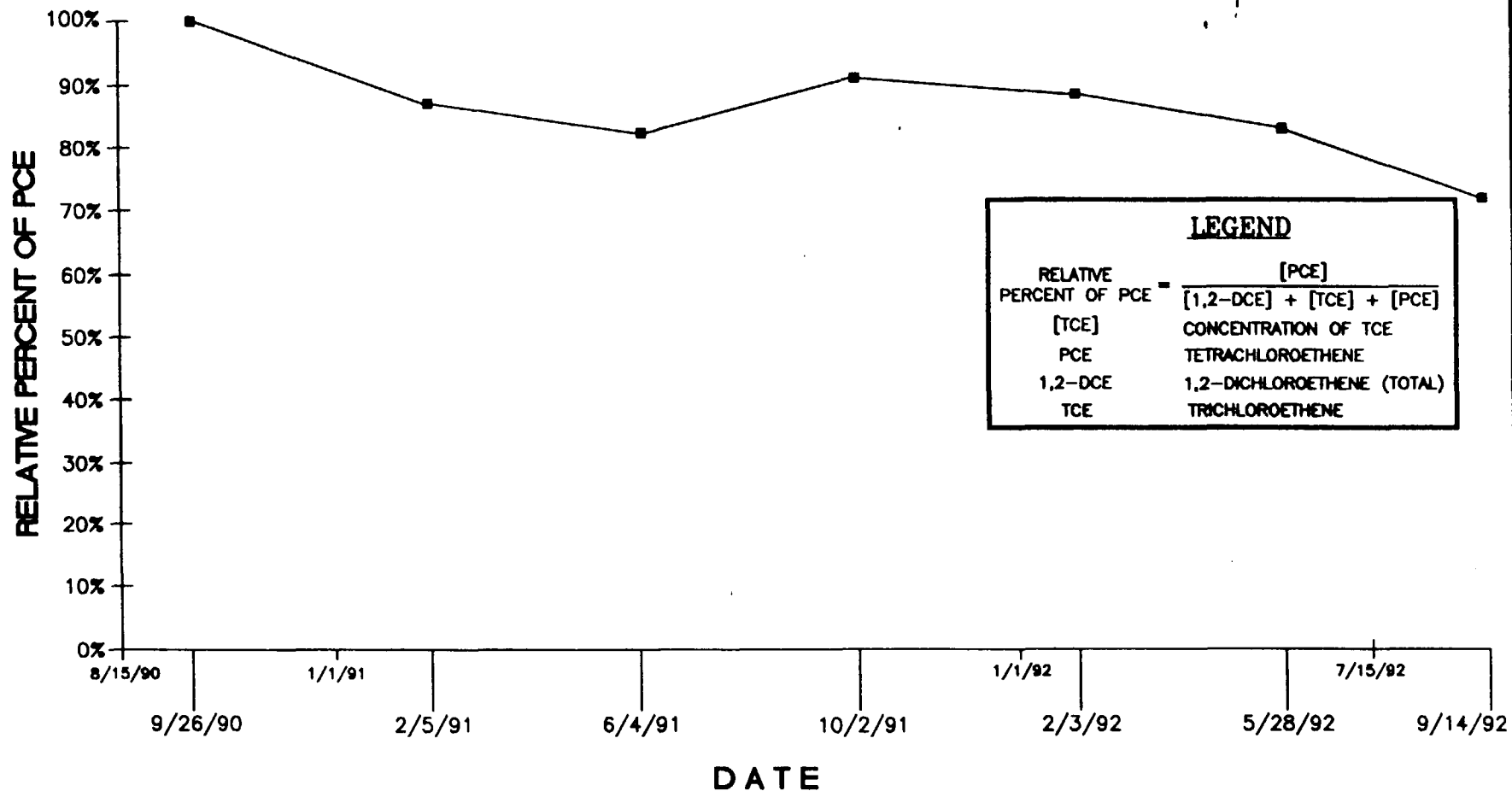
FIGURE

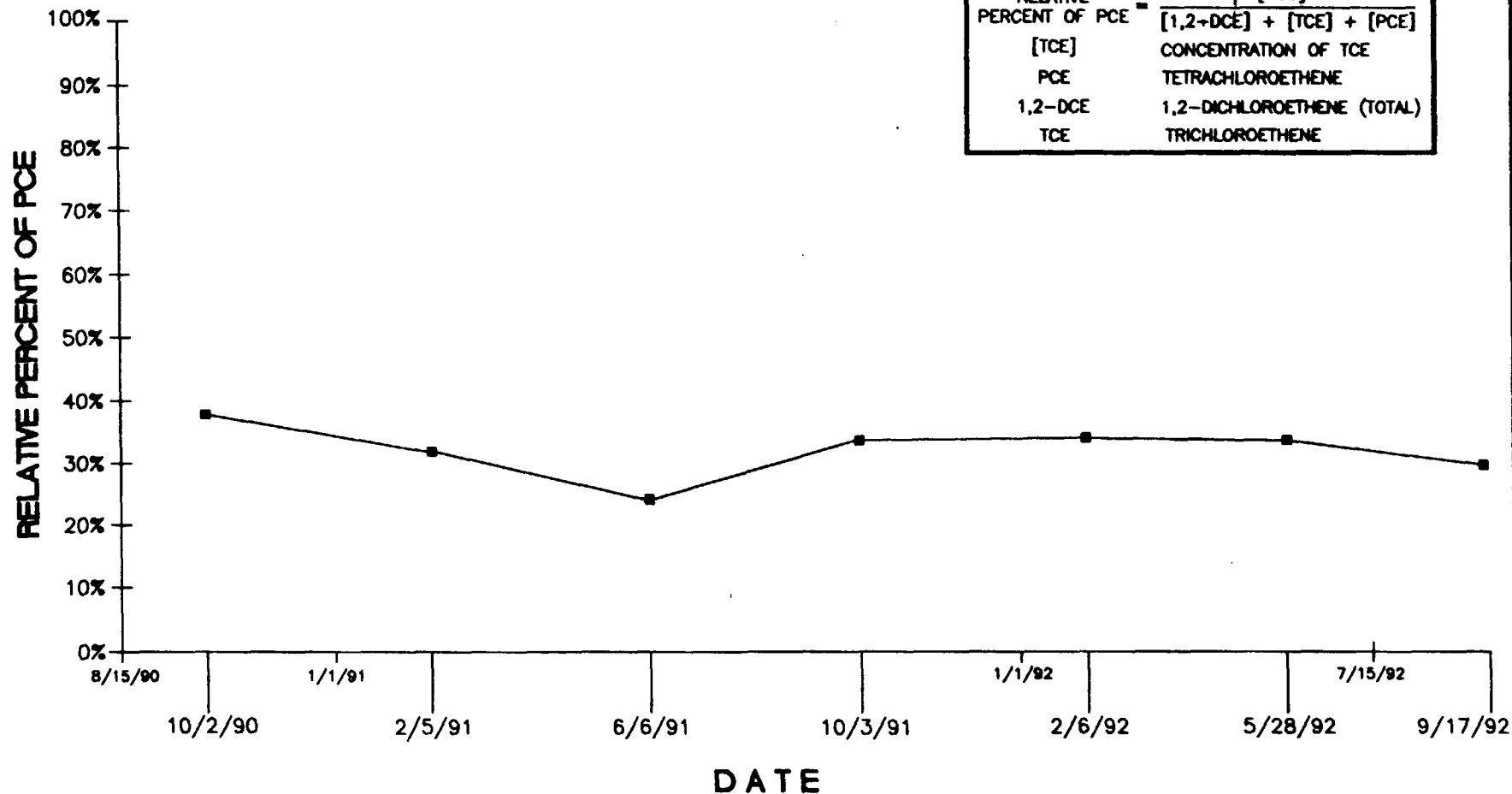
9

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TUT 003 0435





LEGEND	
RELATIVE PERCENT OF PCE =	$\frac{[PCE]}{[1,2-DCE] + [TCE] + [PCE]}$
[TCE]	CONCENTRATION OF TCE
PCE	TETRACHLOROETHENE
1,2-DCE	1,2-DICHLOROETHENE (TOTAL)
TCE	TRICHLOROETHENE

TUT 003 0437

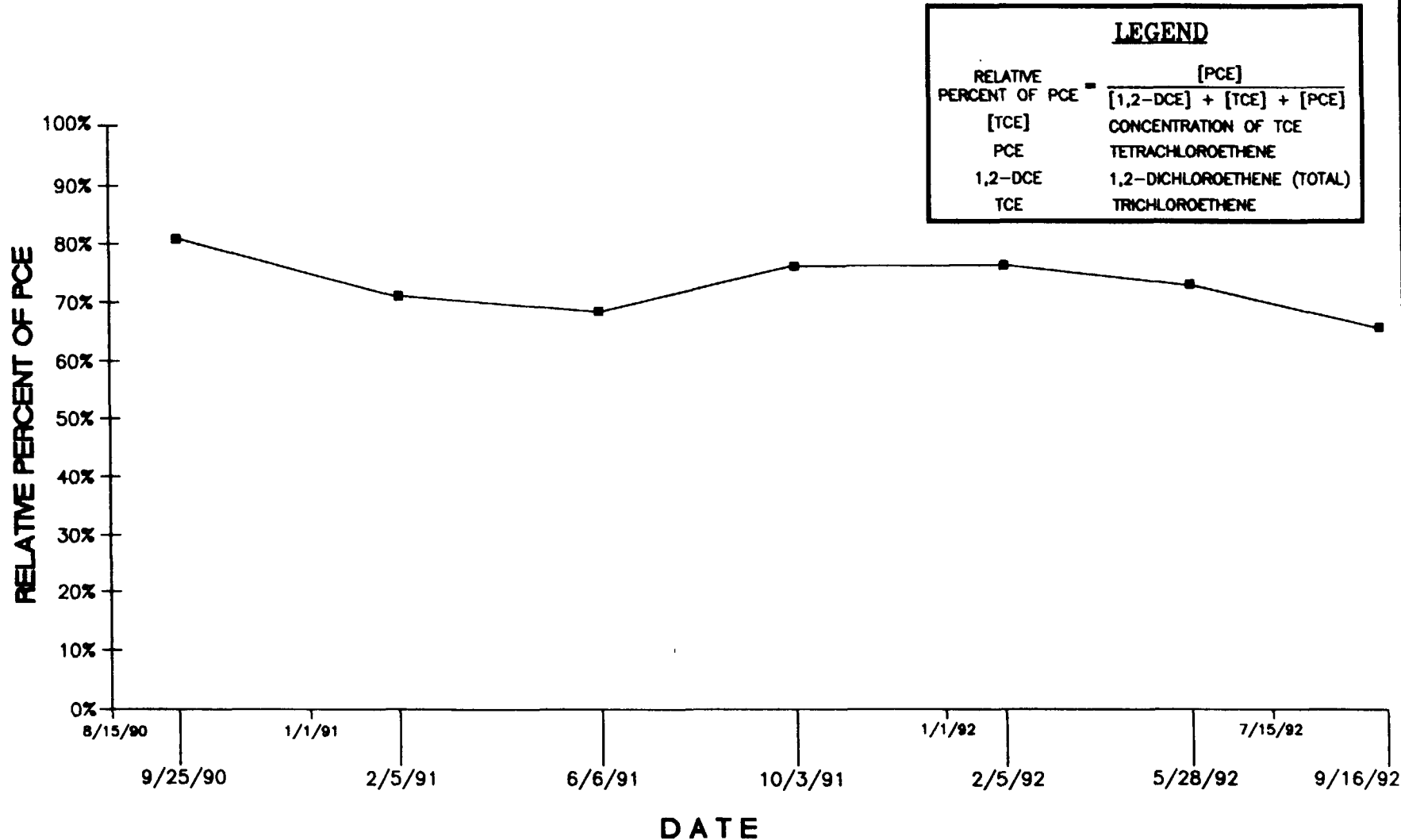


RELATIVE PERCENT OF PCE IN LAPLACE WELL SAMPLES
SEPTEMBER 1990 THROUGH SEPTEMBER 1992

TUTU WELLS SITE
ST. THOMAS, U.S. VIRGIN ISLANDS

FIGURE

12



APPENDIX A

**DATA VALIDATION SUMMARY
REPORT FOR THE TUTU WELLS SITE
MAY 1992 SAMPLING EVENT
ST. THOMAS, U.S. VIRGIN ISLANDS**

TUT 003 0439

APPENDIX A

DATA VALIDATION SUMMARY REPORT FOR THE TUTU WELLS SITE SEPTEMBER 1992 SAMPLING EVENT, ST. THOMAS, U. S. VIRGIN ISLANDS

Appendix A includes the data validation summary report and supporting documentation generated during the analytical data review of ground-water samples collected in September 1992 at the Tutu Wells Site, St. Thomas, U.S. Virgin Islands.

APPENDIX FORMAT

The data validation report appendix is divided into the following sections:

- Introduction.
- Attachment No. 1 - The U.S. Environmental Protection Agency (USEPA) Standard Operating Procedure (SOP) Number (No.) HW-6 (Revision No. 8) Contract Laboratory Program (CLP) organics data review and preliminary review checklist, the data assessment narrative, and the organic regional data assessment form.
- Attachment No. 2 - Tables associated with the data validation assessment narrative.
- Attachment No. 3 - Analytical data packages.

The introduction summarizes (1) the field investigation sampling effort, (2) the analytical parameters and methods employed in support of the field investigation, and (3) the data validation requirements and validation protocols used for the data assessment.

Attachment No. 1 is comprised of the USEPA SOP No. HW-6 (Revision No. 8) CLP organics preliminary data review checklist, the data assessment narrative, and the organic regional data assessment form (USEPA 1992). The data review checklist guides the data reviewer in evaluating pertinent field and laboratory sample documentation and analytical procedures. By evaluating critical quality control (QC) criteria, the data reviewer determines

the validity of generated data and places limitations on data use. In the data assessment narrative, the data reviewer summarizes the validation, discusses sample anomalies and QC outliers, and provides an overall assessment of the analytical data generated in support of the field investigation. The organic regional data assessment form provides a condensed data assessment summary.

In Attachment No. 2, tabulated data are provided that summarize any holding time non-compliance; associated trip blank, field blank, and method blank contamination; laboratory fortified blank (LFB) QC exceedances; and validated analytical data with applied qualifiers.

Attachment No. 3 is comprised of the analytical data packages prepared by the laboratory for all samples collected and reviewed for this field investigation. These data packages are available upon request.

INTRODUCTION

This report presents the data validation and narrative summary for the following 14 ground-water samples, one field blank, and four trip blanks collected in September 1992 at the Tutu Wells Site, St. Thomas, U.S. Virgin Islands:

<u>Enseco-East Project Numbers</u>	<u>Sample Identifiers</u>	<u>Collection Date</u>
24462	Steele, Harvey, Trip Blank (9/14/92).	9/14/92
24697	Four Winds I, Four Winds II, Ramsay, Ruben (Field replicate of Ramsay), Gassett, Field Blank (9/15/92) Trip Blank (9/15/92).	9/15/92
24704	Tillett, Smith, Eglin I, Eglin II, Eglin III, Harthman II, Trip Blank (9/16/92)	9/16/92
24741	LaPlace, Trip Blank (9/25/92).	9/25/92

All of the samples were analyzed for target compound list (TCL) volatile organic compounds (VOCs). In addition, a library search was performed for ten non-target tentatively identified compounds (TICs) based on a comparison of the sample spectra against the reference library mass spectra. Sample analyses were performed by Enseco-East (Enseco), a laboratory division of Enseco Incorporated located in Somerset, New Jersey. VOCs were analyzed according to USEPA Method 524.2, Revision 3.0 (USEPA 1989).

The organic data have been evaluated according to the USEPA Region II SOP No. HW-6, Revision No. 8 (USEPA 1992), in conjunction with the USEPA Draft National Functional Guidelines for Organics Data Review (USEPA 1991) and the requirements of the corresponding, analytical methodology. Because the VOC analyses were not performed in accordance with the

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CLP protocols, the SOP for organic data review is not directly applicable. The SOP was used for guidance, along with the USEPA Method 524.2, Revision 3.0 (USEPA 1989) and the additional QC requirements outlined in the revised Sampling, Analysis, and Monitoring Plan (SAMP) (Geraghty & Miller, Inc. 1991), to perform the data validation. All of the data have been tabulated and assigned the appropriate qualifier codes, if required. The validated data tables are provided as Table A-4 and Table A-5 in Attachment No. 2.

REFERENCES

- Geraghty & Miller, Inc. 1991. Revised Sampling, Analysis, and Monitoring Plan for Wells, Tutu Wells Site, St. Thomas, U.S. Virgin Islands. Prepared for Tutu Environmental Investigation Committee, September 1990, revised September 1991.
- U.S. Environmental Protection Agency (USEPA). 1989. Method 524.2, Measurement of Purgeable Organic Compounds in Water by Capillary Column Gas Chromatography/Mass Spectroscopy, Revision 3.0. Environmental Monitoring Systems Laboratory (EMSL), Office of Research and Development, United States Environmental Protection Agency, 1989.
- U.S. Environmental Protection Agency (USEPA). 1991. Draft National Functional Guidelines for Organics Data Review, Multi-Media, Multi-Concentration (OLM01.0), United States Environmental Protection Agency, December 1990, revised June 1991.
- U.S. Environmental Protection Agency (USEPA). 1992. Contract Laboratory Program (CLP) Organics Data Review and Preliminary Review, Region II Standard Operating Procedure No. HW-6, Revision No. 8, United States Environmental Protection Agency, January 1992.

PR00801/NOVINTRO

TUT 003 0444

ATTACHMENT NO. 1

**U.S. ENVIRONMENTAL PROTECTION AGENCY
STANDARD OPERATING PROCEDURE NO. HW-6
REVISION NO. 8**

TUT 003 0445

SOP NO. HW-6
Revision #8

CLP ORGANICS DATA REVIEW
AND PRELIMINARY REVIEW

BY: Leon Lazarus Date: January 2, 1992
Leon Lazarus, Environmental Scientist
Toxic and Hazardous Waste Section

BY: George Karras Date: January 3, 1992
George Karras, Chemist
Toxic and Hazardous Waste Section

BY: Stelios Gerazounis Date: 1/3/92
Stelios Gerazounis, Chemist
Toxic and Hazardous Waste Section

CONCURRED BY: Kevin W. Kubik Date: 1/3/92
Kevin Kubik, Chief
Toxic and Hazardous Waste Section

APPROVED BY: Robert Runyon Date: 1/7/92
Robert Runyon, Chief
Monitoring Management Branch

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YES NO N/A

PACKAGE COMPLETENESS AND DELIVERABLES

CASE NUMBER: 24462, 24697, 24704, 24741

LAB: Enseco-East

SITE: Tutu Wells

1.0 DATA COMPLETENESS AND DELIVERABLES

- 1.1 Have any missing deliverables been received and added to the data package?

[] [] X

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?

[] [] X

2.0 COVER LETTER SDG NARRATIVE

- 2.1 Is the Narrative or Cover Letter Present?

[X] [] []

- 2.2 Are Case Number and/or SAS number contained in the Narrative or Cover letter?

[X] [] []

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.

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YES NO N/A

3.0 DATA VALIDATION CHECKLIST (continued)

Does this package contain:

VOA Data?

X

BNA Data?

 X

Pesticide/PCB data?

 X

ACTION: Complete corresponding parts of checklist.

PART A: VOA ANALYSES

1.0 TRAFFIC REPORTS AND LABORATORY NARRATIVE

1.1 Are the Traffic Report Forms present for all samples?

[X]

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 circumstances affecting
the quality of the data?

X []

ACTION: If any sample analyzed as a soil, other than TCLP,
contains 50%-90% water, all data should be flagged
as estimated (J). If a soil sample other than
TCLP contains more than 90% water, all data should
be qualified as unusable (R).

ACTION: If samples were not iced upon receipt at the
laboratory, flag all positive results "J" and all
Non-Detects "UJ."

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YES NO N/A

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

2.0 HOLDING TIMES

- 2.1 Have any VOA technical holding times, determined from date of collection to date of analysis, been exceeded?

X

If unpreserved, aqueous samples maintained at 4°C which are to be analyzed for aromatic hydrocarbons must be analyzed within 7 days of collection. If preserved with HCl (pH < 2) and stored at 4°C, then aqueous samples must be analyzed within 14 days of collection. If uncertain about preservation, contact sampler to determine whether or not samples were preserved.

The holding time for soils is 10 days.

Table of Holding Time Violations (See Table A-1 in Attachment No. 2)

Sample ID	Sample Matrix	Preserved?	Date Sampled	Date Lab Received	Date Analyzed
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____

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YES NO N/A

ACTION: If technical 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. If analyses were done more than 14 days beyond holding time, either on the first analysis or upon re-analysis, the reviewer must use professional judgement to determine the reliability of the data and the effects of additional storage on the sample results. At a minimum, all results must be qualified "J", but the reviewer may determine that non-detect data are unusable (R). If holding times are exceeded by more than 28 days, all non-detect data are unusable (R).

3.0 System Monitoring Compound (SMC) Recovery (Form II)

3.1 Are the VOA SMC Recovery Summaries (Form II) present for each of the following matrices:

a.	Low Water	☒	☐	☐
b.	Low Soil	☐	☐	☒
c.	Med Soil	☐	☐	☒

3.2 Are all the VOA samples listed on the appropriate System Monitoring Compound Recovery Summary for each of the following matrices:

a.	Low Water	☒	☐	☐
b.	Low Soil	☐	☐	☒
c.	Med Soil	☐	☐	☒

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YES NO N/A

ACTION: Call lab for explanation/resubmittals. If missing deliverables are unavailable, document effect in data assessments.

3.3 Were outliers marked correctly with an asterisk? ☐ ☐ ☒

ACTION: Circle all outliers in red.

3.4 Was one or more VOA system monitoring compound recovery outside of contract specifications for any sample or method blank? ☐ ☒ ☐

If yes, were samples re-analyzed? ☐ ☐ ☒

Were method blanks re-analyzed? ☐ ☐ ☒

ACTION: If recoveries are > 10% but one or more compounds fail to meet SOW specifications:

1. All positive results are qualified as estimated (J).
2. Flag all non-detects as estimated detection limits ("UJ") where recovery is less than the lower acceptance limit.
3. If SMC recoveries are above allowable levels, do not qualify non-detects.

If any system monitoring compound recovery is < 10%:

1. Flag all positive results as estimated ("J").
2. Flag all non-detects as unusable ("R").

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YES NO N/A

Professional judgement should be used to qualify data that only have method blank SMC 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?

___ [X] ___

ACTION: If large errors exist, call lab for explanation/resubmittal, make any necessary corrections and note errors in the data assessment.

4.0 Matrix Spikes (Form III)

- 4.1 Is the Matrix Spike/Matrix Spike Duplicate Recovery Form (Form III) present?

[X] ___ ___

- 4.2 Were matrix spikes analyzed at the required frequency for each of the following matrices:

a. Low Water

[X] ___

b. Low Soil

[___] ___ X

c. Med Soil

[___] ___ X

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

1 out of 10

N/A out of 10

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YES NO N/A

- 4.4 How may RPD's for matrix spike and matrix spike duplicate recoveries are outside QC limits?

Water

Soils

1 out of 5

N/A out of 5

ACTION: No action is taken based on MS/MSD data alone. However, using informed professional judgement, the MS/MSD results may be used in conjunction with other QC criteria to determine the need for qualification of the data.

5.0 Blanks (Form IV)

- 5.1 Is the Method Blank Summary (Form IV) present?

[X]

- 5.2 Frequency of Analysis: for the analysis of VOA TCL compounds, has a reagent/method blank been analyzed for each SDG or every 20 samples of similar matrix (low water, low soil, medium soil), whichever is more frequent?

[X] ____

- 5.3 Has a VOA method/instrument blank been analyzed at least once every twelve hours for each concentration level and GC/MS system used?

[X] ____

ACTION: If any method blank data are missing, call lab for explanation/resubmittal. If method blank data are not available, reject (R) all associated positive data. However, using professional judgement, the data reviewer may substitute field blank or trip blank data for missing method blank data.

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YES NO N/A

- 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?

[X]

ACTION: Use professional judgement to determine the effect on the data.

6.0 Contamination

NOTE: "Water Blanks", "drill 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 describe below, the contaminant concentration in these blanks are multiplied by the sample dilution factor and corrected for % moisture when necessary.

 X

- 6.2 Do any field/trip/rinse blanks have positive VOA results (TCL and/or TIC)?

 X

ACTION: Prepare a list of the samples associated with each of the contaminated blanks. (Attach a separate sheet).

NOTE: All field blank results associated to a particular group of samples (may exceed one per case) must be used to qualify data. Trip blanks are used to qualify only those samples with which they were shipped and are not required for non-aqueous matrices. Blanks may not be qualified

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YES NO N/A

because of contamination in another blank. Field blanks & Trip blanks must be qualified for system monitoring compound, instrument performance criteria, spectral 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. If any blanks are grossly contaminated, all associated data should be qualified as unusable (R).

	Sample conc > CRQL but < 10 x blank value	Sample conc < CRQL & < 10x blank value	Sample conc > CRQL & > 10x blank value
Methylene Chloride Acetone Toluene 2-Butanone	Flag sample result with a "U"	Report CRQL & qualify "U"	No qualification is needed
	Sample conc > CRQL but < 5x blank	Sample conc < CRQL & is < 5x blank value	Sample conc > CRQL value & > 5x blank value
Other Contaminants	Flag sample result with a "U"	Report CRQL & qualify "U"	No qualification is needed

NOTE: Analytes qualified "U" for blank contamination are still considered as "hits" when qualifying for calibration criteria.

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YES NO N/A

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 Instrument Performance Check (Form V)

- 7.1 Are the GC/MS instrument Performance Check 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 an instrument performance compound been analyzed for every twelve hours of sample analysis per instrument? ☒ ☐ ☐

ACTION: List date, time, instrument ID, and sample analysis for which no associated GC/MS tuning data are available.

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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 abundances been normalized to m/z 95? [X] _____

ACTION: If mass assignment is in error, qualify all associated data as unusable (R).

7.5 Have the ion abundance criteria been met for each instrument used? [X] _____

ACTION: List all data which do not meet ion abundance criteria (attach a separate sheet).

ACTION: If ion abundance criteria are not met, the Region II TPO must be notified.

7.6 Are there any transcription/calculation errors between mass lists and Form Vs? (Check at least two values but if errors are found, check more). _____ [X] _____

7.7 Have the appropriate number of significant figures (two) been reported? [X] _____

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	YES	NO	N/A
7.8 Are the spectra of the mass calibration compound acceptable?	☒	☐	☐
8.0 <u>Target Compound List (TCL) Analytes</u>			
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	☒	☐	☐
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	☒	☐	☐
<u>ACTION:</u> If any data are missing, take action specified in 3.2 above.			
8.3 Are the response factors shown in the Quant Report?	☐	☒	☐

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	YES	NO	N/A
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%?	☒	☐	☐

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YES NO N/A

ACTION: Use professional judgement to determine acceptability of data. If it is determined that incorrect identifications were made, all such data should be rejected (R), flagged "N" (presumptive evidence of the presence of the compound) or changed to not detected (U) at the calculated detection limit. In order to be positively identified, the data must comply with the criteria listed in 8.6, 8.7, and 8.8.

ACTION: When sample carry-over is a possibility, professional judgement should be used to determine if instrument cross-contamination has affected any positive compound identification.

9.0 Tentatively Identified Compounds (TICs)

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 "JN" qualifier?

[] X

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

[X] [] []

b. Blanks

[X] [] []

ACTION: If any TIC data are missing, take action specified in 3.2 above.

ACTION: Add "JN" qualifier if missing.

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YES NO N/A

- 9.3 Are any TCL compounds (from any fraction) listed as TIC compounds (example: 1,2-dimethylbenzene is xylene-a VOA TCL analyte - and should not be reported as a TIC)?

____ [X] ____

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?

[X] ____ ____

- 9.5 Do TIC and "best match" standard relative ion intensities agree within 20%?

[X] ____ ____

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.

Also, when a compound is not found in any blank, but is detected in a sample and is a suspected artifact of a common laboratory contaminant, the result should be qualified as unusable (R). (i.e. Common Lab Contaminants: Co₂ (M/E 44), Siloxanes (M/E 73) Hexane, Aldol Condensation Products, Solvent Preservatives, and related by products - see Functional Guidelines for more guidance).

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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. Verify that the correct internal standard, quantitation ion, and RRF were used to calculate Form I result. Were any errors found?

___ [X] ___

- 10.2 Are the CRQLs adjusted to reflect sample dilutions and, for soils, sample moisture?

[X] ___ ___

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 data from the diluted sample analysis). Replace concentrations that exceed the calibration range in the original analysis by crossing out the "E" and its associated value on the original Form I and substituting the data from the analysis of the 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?

[X] ___ ___

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YES NO N/A

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 at concentrations
10, 20, 50, 100, 200 ug/L? Are there separate
calibrations for low water/med soils and low soil
samples?

[] [] X

ACTION: If any calibration standard forms are missing,
take action specified in 3.2 above.

- 12.2 Were all low level soil standards, blanks and samples
analyzed by heated purge?

[] [] X

ACTION: If low level soil samples were not heated during
purge, qualify positive hits "J" and non-detects "R".

- 12.3 Are response factors stable for VOA's over the
concentration range of calibration (% Relative
Standard Deviation [%RSD] < 30.0%)?

[X] [] []

ACTION: Circle all outliers in red.

NOTE: Although 11 VOA compounds have a minimum
RRF and no maximum %RSD, the technical
criteria are the same for all analytes.

ACTION: If %RSD > 30.0%, qualify associated positive
results for that analyte "J" and non-detects
using professional judgement. When RSD > 90%, flag
all non-detects for that analyte R (unusable).

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YES NO N/A

NOTE: Analytes previously qualified "U" for blank contamination are still considered as "hits" when qualifying for initial calibration criteria.

12.4 Are the RRFs above 0.05? ☐ ☒ ☐

ACTION: Circle all outliers in red.

ACTION: If any RRF are < 0.05 , qualify associated non-detects (R) and flag associated positive data as estimated (J).

12.5 Are there any transcription/calculation errors in the reporting of average response factors (RRF) or %RSD? (check at least 2 values, but if errors are found, check more). ☐ ☒ ☐

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.

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YES NO N/A

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 volatile compounds have a % Difference (%D) between the initial and continuing RRF which exceeds the $\pm 25\%$ criteria?

X []

ACTION: Circle all outliers in red.

ACTION: Qualify both positive results and non-detects for the outlier compound(s) as estimated. When % D is above 90%, reject all non-detects for that analyte (R) unusable.

- 13.4 Do any volatile compounds have a RRF < 0.05 ?

X []

ACTION: Circle all outliers in red.

ACTION: If the RRF < 0.05 , qualify associated non-detects as unusable (R) and "J" associated positive values.

- 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.)

[] X []

ACTION: Circle errors in red.

ACTION: If errors are large, call lab for explanation/resubmittal, make any necessary corrections and note errors under "Conclusions".

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YES NO N/A

14.0 Internal Standard (Form VIII)

14.1 Are the internal standard areas (Form VIII) of every sample and blank within the upper and lower limits (-50% to +100 %) for each continuing calibration.

[X] ____ ____

ACTION: List all the outliers below.

Sample #	Internal Std	Area	Lower Limit	Upper Limit
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____

(Attach additional sheets if necessary).

ACTION:

1. If the internal standard area count is outside the upper or lower limit, flag with "J" all positive results quantitated with this internal standard.
2. Non-detects associated with IS area counts > 100% should not be qualified.
3. If IS area is below the lower limit (< 50%), qualify all associated non-detects (U values) "J". If extremely low area counts are reported, (< 25% or if performance exhibits a major abrupt drop off, flag all associated non-detects as unusable ("R").

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YES NO N/A

- 14.2 Are the retention times of the internal standards within 30 seconds of the associated calibration standard?

[X] ____ ____

ACTION: Professional judgement should be used to qualify data if the retention times differ by more than 30 seconds.

15.0 Field Duplicates

- 15.1 Were any field duplicates submitted for VOA analysis?

[X] ____ ____

ACTION: Compare the reported results for field duplicates and calculate the relative percent difference.

ACTION: Any gross variation between 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.

#PR00801DV3/1192ORGAN.DTA

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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: If any sample analyzed as a soil, other than TCLP, contains 50%-90% water, all data should be flagged as estimated ("J"). If a soil sample, other than TCLP, contains more than 90% water, all data should be qualified as usable (R).

ACTION: If samples were not iced upon receipt at the laboratory, flag all positive results "J" and all non-detects "UJ".

2.0 Holding Times

- 2.1 Have any BNA technical holding times, determined from date of collection to date of extraction, been exceeded? []

Continuous extraction of water samples for BNA analysis be started within seven days of the date of collection. Soil/sediment samples must be extracted within 7 days of collection. Extracts must be analyzed within 40 days of the date of extraction.

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YES NO N/A

Table of Holding Time Violations (See Narrative)

(See Traffic Report)					
Sample	Sample Matrix	Date Stamped	Date Lab Received	Date Extracted	Date Analyzed
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____

ACTION: If technical 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.

If analyses were done more than 14 days beyond holding time, either on the first analysis or upon reanalysis, reviewer must use professional judgement to determine the reliability of the data and the effects of additional storage on the sample results. At a minimum, all results should be qualified "J", but the reviewer may determine that non-detect data are unusable ("R"). If holding times are exceeded by more than 28 days, all non-detect data are unusable (R).

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	YES	NO	N/A
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. Low Soil	☐	☐	☐
c. 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. Low Soil	☐	☐	☐
c. Low Soil	☐	☐	☐
<u>ACTION:</u> Call lab for explanation/resubmittals. If missing deliverables are unavailable, document effect in data assessments.			
3.3 Were outliers marked correctly with an asterisk?	☐	☐	☐
3.4 Were two or more base-neutral <u>OR</u> acid surrogate recoveries out of specification for any sample or method blank?	☐	☐	☐
If yes, were samples reanalyzed?	☐	☐	☐
Were method blanks reanalyzed?	☐	☐	☐

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YES NO N/A

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") when recoveries are less than the lower acceptance limit.
3. If recoveries are greater than the upper acceptance limit, do not qualify non-detects.

If any base-neutral or acid surrogate has a recovery of < 10%:

1. Positive results for the fraction with < 10% surrogate recovery are qualified with "J".
2. Non-detects for that fraction should be qualified as unusable (R).

- 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 document effect in data assessments.

4.0 **Matrix Spikes (Form III)**

- 4.1 Is the Matrix Spike/Matrix Spike Duplicate Recovery Form (Form III) present?

[] ___

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	YES	NO	N/A
4.2 Were matrix spikes analyzed at the required frequency for each of the following matrices:			
a. Low Water	☐	___	___
b. Low Soil	☐	___	___
c. Med Soil	☐	___	___

ACTION: If any matrix spike data are missing, take the action specified in 3.2 above.

4.3 How may BNA spike recoveries are outside QC limits?

Water

Soils

2 out of 22

N/A out of 22

4.4 How may 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: No action is taken on MS/MSD data alone. However, using informed professional judgement, the data reviewer may use the matrix spike and matrix spike duplicate results in conjunction with other QC criteria and determine the need for some qualification of the data.

5.0 Blanks (Form IV)

5.1 Is the Method Blank Summary (Form IV) present? ☐ ___

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YES NO N/A

5.2 Frequency of Analysis:

Has a reagent/method blank analysis been reported per 20 samples of similar matrix, or concentration level, and for each extraction batch?

[] [] []

5.3 Has a BNA method blank been analyzed for each GC/MS system used?

[] [] []

(See SOW p. D - 59/SV, Section 8.7)

ACTION: If any method blank data are missing, call lab for explanation/resubmittal. If not available, use professional judgement to determine if the associated sample data should be qualified.

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 BNAs?

[] [] []

ACTION: Use professional judgement to determine the effect on the data.

6.0 Contamination

NOTE: "Water blank", "drill blanks" and "distilled water blanks" are validated like any other sample and are not used to qualify the data. Do not confuse them with the other QC blanks discussed below.

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YES NO N/A

- 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 and corrected for % moisture where necessary.

___ [___] ___

- 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: All field blank results associated to a particular group of samples (may exceed one per case) must be used to qualify data. Blanks may not be qualified because of contamination in another blank. Field Blanks must be qualified for surrogate, spectral, instrument performance 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. If gross contamination exists, all data in the associated samples should be qualified as unusable (R).

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Sample conc > CRQL but < 10x blank	Sample conc < CRQL & is < 10x blank value	Sample conc > CRQL value & > 10x blank
---------------------------------------	--	---

Common Phthalate Esters

Flag sample result with a "U"	Report CRQL & qualify "U"	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"	Report CRQL & qualify "U"	No qualification is needed.
----------------------------------	------------------------------	--------------------------------

YES NO N/A

NOTE: Analytes qualified "U" for blank contamination are still considered as "hits" when qualifying for calibration criteria.

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?

___ ☐ ___

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YES NO N/A

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 Instrument Performance Check

7.1 Are the GC/MS Instrument Performance Check 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 an instrument performance check solution been analyzed for every twelve hours of sample analysis per instrument?

[] — —

ACTION: List date, time, instrument ID, and sample analyses for which no associated GC/MS tuning data are available.

DATE	TIME	INSTRUMENT	SAMPLE NUMBERS
------	------	------------	----------------

—	—	—	—
—	—	—	—
—	—	—	—

ACTION: If lab cannot provide missing data, reject ("R") all data generated outside an acceptable twelve hour calibration interval.

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YES NO N/A

ACTION: If mass assignment is in error, flag all associated sample data as unusable (R).

ACTION: If mass assignment is in error, flag all associated sample data as unusable (R).

7.4 Have the ion abundances been normalized to m/z 198?

☐ ☐ ☐

7.5 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).

7.6 Are there any transcription/calculation errors between mass lists and Form Vs?

☐ ☐ ☐

7.7 Have the appropriate number of significant figures (two) been reported?

☐ ☐ ☐

ACTION: If large errors exist, call lab for explanation/resubmittal, make necessary corrections and document effect in data assessments.

7.8 Are the spectra of the mass calibration compound acceptable?

☐ ☐ ☐

ACTION: Use professional judgement to determine whether associated data should be accepted, qualified, or rejected.

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YES NO N/A

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 | [] | ___ | ___ |

8.2 Has GPC cleanup been performed on all soil/sediment sample extracts?

[] ___

ACTION: If data suggests that GPC was not performed, use professional judgement. Make note in "Contract Problems/Non-Compliance".

8.3 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.

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		YES	NO	N/A
8.4	Are the response factors shown in the Quant Report?	[]	___	___
8.5	Is chromatographic performance acceptable with respect to:			
	Baseline stability?	[]	___	___
	Resolution?	[]	___	___
	Peak shape?	[]	___	___
	Full-scale graph (attenuation)?	[]	___	___
	Other: _____	[]	___	___
	<u>ACTION:</u> Use professional judgement to determine the acceptability of the data.			
8.6	Are the lab-generated standard mass spectra of identified BNA compounds present for each sample?	[]	___	___
	<u>ACTION:</u> 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". If spectra are missing, reject all positive data.			
8.7	Is the RRT of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?	[]	___	___
8.8	Are all ions present in the standard mass spectrum at a relative intensity greater than 10% also present in the sample mass spectrum?	[]	___	___

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YES NO N/A

- 8.9 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 (R), flagged "N" (Presumptive evidence of the presence of the compound) or changed to not detected (U) at the calculated detection limit. In order to be positively identified, the data must comply with the criteria listed in 8.7, 8.8, and 8.9.

ACTION: When sample carry-over is a possibility, professional judgement should be used to determine if instrument cross-contamination has affected any positive compound identification.

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 "JN" 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

☐ ☐ ☐

☐ ☐ ☐

☐ ☐ ☐

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YES NO N/A

ACTION: If any TIC data are missing take action specified in 3.2 above.

ACTION: Add "JN" qualifier if missing.

- 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. Also, when a compound is not found in any blank, but is a suspected artifact of a common laboratory contaminant, the result should be qualified as unusable (R).

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,

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-
- | | YES | NO | N/A |
|--|--------------------------|--------------------------|-----|
| 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? | ☐ | ___ | ___ |

ACTION: If errors are large, call lab for explanation/resubmittal, make any necessary corrections and document effect in data assessments.

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" and it's associated value on the original Form I and substituting the data from the analysis of the 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 Standard 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? | ☐ | ___ | ___ |
|---|--------------------------|-----|-----|

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YES NO N/A

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?
(% Relative standard deviation [%RSD] < 30.0%)

[] [] []

ACTION: Circle all outliers in red.

NOTE: Although 20 BNA compounds have a minimum RRF and no maximum %RSD, the technical criteria are the same for all analytes.

ACTION: If the % RSD is > 30.0, qualify positive results for that analyte "J" and non-detects using professional judgement. When RSD > 90%, flag all non-detect results for that analyte R (unusable).

NOTE: Analytes previously qualified "U" due to blank contamination are still considered as "hits" when qualifying for calibration criteria.

- 12.3 Are all BNA compound RRFs > 0.05?

[] [] []

ACTION: Circle all outliers in red.

ACTION: If any RRF < 0.05

1. "R" all non-detects.
2. "J" all positive results.

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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 in data assessments.

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 a continuing calibration analysis for each instrument used.

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").

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YES NO N/A

- 13.3 Do any semivolatile compounds have a % Difference (%D) between the initial and continuing RRF which exceeds + 25.0% criteria?

___ [___] ___

ACTION: Circle all outliers in red.

ACTION: Qualify both positive results and non-detects for the outlier compound(s) as estimated (J). When %D is above 90%, reject all non-detects for that analyte (R) unusable.

- 13.4 Do any semivolatile compounds have a RRF < 0.05?

___ [___] ___

ACTION: Circle all outliers in red.

ACTION: If RRF < 0.05, qualify as unusable (R) associated non-detects and "J" associated positive values.

- 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 document effect in data assessments.

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YES NO N/A

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 (-50% to + 100%) for each continuing calibration?

[] [] []

ACTION: List all the outliers below.

Sample #	Internal Std	Area	Lower Limit	Upper Limit
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____

(Attach additional sheets if necessary).

ACTION:

1. 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.
2. Non-detects associated with IS areas > 100% should not be qualified.

TUT 101 0112

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YES NO N/A

3. If the IS area is below the lower limit (<50%), qualify all associated non-detects (U-values) "J". If extremely low area counts are reported (<25%) 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

- 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.

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YES NO N/A

PART C: PESTICIDE/PCB ANALYSIS

1.0 Traffic Reports and Laboratory Narrative

- 1.1 Are 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 SDG Narrative indicate any problems with sample receipt, condition of the samples, analytical problems or special circumstances affecting the quality of the data?

[] [] []

ACTION: If any sample analyzed as a soil, other than TCLP, contains 50%-90% water, all data should be qualified as estimated (J). If a soil sample, other than TCLP, contains more than 90% water, all data should be qualified as unusable (R).

ACTION: If samples were not iced upon receipt at the laboratory, flag all positive results "J" and non-detects "UJ".

2.0 Holding Times

- 2.1 Have any PEST/PCB technical holding times, determined from date of collection to date of extraction, been exceeded?

[] [] []

Water and soil samples for PESTS/PCB analysis must be extracted within 7 days of the date of collection. Extracts must be analyzed within 40 days of the date extraction.

OUT 003 0446

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YES NO N/A

ACTION: If technical holding times are exceeded, flag all positive results as estimated (J) and sample quantitation limits (UJ) and document in the narrative that holding times were exceeded. If analyses were done more than 14 days beyond holding time, either on the first analysis or upon re-analysis, the reviewer must use professional judgement to determine the reliability of the data and the effects of additional storage on the sample results. At a minimum, all the data should at least be qualified "J", but the reviewer may determine that non-detects are unusable (R).

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. Soil ☐ ☐ ☐

3.2 Are all the PEST/PCB samples listed on the appropriate Surrogate Recovery Summary for each of the following matrices?

a. Low Water ☐ ☐ ☐

b. Soil ☐ ☐ ☐

ACTION: Call lab for explanation/resubmittals. If missing deliverables are unavailable, document effect in data assessments.

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- | | YES | NO | N/A |
|--|--------------------------|--------------------------|--------------------------|
| 3.3 Were outliers marked correctly with an asterisk? | ☐ | ☐ | ☐ |
| <u>ACTION:</u> Circle all outliers in red. | | | |
| 3.4 Were surrogate recoveries of TCX or DCB outside of the contract specification for any sample or blank? (60-150%) | ☐ | ☐ | ☐ |
| <u>ACTION:</u> No qualification is done if surrogates are diluted out. If recovery for <u>both</u> surrogates is below the contract limit, but above 10%, flag all results for that sample "J". If recovery is < 10% for either surrogate, qualify positive results "J" and flag non-detects "R". If recovery is above the contract advisory limits for <u>both</u> surrogates qualify positive values "J". | | | |
| 3.5 Were surrogate retention times (RT) within the windows established during the initial 3-point analysis of individual Standard Mixture A? | ☐ | ☐ | ☐ |
| <u>ACTION:</u> If the RT limits are not met, the analysis may be qualified unusable (R) for that sample on the basis of professional judgement. | | | |
| 3.6 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 document effect in data assessments.

TUT 003 0490

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	YES	NO	N/A
4.0			
<u>Matrix Spikes (Form III)</u>			
4.1 Is the Matrix Spike/Matrix Spike Duplicate Recovery Form (Form III) present?	[]	___	___
4.2 Were matrix spikes analyzed at the required frequency for each of the following matrices? (1 MS/MSD must be performed for every 20 samples of similar matrix or concentration level)			
a. Low Water	[]	___	___
b. Soil	[]	___	___
<u>ACTION:</u> 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?			
<u>Water</u>			
___ out of 12			
<u>Soil</u>			
___ out of 12			
4.4 How many RPD's for matrix spike and matrix spike duplicate recoveries are outside QC limits?			
<u>Water</u>			
___ out of 6			
<u>Soil</u>			
___ out of 6			

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YES NO N/A

ACTION: No action is taken on MS/MSD data alone. However, using informed professional judgement, the data reviewer may use the matrix spike and matrix spike duplicate results in conjunction with other QC criteria and determine the need for some qualification of the data.

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/PCB TCL compounds, has a reagent/method blank been analyzed for each SDG or every 20 samples of similar matrix or concentration or each extraction batch, whichever is more frequent? ☐ ☐ ☐

ACTION: If any blank data are missing, take the action specified above in 3.2. If blank data is not available, reject (R) all associated positive data. However, using professional judgement, the data reviewer may substitute field blank data for missing method blank data.

5.3 Has a PEST/PCB instrument blank been analyzed at the beginning of every 12 hr. period following the initial calibration sequence? (minimum contract requirement).

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YES NO N/A

ACTION: If any blank data are missing, call lab for explanation/resubmittals. If missing deliverables are unavailable, document the effect in data assessments.

- 5.4 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", "distilled water blanks" and "drilling water blanks" are validated like any other sample and are not used to qualify the data. Do not confuse them with the other QC blanks discussed below.

- 6.1 Do any method/instrument/reagent/cleanup 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 and corrected for % moisture when necessary.

___ [] ___

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YES NO N/A

- 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)

NOTE: All field blank results associated to a particular group of samples (may exceed one per case or one per day) may be used to qualify data. Blanks may not be qualified because of contamination in another blank. Field blanks must be qualified for surrogate, or calibration QC problems.

ACTION: Follow the directions in the table below to qualify TCI results due to contamination. Use the largest value from all the associated blanks.

Sample conc > CRQL but < 5 x blank	Sample conc < CRQL & is < 5x blank value	Sample conc > CRQL & > 5 x blank value
Flag sample result with a "U"	Report CRQL & qualify "U"	No qualification is needed

NOTE: If gross blank contamination exists, all data in the associated samples should be qualified as unusable (R).

- 6.3 Are there field/rinse/equipment blanks associated with every sample? ☐ ☐ ☐

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YES NO N/A

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 Systems Printouts for both columns present for all samples, blanks, MS/MSD?

- | | | | |
|--|-----|-----|-----|
| a. peak resolution check | [] | ___ | ___ |
| b. performance evaluation mixtures | [] | ___ | ___ |
| c. aroclor 1016/1260 | [] | ___ | ___ |
| d. aroclors 1221, 1232, 1242, 1248, 1254 | [] | ___ | ___ |
| e. toxaphene | [] | ___ | ___ |
| f. low points individual mixtures A & B | [] | ___ | ___ |
| g. med points individual mixtures A & B | [] | ___ | ___ |
| h. high points individual mixtures A & B | [] | ___ | ___ |
| i. instrument blanks | [] | ___ | ___ |

ACTION: If no, take action specified in 3.2 above.

- | | | | |
|--|-----|-----|-----|
| 7.2 Are Forms VI - PEST 1-4 present and complete for each column and each analytical sequence? | [] | ___ | ___ |
| 7.3 Are there any transcription/calculation errors between raw data and Forms VI? | ___ | [] | ___ |

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YES NO N/A

ACTION: If large errors exist, call lab for explanation/
resubmittal, make necessary corrections and document
effect in data assessments.

- 7.4 Do all standard retention times, including each
pesticide in each level of Individual Mixtures
A & B, fall within the windows established during
the initial calibration analytical sequence? (For
Initial Calibration Standards, Form VI - PEST - 1).

[] [] []

ACTION: If no, all samples in the entire analytical
sequence are potentially affected. Check to see if
the chromatograms contain peaks within an expanded
window surrounding the expected retention times.
If no peaks are found and the surrogates are visible,
non-detects are valid. If peaks are present and
cannot be identified through pattern recognition or
using a revised RT window, qualify all positive
results and non-detects as unusable (R).
For aroclors, RT may be outside the RT window,
but the aroclor may still be identified from the
individual pattern.

- 7.5 Are the linearity criteria for the initial analyses
of Individual Standards A & B within limits for both
columns? (%RSD must be < 20.0% for all analytes except
for the 2 surrogates, which must not exceed 30.0 % RSD).
See Form VI PEST - 2.

[] [] []

ACTION: If no, qualify all associated positive results
generated during the entire analytical sequence "J"
and all non-detects "UJ". When RSD > 90% flag all non-
detect results for that analyte R (unusable).

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YES NO N/A

- 7.6 Is the resolution between any two adjacent peaks in the Resolution Check Mixture > 60.0% for both columns? (Form VI-PEST-4).

[] [] []

ACTION: If no, positive results for compounds that were not adequately resolved should be qualified "J". Use professional judgement to determine if non-detects which elute in areas affected by co-eluting peaks should be qualified "N" as presumptive evidence of presence or unusable (R).

- 7.7 Is Form VII - Pest-1 present and complete for each Performance Evaluation Mixture analyzed during the analytical sequence for both columns?

[] []

ACTION: If no, take action as specified in 3.2 above.

- 7.8 Has the individual % breakdown exceeded 20.0% on either column.

[] [] []

- for 4,4' - DDT?

[] [] []

- for endrin?

[] [] []

Has the combined % breakdown for 4,4' - DDT/ Endrin exceeded 30.0% on either column? (required in all instances)

[] [] []

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YES NO N/A

ACTION:

1. If any % breakdown has failed the QC criteria in either PEM in steps 2 and 17 in the initial calibration sequence (p. D-38/Pest SOW 3/90), qualify all sample analyses in the entire analytical sequence as described below.
2. If any % breakdown has failed the QC criteria in a PEM Verification calibration, review data beginning with the samples which followed the last in-control standard until the next acceptable PEM & qualify the data as described below.
 - a. 4,4' - DDT Breakdown: If 4,4' - DDT breakdown is greater than 20. %:
 - i. Qualify all positive results for DDT with "J". If DDT was not detected, but DDD and DDE are positive, then qualify the quantitation limit for DDT as unusable (R).
 - ii. Qualify positive results for DDD and/or DDE as presumptively present at an approximated quantity (NJ).
 - b. Endrin Breakdown: If endrin breakdown is greater than 20.0%:

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YES NO N/A

- i. Qualify all positive results for endrin with "J". If endrin was not detected, but endrin aldehyde and endrin ketone are positive, then qualify the quantitation limit for endrin as unusable (R).
 - ii. Qualify positive results for endrin ketone and endrin aldehyde as presumptively present at an approximated quantity (NJ).
 - c. Combined Breakdown: If the combined 4,4' - DDT and endrin breakdown is greater than 30.0%.
 - i. Qualify all positive results for DDT and endrin with "J". If endrin was not detected, but positive aldehyde and endrin ketone are positive, then qualify the quantitation limit for endrin as unusable (R). If DDT was not detected, but DDD and DDE are positive, then qualify the quantitation limit for DDT as unusable (R).
 - ii. Qualify positive results for endrin ketone and endrin aldehyde as presumptively present at an approximated quantity (NJ). Qualify positive results for DDD and/or DDE as presumptively present at an approximated quantity (NJ).
- 7.9 Are the relative percent difference (RPD) values for all PEM analytes < 25.0% (Form VII-PEST-1)

[] [] []

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YES NO N/A

ACTION: If no, qualify all associated positive results generated during the analytical sequence "J" and sample quantitation limits "UJ".

NOTE: If the failing PEM is part of the initial calibration. All samples are potentially affected. If the offending standard is a verification calibration, the associated samples are those which followed the last in-control standard until the next passing standard.

7.10 Have all samples been injected within a 12 hour period beginning with the injection of an instrument Blank?

☐ ☐ ☐

7.11 Is Form VII - Pest-2 present and complete for INDA and INDB Verification Calibration analyzed?

☐ ☐ ☐

7.12 Are there any transcription/calculation errors between raw data and Form VII - Pest - 2?

☐ ☐ ☐

ACTION: If large errors exists, call lab for explanation/resubmittal, make any necessary corrections and document effect in data assessments. Under "Conclusions".

7.13 Do all standard retention times for each INDA and INDB Verification Calibration fall within the windows established by the initial calibration sequence?

☐ ☐ ☐

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YES NO N/A

- 7.14 Are RPD values for all verification calibration
standard compounds < 25.0%?

☐ ☐ ☐

ACTION: If the RPD is > 25.0% for the compound
being quantitated, qualify all associated
positive results "J" and non-detects "UJ". The
"associated samples" are those which followed
the last in-control standard up to the next
passing standard containing the analyte which
failed the criteria. If the RPD is > 90%, flag
all non-detects for that analyte R (unusable).

8.0 Analytical Sequence Check (Form VIII-PEST)

- 8.1 Is Form VIII present and complete for each
column and each period of analyses?

☐ ☐ ☐

ACTION: If no, take action specified in 3.2
above.

- 8.2 Was the proper analytical sequence followed for
each initial calibration and subsequent analyses?
(See CLP SOW p. D-39 & D-41/PEST)

☐ ☐

ACTION: If no, use professional judgement to
determine the severity of the effect on the
data and qualify it accordingly. Generally,
the effect is negligible unless the sequence
was grossly altered or the calibration was also
out of limits.

9.0 Cleanup Efficiency Verification (Form IX)

- 9.1 Is Form IX - Pest-I Pest-I present and complete for
each lot of Florisil Cartridges used? (Florisil
Cleanup is required for all Pest/PCB extracts.)

☐ ☐ ☐

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YES NO N/A

ACTION: If no, take action specified in 3.2 above.
If data suggests that florisil cleanup was not performed, make note in "Contract Problems/Non-Compliance".

9.2 Are all samples listed on the Pesticide Florisil Cartridge Check Form?

[] [] []

9.3 If GPC Cleanup was performed, (mandatory for all soil sample extracts) is Form IX - Pest-2 present?

[] [] []

ACTION: If no, take action specified in 3.2 above.

ACTION: If GPC was not performed when required, make note in "Contract Problems/Non-Compliance" section of data assessment.

9.4 Are percent recoveries (% R) of the pesticide and surrogate compounds used to check the efficiency of the cleanup procedures within QC limits:

80-120% for florisil cartridge check?

[] [] []

80-110% for GPC calibration?

[] [] []

Qualify only the analyte(s) which fail the recovery criteria as follows:

ACTION: If a R are < 80%, qualify positive results "J" and quantitation limits "UJ". Non-detects should be qualified "R" if zero %R was obtained for pesticide compounds. Use professional judgement to qualify positive results if recoveries are greater than the upper limit.

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YES NO N/A

NOTE: Sample data should be evaluated for potential interferences if recovery 2,4,5-trichlorophenol was > 5% in the Florisil Cartridge Performance Check analysis. Make note in Contract Problems/Non-Compliance section of reviewer narrative.

NOTE: The raw data of the GPC Calibration Check analysis is evaluated for pattern similarity with previously run Aroclor standards.

10.0 Pesticide/PCB Identification

10.1 Is Form X complete for every sample in which a pesticide or PCB was detected?

[] [] []

10.2 Are there any transcription/calculation errors between raw data and Forms 6E, 6G, 7E, 7D, 8D, 9A, B, 10A.

[] [] []

ACTION: If large errors exist, call lab for explanation/resubmittal, make necessary corrections and not error under "Conclusions".

10.3 Are retention times (RT) of sample compounds within the established RT windows for both analyses?

[] [] []

Was GC/MS confirmation provided when required (when compound concentration is > 10 ug/ml in final extract)?

[] [] []

ACTION: Use professional judgement to qualify positive results which were not confirmed by GC/MS. Qualify as unusable (R) all positive results which were not confirmed by second

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YES NO N/A

GC column analysis. Also qualify as unusable (R) all positive results not meeting RT window unless associated standard compounds are similarly biased. (See Functional Guidelines). The reviewer should use professional judgement to assign an appropriate quantitation limit.

- 10.4 Is the percent difference (% D) calculated for the positive sample results on the two GC columns < 25.0%?

[] [] []

ACTION: If the reviewer finds neither column shows interference for the positive hits, the data should be fagged as follows:

% Difference Qualifier

25-50 %	J
50-90 %	JN
> 90 %	R

NOTE: The lower of the two values is reported on Form I. If using professional judgement, the reviewer determines that the higher results was more acceptable, the reviewer should replace the value and indicate the reason for the change in the data assessment.

- 10.5 Check chromatograms for false negatives, especially the multiple peak compounds toxaphene and PCBs. Were there any false negatives?

[] [] []

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YES NO N/A

ACTION: Use professional judgement to decide if the compound should be reported. If the appropriate PCB standards were not analyzed, qualify the data unusable (R).

11.0 Compound Quantitation and Reported Detection Limits

- 11.1 Are there any transcription/calculation errors in Form I results? Check at least two positive values. Were any errors found?

___ ☐ ___

NOTE: Single-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 approximated quantity (NJ). This necessitates a determination of an estimated concentration on the confirmation column. The narrative should indicate that the presence of interferences has interfered with the evaluation of the second column confirmation.

- 11.2 Are the CRQLs adjusted to reflect sample dilutions and, for soils, % moisture?

☐ ___

ACTION: If errors are large, call lab for explanation/resubmittal, make any necessary corrections and document effect in data assessments.

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YES NO N/A

ACTION: When a sample is analyzed at more than one dilution, the lowest CRQLs are used (unless a QC exceedance dictates the use of 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.

ACTION: Quantitation limits effected by large, off-scale peaks should be qualified as unusable (R). If the interference is on-scale, the reviewer can provide an approximated quantitation limit (UJ) for each affected compound.

12.0 Chromatogram Quality

- 12.1 Were baselines stable? ☐ ☐ ☐
- 12.2 Were any electropositive displacement (negative peaks) or unusual peaks seen? ☐ ☐ ☐

ACTION: Address comments under System Performance of data assessment.

13.0 Field Duplicates

- 13.1 Were any field duplicates submitted for PEST/PCB analysis? ☐ ☐ ☐

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YES NO N/A

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.

#PR00801-DV3/ORGANIC DTA

TOTAL REVIEW

CLP DATA ASSESSMENT

Functional Guidelines for Evaluating Organics Analysis

Case Nos. 24462,24697,24704,24741 SDG No. NA LABORATORY Enseco-East SITE Tutu Wells

DATA ASSESSMENT:

The current functional guidelines (USEPA Revision June 1991) 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" (undetected), "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 and rejected. In other words, due to significant quality control (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 some error.

Reviewer's

Signature: _____

Uma Parasar

Date: 12/29/92

Verified by: _____

Lidya Gloria

Date: 12/29/92

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 are qualified as estimated (J). The non-detects (sample quantitation limits) are qualified as estimated (J), unless the holding times are grossly exceeded (over one week beyond maximum holding time), in which case the associated data are unusable and rejected (R).

The following action was taken in the samples and analytes shown due to excessive holding time:

All of the samples in the seventh quarterly sampling event at the Tutu Wells Site except LaPlace were analyzed within the specified holding time as calculated from sample collection to volatile organic compound (VOC) analyses. Sample LaPlace was not preserved and was analyzed 1-day outside the 7-day holding time for unpreserved samples. Therefore, all aromatic VOC data in sample LaPlace are qualified as estimated (J) or (UJ) at the quantitation limit.

A holding time non-compliance summary for all samples is provided in Table A-1.

2. BLANK CONTAMINATION

Quality assurance (QA) blanks, i.e., method, trip, field, rinse, and water blanks are prepared to identify any contamination that 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 five times the blank contaminant level (ten times for the common contaminants), the analytes are negated and qualified as undetected, "U." The following analytes in the samples shown were qualified with "U" for these reasons:

A) Method Blank Contamination

All of the method blanks associated with the VOC analyses were reviewed to determine laboratory contamination levels. The method blanks are referred to by their file identification numbers for ease of correlation of the blank with the associated samples.

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The method blank (A4627) is reported to contain 0.9 micrograms per liter (ug/L) of methylene chloride and 1.8 ug/L of acetone, both of which are common laboratory VOC contaminants. Samples Steele, Eglin I, Harvey, Tillett, and Smith are associated with this blank. Methylene chloride is detected in samples Steele and Smith at concentrations less than ten times ($< 10x$) the amount detected in the method blank. Therefore, the methylene chloride data in these samples are negated and qualified (U). Acetone is detected in sample Smith at a concentration $< 10x$ the amount detected in the blank. Therefore, the result is negated and qualified (U). In the remaining samples, acetone and methylene chloride were either undetected or the concentrations were greater than ten times ($> 10x$) the amount detected in the blank and, therefore, no qualifiers have been assessed.

The method blank (A4653) is reported to contain 0.885 ug/L of methylene chloride. Samples Four Winds I, Four Winds II, Ramsay, Ramsay field replicate (FR), Eglin II, Eglin III, Harthman II, and Gassett are associated with this blank. Methylene chloride is detected in all these samples at a concentration $< 10x$ the amount detected in the method blank. Therefore, the methylene chloride data in these samples are negated and qualified (U). The methylene chloride result in sample Ramsay is below the contract required quantitation limit (CRQL). Therefore, the result is negated, raised to the CRQL, and qualified (U).

The method blank (A4786) is reported to contain 0.95 ug/L of methylene chloride. Sample LaPlace is associated with this blank. Methylene chloride was detected in this sample at a concentration $< 10x$ the amount detected in the blank and, therefore, the result is negated and qualified (U).

B) Field Blank Contamination

The field blank is a sample of deionized (DI) water passed through the decontaminated sampling equipment. It is used to identify any contaminant that may still be present in the sampling equipment and therefore may result in subsequent sample contamination.

For the seventh quarter Tutu Wells Site sampling effort, the Gassett well was sampled using a bailer. The remainder of the wells did not require any sampling equipment as all of the other wells had pumps installed. Therefore, the field blank collected is associated only with sample Gassett and is used to qualify this sample only.

The field blank (9/15/92) is reported to contain 0.44 ug/L of methylene chloride, 0.096 ug/L of carbon disulfide, and 0.11 ug/L of chloroform. As previously discussed, the

methylene chloride detected in sample Gassett is negated due to method blank contamination. Carbon disulfide and chloroform are not detected in sample Gassett and, therefore, no qualifiers have been assessed.

C) *Trip Blank Contamination*

The trip blank (9/14/92) is reported to contain 0.73 ug/L of methylene chloride. The samples associated with this blank have been qualified based on the method blank and, therefore, no qualifiers have been assessed based on the trip blank.

The trip blank (9/15/92) is reported to contain 0.65 ug/L of methylene chloride. The samples associated with this blank have been qualified based on the method blank and, therefore, no qualifiers have been assessed based on the trip blank.

The trip blank (9/16/92) is reported to contain 0.89 ug/L of methylene chloride and 0.15 ug/L of chloroform. Samples Eglin I, Eglin II, Eglin III, Harthman II, Smith, and Tillett are associated with this blank. The methylene chloride data in these samples have been qualified based on the method blank, which is reported to contain a higher concentration of methylene chloride than the trip blank. Chloroform is detected in samples Eglin II, Eglin III, Smith, and Hartman II at concentrations less than five times (<5x) the amount detected in the blank. Therefore, the associated chloroform data in these samples are negated and qualified (U).

The trip blank (9/17/92) is reported to contain 1.6 ug/L of methylene chloride and 0.74 ug/L of toluene. Sample LaPlace is associated with this blank. As previously discussed the methylene chloride result in sample La Place is negated due to method blank contamination and, therefore, no sample data are qualified based on the trip blank result. Toluene is detected in sample LaPlace at a concentration < 10x the amount detected in the blank. Therefore, the result is negated and qualified (U).

A summary of all contaminated blanks and associated samples is provided in Table A-2.

3. MASS SPECTROMETER TUNING

Tuning and performance criteria are established to ensure adequate mass resolution, proper compound identification, 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 VOCs is bromofluorobenzene (BFB).

If the mass calibration is in error, all associated data will be classified as unusable, "R."

All mass calibrations associated with the VOC analyses in this project have met the QC criteria to ensure adequate mass resolution, proper compound identification, and instrument response.

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 analytical sequence. The continuing calibration checks document that the instrument is giving satisfactory daily performance.

A) Response Factor

The response factor (RF) 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). For analytes detected in the sample for which the response factor is < 0.05 , positive detects will be qualified as estimated (J). All non-detects for that compound will be rejected (R).

The initial calibration verification (ICV) performed on 9/12/92 had a RF less than ($<$) 0.05 units for 2-hexanone (0.035). All the samples in the project are associated with this ICV (Eglin I, Eglin II, Eglin III, Four Winds I, Four Winds II, Gassett, Harthman II, trip blank [9/14/92], Harvey, LaPlace, Ramsay, Ramsay FR, Smith, Steele, trip blank [9/15/92], trip blank [9/16/92], field blank [9/15/92], Tillett, and trip blank [9/17/92]). 2-Hexanone was not detected in these samples; therefore, the results are biased low and are rejected (R).

The continuing calibration verifications (CCVs) performed on 9/19/92 (0.0396), 9/20/92 (0.03932), and 9/25/92 (0.0375) have RFs < 0.05 units for 2-hexanone (RFs are in parentheses). The 2-hexanone data in all samples are rejected based on the RF criteria associated with the ICV. No further qualifications are necessary based on the associated CCVs.

5. CALIBRATION

(B) Percent Relative Standard Deviation and Percent Difference

Percent relative standard deviation (%RSD) is calculated from the initial calibration and is used to indicate the stability of the specific compound response factor over increasing concentration. Percent difference (%D) compares the response factor of the continuing calibration check to the average response factor (RRF) from the initial calibration. Percent D is a measure of the instrument's daily performance.

Under Revision 3.0 for Method 524.2, %RSD must be < 20 percent (%) and %D must be < 30%. A value outside of these limits indicates potential detection and quantitation errors. All positive results are flagged as estimated, "J," and non-detects are flagged "UJ" if %D is greater than (>) 30% or %RSD > 20%. If there is a gross deviation (i.e., > 90%) for %RSD and %D, the non-detects may be rejected (R).

The ICV performed on 9/12/92 has a %RSD for acetone (31.05%) outside the method specified limit (20%). All samples in this project are associated with this ICV and are qualified as estimated (J) or (UJ) at the quantitation limit.

The CCV performed on 9/19/92 has a %D for acetone (35.02%) outside the method specified limit (30%). The acetone data in all samples associated with this CCV are already qualified as estimated based on the %RSD criteria associated with the ICV. No further qualifications are necessary based on the CCV.

6. SURROGATES

All samples are spiked with surrogate compounds prior to sample preparation or analysis 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 surrogate percent recoveries (%Rs) for this project are within the corresponding QC limits (toluene-d8 [88-110%], bromofluorobenzene [86-115%], 1,2-dichloroethane-d4 [76-114%]). %R data were transcribed correctly from the quantitation reports to the Form II's.

7. INTERNAL STANDARDS PERFORMANCE

Internal standard (IS) performance criteria ensure that the gas chromatograph/mass spectrophotometer (GC/MS) sensitivity and response are stable during every analytical run. The internal standard area count must not vary by more than a factor of two (-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 estimated at the reporting limit (UJ), or unusable and rejected (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.

All of the IS area counts and retention times are within the above QC limits for the VOC analyses. Bromochloromethane, 1,4-difluorobenzene, and chlorobenzene were the three internal standards used to quantitate the data for these projects. All retention times, area counts, and chromatography for the IS compounds are acceptable.

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 spectra that has a ratio of the primary and secondary m/e intensities within 20% of that in the standard compound. For the tentatively identified compounds (TICs), the ion spectra must match accurately. In cases where there is not an adequate ion spectrum match, the laboratory may have provided false-positive identifications.

TCL compound identification by GC/MS was based on comparison of the analyte RRT and ion spectra to those obtained from known standard spectra. Positive hits were reviewed for all samples and the following discrepancies were noted in meeting the RRT criteria of plus or minus ($\pm$) 0.06.

RRT criteria were exceeded in the VOC analyses for total 1,2-dichloroethene (DCE). This discrepancy is attributed to the presence of structural isomers. 1,2-DCE exists as cis and trans isomers. Since the relative intensity between the two isomer peaks varies, quantitation is based on the retention time of the peak with the higher intensity. As the ionic spectra for 1,2-DCE accurately matches the standard compound spectrum, no data have been qualified based on RRT deviations.

TICs with positive identifications based on presumptive evidence of the detected compound as an estimated value are qualified "JN." All TIC data are qualified as estimated (J) since these compounds are not calibrated for.

9. MATRIX SPIKE/MATRIX SPIKE DUPLICATE

The matrix spike/matrix spike duplicate (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.

The MS/MSD were performed on sample Steele to determine sample matrix interferences on the analytical results. The sample was spiked in duplicate at a level of 5 ug/L with the following analytes (QC limits for recovery are within parentheses): 1,1-DCE (61-145%), trichloroethene (71-120%), benzene (76-127%), toluene (76-125%), and chlorobenzene (75-130%).

The MS %R for trichloroethene was 70%, which is below the required limit. All other matrix spike %Rs meet the specified QC criteria. Relative percent differences (RPDs) between MS/MSD %Rs are within QC limits (11-14%) for all analytes except trichloroethene (27%). No data have been qualified based on the MS/MSD spike recoveries.

10. OTHER QC DATA OUT OF SPECIFICATION

A) Method Detection Limit Study

The method detection limit (MDL) study associated with Method 524.2 was performed on August 9, 1992. The MDL determination was based on the analysis of seven replicates of reagent water fortified at a concentration of 1.0 ug/L with the TCL analytes (except for ketones at 5 ug/L, and 1,2-DCE at 2 ug/L).

Section 10.3.3 of Method 524.2 states that for every analyte and surrogate, the mean accuracy, expressed as a percentage of the true value, should be 80 to 120% and the %RSD < 20%.

The MDL study meets these requirements. None of the data is qualified based on the results from the MDL study.

B) Laboratory Fortified Blanks

As per the QC requirements in Method 524.2 (Revision 3.0) and the site SAMP, a laboratory fortified blank (LFB) containing each target analyte at a known concentration is to be analyzed with every batch of samples processed using the method. For the seventh quarter Tutu Wells Site sampling effort, LFBs were prepared at a concentration of 1 ug/L for all TCL analytes except ketones and 1,2-DCE. Ketones were analyzed at 5 ug/L and 1,2-DCE was analyzed at 2 ug/L. The 1,2-DCE matrix fortification was comprised of 1 ug/L of the cis isomer and 1 ug/L of the trans isomer injected together, and quantitated as total 1,2-DCE. The LFBs were used to evaluate the accuracy of the method and estimate whether MDLs were achieved for every associated analytical sequence. If the laboratory did not meet these QC criteria, the deficiencies had to be rectified prior to further sample analyses (as specified in Method 524.2, Section 10.3).

The QC criteria for the data assessment were modified for the VOC analyses of the Tutu Site samples. Based on USEPA guidance (dated December 4, 1990) regarding additional quality assurance/quality control (QA/QC) requirements when Method 524.2 is used for aqueous sample analysis, the 80 to 120% criteria for the accuracy assessment of the LFB were expanded to 50 to 150% for the ketones (acetone, 2-butanone, 4-methyl-2-pentanone, and 2-hexanone). Therefore, for this validation, associated data for all TCL analytes with LFB recoveries < 50% are rejected and qualified "R." For LFB analyte recoveries in the range of 50 to 79% for TCL analytes other than ketones, the associated sample data are qualified as estimated (J). For LFB analyte recoveries > 120% or 150% (as appropriate for the ketones), associated sample data are not qualified. The LFBs associated with this project, which have analyte recoveries outside of the required QC guidelines, are summarized below. All LFBs are referred to by their file identification numbers as well as the dates they were analyzed.

The LFB (A4629) analyzed on 9/19/92 has %Rs outside QC limits for the following compounds:

<u>Compound</u>	<u>Recovery (%)</u>
Methylene chloride	198
1,1,2,2-Tetrachloroethane	78.5

Samples Steele, Eglin I, Harvey, Smith, Tillett, field blank (9/15/92), trip blank (9/15/92), and trip blank (9/14/92) are associated with this blank. Associated sample data for 1,1,2,2-tetrachloroethane are estimated at the quantitation limit (UJ).

The LFB (A4654) analyzed on 9/20/92 has %Rs outside QC limits for the following compounds:

<u>Compound</u>	<u>Recovery (%)</u>
Methylene chloride	188
Bromoform	72.3

Samples Four Winds I, Four Winds II, Ramsay, Ramsay FR, Gassett, Eglin II, Eglin III, Harthman II, and trip blank (9/16/92) are associated with this blank. Associated sample data for bromoform are estimated at the quantitation limit (UJ).

The LFB (A4788) analyzed on 9/25/92 has %Rs outside QC limits for the following compounds:

<u>Compound</u>	<u>Recovery (%)</u>
Methylene chloride	176
Carbon disulfide	126
1,2-Dichloroethane	121

Samples LaPlace and trip blank (9/17/92) are associated with this blank. Associated sample data do not require qualification.

C) *Field Duplicate*

Field duplicate or replicate samples are taken and analyzed as an indication of overall precision. These analyses measure both field and laboratory precision; therefore, the results may have more variability than laboratory duplicates that measure only laboratory performance.

Sample Ruben (listed as such on the chain-of-custody [COC] record) is a field replicate of Ramsay, and in all discussions and tables in this report is referred to as Ramsay FR. The RPD between results in both samples is calculated only for positive detects and not for estimated or undetected results. The RPDs calculated are within the required limit ($< 20\%$) and, therefore, no qualification of data is required.

D) *Sample Disposition*

In several instances, the COC records indicate that the sample vials were received with air bubbles or headspace. In instances where only one or two vials had headspace, the associated data are not qualified. It is assumed that the laboratory exercised good judgement, and followed their policy of using the vial(s) without headspace for the sample analysis. However, if the sample was diluted and reanalyzed, all positive results in the diluted sample are qualified as estimated (J) because it is possible that one vial with headspace was used for the diluted sample analysis. If all three vials for one sample were received with headspace, the associated positive VOC results are qualified as estimated (J) and the non-detects are rejected (R).

The trip blank (TB091592) was received with headspace in all three vials as documented in the COCs. All associated non-detect sample data are rejected as unusable (R), and all positive detects are assumed to be biased low and qualified as estimated (J).

Samples Steele, Gassett, field blank (FB091592), Tillett, Four Winds I, and Eglin II were received with two vials with headspace. The associated sample data do not require qualification.

Samples trip blank (TB091492), Smith, Eglin I, and LaPlace were received with one vial with headspace. The associated sample data do not require any qualification.

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11. SYSTEM PERFORMANCE AND OVERALL ASSESSMENT

It is appropriate for the data reviewer to make professional judgments and express concerns and comments on the validity of the overall data for a case. This is particularly appropriate when there are several QC criteria out of specification. The additive nature of QC factors out of specifications is difficult to assess in an objective manner. The reviewer has a responsibility to inform the person using the data concerning data quality and data limitations to assist the individual in avoiding inappropriate use of the data. Therefore, this review has presented all QC factors that may affect the quality of the data.

Overall, the data submitted by Enseco-East are of good quality and acceptable completeness. Aside from the exceptions summarized below, the majority of the data for this project is valid and usable.

Non-detect data for 2-hexanone in all the samples in this project are biased low and are rejected due to poor sensitivity, as determined from the consistently low instrument RFs.

Some acetone data are estimated due to unacceptable instrument performance during the initial calibration sequence and the continuing calibration verifications. The data qualification is based on the %RSD and %D in the associated calibration verifications being above the specified QC limits.

The aromatic VOCs in sample La Place are qualified as estimated because the analysis was conducted outside the 7-day holding time for unpreserved samples.

Much of the sample data for methylene chloride are negated since their presence is the result of blank contamination.

Some of the sample data for bromoform and some sample data for 1,1,2,2-tetrachloroethane are estimated due to poor recovery in the associated LFBs.

All TICs detected in these samples are qualified as estimated (J), because the laboratory does not calibrate the GC/MS for these compounds. TICs that are "positively identified" are qualified (JN) indicating presumptive evidence of the detected compound at an estimated value.

TCL analytes that required re-analysis upon dilution are qualified (D).

12. CONTRACT PROBLEMS (NON-COMPLIANCE)

The laboratory fortified blanks did not meet all of the method criteria as required. In accordance with the method, all deficiencies should be located and remedied prior to sample analysis.

The case narratives submitted by Enseco along with the data packages contained inaccuracies.

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:

Samples Steele, Harvey, Four Winds I, Four Winds II, Smith, LaPlace, and Tillett were analyzed at a dilution due to the presence of high concentrations of target analytes. All the dilution data appear on the initial Form I data sheets.

PR00801-DV/tutnov

ORGANIC REGIONAL DATA ASSESSMENT

CASE NO. 22462, 24697, 24704, 24741SITE Tutu Wells, St. Thomas,
U.S. Virgin IslandsLABORATORY Enseco-EastNO. OF SAMPLES/
MATRIX 19/WaterSDG# N/AREVIEWER (IF NOT ESD) N/ASOW# OLM01.0, March 1990 (including
further revisions)REVIEWER'S NAME Uma ParasarDPO: ACTION _____ FYI XCOMPLETION DATE November 30, 1992DATA ASSESSMENT SUMMARY

	VOA	BNA	PEST
1. HOLDING TIMES	<u>O</u>	<u>N/A</u>	<u>N/A</u>
2. GC/MS TUNE/INSTR. PERFORM.	<u>O</u>	<u>N/A</u>	<u>N/A</u>
3. CALIBRATIONS	<u>M</u>	<u>N/A</u>	<u>N/A</u>
4. BLANKS	<u>O</u>	<u>N/A</u>	<u>N/A</u>
5. SYSTEM MONITORING COMPOUNDS	<u>O</u>	<u>N/A</u>	<u>N/A</u>
6. MATRIX SPIKE/DUP	<u>O</u>	<u>N/A</u>	<u>N/A</u>
7. OTHER QC	<u>O</u>	<u>N/A</u>	<u>N/A</u>
8. INTERNAL STANDARDS	<u>O</u>	<u>N/A</u>	<u>N/A</u>
9. COMPOUND IDENTIFICATION	<u>O</u>	<u>N/A</u>	<u>N/A</u>
10. SYSTEM PERFORMANCE	<u>O</u>	<u>N/A</u>	<u>N/A</u>
11. OVERALL ASSESSMENT	<u>O</u>	<u>N/A</u>	<u>N/A</u>

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: Some data for common blank contaminants have been negated based on blank contamination. Some data have been estimated based on calibration criteria, laboratory fortified blank (LFB) recoveries, and analysis outside of holding time. Some data for volatile organic analysis (VOA) have been rejected for response factors.

AREAS OF CONCERN: NoneNOTABLE PERFORMANCE: Overall data are valid and can be used with some exceptions.

PR00801-DV3/111992.dta

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ATTACHMENT NO. 2

TABLES

TUT 003 0522

Table A-1. Volatile Organic Analysis Holding Time Summary, Seventh Quarter Sampling Event, September 1992, Tutu Wells Site, St. Thomas, U.S. Virgin Islands.

Sample Identifier	Matrix	Preserved	Date Collected	Date Received	Date Analyzed	Days from Collection to Analysis	Days Holding Time Exceeded
Eglin I	Aqueous	No	16-Sep-92	17-Sep-92	19-Sep-92	3	0
Eglin II	Aqueous	No	16-Sep-92	17-Sep-92	20-Sep-92	4	0
Eglin III	Aqueous	No	16-Sep-92	17-Sep-92	20-Sep-92	4	0
Four Winds I	Aqueous	Yes	15-Sep-92	17-Sep-92	20-Sep-92	5	0
Four Winds II	Aqueous	Yes	15-Sep-92	17-Sep-92	20-Sep-92	5	0
Gassett	Aqueous	Yes	15-Sep-92	16-Sep-92	20-Sep-92	5	0
Hartman II	Aqueous	No	16-Sep-92	17-Sep-92	20-Sep-92	4	0
Harvey	Aqueous	No	14-Sep-92	15-Sep-92	19-Sep-92	5	0
LaPlace	Aqueous	No	17-Sep-92	18-Sep-92	25-Sep-92	8	1
Ramsay	Aqueous	Yes	15-Sep-92	16-Sep-92	20-Sep-92	5	0
Ramsay FR	Aqueous	Yes	15-Sep-92	16-Sep-92	20-Sep-92	5	0
Smith	Aqueous	No	16-Sep-92	17-Sep-92	19-Sep-92	3	0
Steele	Aqueous	No	14-Sep-92	15-Sep-92	19-Sep-92	5	0
Tillett	Aqueous	No	16-Sep-92	17-Sep-92	19-Sep-92	3	0
Field Blank (09/15/92)	Aqueous	Yes	15-Sep-92	16-Sep-92	19-Sep-92	4	0
Trip Blank (09/14/92)	Aqueous	Yes	14-Sep-92	15-Sep-92	19-Sep-92	5	0
Trip Blank (09/15/92)	Aqueous	Yes	15-Sep-92	16-Sep-92	19-Sep-92	4	0
Trip Blank (09/16/92)	Aqueous	Yes	16-Sep-92	17-Sep-92	20-Sep-92	4	0
Trip Blank (09/17/92)	Aqueous	Yes	17-Sep-92	18-Sep-92	25-Sep-92	8	0

FR Field replicate.

PR00801-DV3/tbla1.wk3

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Table A-2. Summary of Volatile Organic Compound Contaminated Blanks and Associated Ground-Water Samples, Seventh Quarter Sampling Event, September 1992, Tutu Wells Site, St. Thomas, U.S. Virgin Islands.

Blank Identifier (Date Sampled or File I.D.)	Date Analyzed	Associated Sample(s)
Method Blank (A4627)	09/19/92	Steele, Harvey, Tillett, Smith, Eglin I
Method Blank (A4653)	09/20/92	Four Winds I, Four Winds II, Ramsay, Gassett, Ramsay FR, Eglin II, Eglin III, Hartman II
Method Blank (A4786)	09/25/92	LaPlace
Trip Blank (09/14/92)	09/19/92	Steele, Harvey
Trip Blank (09/15/92)	09/19/92	Four Winds I, Four Winds II, Ramsay, Gassett, Ramsay FR
Trip Blank (09/16/92)	09/20/92	Tillett, Smith, Eglin I, Eglin II, Eglin III, Hartman II
Trip Blank (09/17/92)	09/25/92	LaPlace
Field Blank (09/15/92)	09/19/92	Gassett

I.D. Identification.
FR Field replicate.

PR00801-DV3/tbla2.wk3

TUT 003 0524

Table A-3. Summary of Laboratory Fortified Blanks with Exceeded QC Criteria and Associated Ground-Water Samples, Seventh Quarter Sampling Event, September 1992, Tutu Wells Site, St. Thomas, U.S. Virgin Islands.

Sample Identifier (File I.D.)	Date Analyzed	Associated Samples	Compounds with Exceeded QC Criteria
LFB (A4629)	09/19/92	TB091492, Harvey TB091592, Steele FB091592, Tillett Smith, Eglin I	Methylene chloride (198%) 1,1,2,2-Tetrachloroethane (78.5%)
LFB (A4654)	09/20/92	Four Winds I Four Winds II Ramsay Gassett Ramsay FR Eglin II, Eglin III Harthman II, TB091692	Methylene chloride (188%) Bromoform (72.3%)
LFB (A4788)	09/25/92	TB091792 LaPlace	Methylene chloride (175%) Carbon disulfide (126%) 1,2-Dichloroethane (121%)

I.D. Identification.
 QC Quality control.
 LFB Laboratory-fortified blank.
 FR Field replicate.

PR00801-DV3/tbla3.wk3

TUT 003 0525

Table A-4. Concentrations of Volatile Organic Compounds in Ground-Water Samples Collected in September 1992 at the Tutu Wells Site, St. Thomas, U.S. Virgin Islands.

	Sample ID: Eglin I	Eglin II	Eglin III	Four Winds I	Four Winds II	Gassett	Harthman II	Harvey	LaPlace	Ramsay	Ramsay FR	Smith	Steele	
Analyte	Date:	16-Sep-92	16-Sep-92	16-Sep-92	15-Sep-92	15-Sep-92	15-Sep-92	16-Sep-92	14-Sep-92	17-Sep-92	15-Sep-92	15-Sep-92	16-Sep-92	14-Sep-92
Chloromethane		0.5 U	0.5 U	0.5 U	2.5 Uu	2 Uu	0.5 U	0.5 U	5 Uu	2 Uu	0.5 U	0.5 U	2.5 Uu	2 Uu
Bromomethane		0.5 U	0.5 U	0.5 U	2.5 U	2 U	0.5 U	0.5 U	5 U	2 U	0.5 U	0.5 U	2.5 U	2 U
Vinyl chloride		0.5 U	0.5 U	0.5 U	2.5 U	2 U	0.5 U	0.5 U	5 U	2 U	0.5 U	0.5 U	2.5 U	3.3
Chloroethane		0.5 U	0.5 U	0.5 U	2.5 U	2 U	0.5 U	0.5 U	5 U	2 U	0.5 U	0.5 U	2.5 U	2 U
Methylene chloride		0.5 U	0.74 U	1.8 U	4.4 U	2.8 U	0.52 U	0.73 U	11 B	6.9 U	0.5 U	0.52 U	5 U	3.7 U
Acetone		2 UJ	2 UJ	2 UJ	10 UJ	8 UJ	2 UJ	2 UJ	28 BJ	8 UJ	2 UJ	2 UJ	10 UJ	8 UJ
Carbon disulfide		0.5 U	0.5 U	0.5 U	2.5 U	2 U	0.5 U	0.5 U	5 U	2 U	0.15 J	0.5 U	2.5 U	2 U
,1-Dichloroethene		0.5 U	0.5 U	0.5 U	2.5 U	2 U	0.5 U	0.5 U	5 U	2 U	0.5 U	0.5 U	2.5 U	2 U
,1-Dichloroethane		0.5 U	0.5 U	0.5 U	2.5 U	2 U	0.5 U	0.5 U	5 U	2 U	0.5 U	0.5 U	2.5 U	2 U
,2-Dichloroethene (cis/trans)		12	11	32	170	99	0.5 U	11	49	130	1.4	1.4	60	140
Chloroform		0.5 U	0.5 U	0.5 U	1.6 J	1 J	0.5 U	0.5 U	5 U	1.4 J	2.9	2.8	0.5 U	2 U
,2-Dichloroethane		0.5 U	0.5 U	0.5 U	2.5 U	2 U	0.5 U	0.5 U	5 U	2 U	0.5 U	0.5 U	2.5 U	2 U
-Butanone		2 U	2 U	2 U	10 U	8 U	2 U	2 U	20 U	8 U	2 U	2 U	10 U	8 U
,1,1-Trichloroethane		0.5 U	0.5 U	0.5 U	2.5 U	2 U	0.5 U	0.5 U	5 U	2 U	0.5 U	0.5 U	2.5 U	2 U
Carbon tetrachloride		0.5 U	0.5 U	0.5 U	2.5 U	2 U	0.5 U	0.5 U	5 U	2 U	0.5 U	0.5 U	2.5 U	2 U
Bromodichloromethane		0.5 U	0.5 U	0.5 U	2.5 U	2 U	0.5 U	0.5 U	5 U	2 U	0.98	0.89	2.5 U	2 U
,2-Dichloropropane		0.5 U	0.5 U	0.5 U	2.5 U	2 U	0.5 U	0.5 U	5 U	2 U	0.5 U	0.5 U	2.5 U	2 U
trans-1,3-Dichloropropene		0.5 U	0.5 U	0.5 U	2.5 U	2 U	0.5 U	0.5 U	5 U	2 U	0.5 U	0.5 U	2.5 U	2 U
Trichloroethene		4.5	4.7	13	21	10	0.5 U	2.3	46	22	0.94	0.89	21	33
Dibromochloromethane		0.5 U	0.5 U	0.5 U	2.5 U	2 U	0.5 U	0.5 U	5 U	2 U	0.5 U	0.5 U	2.5 U	2 U
,1,2-Trichloroethane		0.5 U	0.5 U	0.5 U	2.5 U	2 U	0.5 U	0.5 U	5 U	2 U	0.5 U	0.5 U	2.5 U	2 U
benzene		0.5 U	0.5 U	0.5 U	2.5 U	2 U	0.5 U	0.5 U	5 U	0.29 J	0.5 U	0.5 U	2.5 U	2 U
cis-1,3-Dichloropropene		0.5 U	0.5 U	0.5 U	2.5 U	2 U	0.5 U	0.5 U	5 U	2 U	0.5 U	0.5 U	2.5 U	2 U
Bromoform		0.5 U	0.5 UJ	0.5 UJ	2.5 UJ	2 UJ	0.5 UJ	0.5 UJ	5 U	2 U	0.5 UJ	0.5 UJ	2.5 U	2 U
-Methyl-2-pentanone		2 U	2 U	2 U	10 U	8 U	2 U	2 U	20 U	8 U	2 U	2 U	10 U	8 U
-Hexanone		R	R	R	R	R	R	R	R	R	R	R	R	R
,1,2,2-Tetrachloroethane		0.5 UJ	0.5 U	0.5 U	2.5 U	2 U	0.5 U	0.5 U	5 UJ	2 U	0.5 U	0.5 U	2.5 UJ	2 UJ
tetrachloroethene		11	11	34	78	38	0.5 U	10	260	67	16	16	170	65
toluene		0.5 U	0.081 J	0.5 U	2.5 U	2 U	0.5 U	0.5 U	5 U	0.63 UJ	0.5 U	0.5 U	2.5 U	2 U
chlorobenzene		0.5 U	0.5 U	0.5 U	2.5 U	2 U	0.5 U	0.5 U	5 U	2 UJ	0.5 U	0.5 U	2.5 U	2 U
ethylbenzene		0.5 U	0.5 U	0.5 U	2.5 U	2 U	0.5 U	0.5 U	5 U	2 UJ	0.5 U	0.5 U	2.5 U	2 U
pyrene		0.5 U	0.5 U	0.5 U	2.5 U	2 U	0.5 U	0.5 U	5 U	2 U	0.5 U	0.5 U	2.5 U	2 U
xylenes (total)		0.5 U	0.5 U	0.5 U	2.5 U	2 U	0.5 U	0.5 U	5 U	0.85 J	0.5 U	0.5 U	2.5 U	2 U

analyte concentrations in micrograms per liter (parts per billion [ppb]).
 analyses were performed by Ensco-East of Somerset, New Jersey, using USEPA Method 524.2, Revision 3.0.

Analyte is detected in the laboratory blank.
 Result is detected below the reporting limit and/or is an estimated concentration.
 Compound or element analyzed for, but not detected at the corresponding reporting limit.
 All reporting limits raised due to high levels of target analytes.
 Result rejected.
 R Field replicate of previous sample.

Table A-4. Concentrations of Volatile Organic Compounds in Ground-Water Samples Collected in September 1992 at the Tutu Wells Site, St. Thomas, U.S. Virgin Islands.

Analyte	Sample ID: Tillett		Field Blank	Trip Blank	Trip Blank	Trip Blank	Trip Blank
	Date:	16-Sep-92	15-Sep-92	14-Sep-92	15-Sep-92	16-Sep-92	17-Sep-92
Monomethane	5 Uu	0.5 U	0.5 U	R	0.5 U	0.5 U	
Bromomethane	5 U	0.5 U	0.5 U	R	0.5 U	0.5 U	
Methyl chloride	5 U	0.5 U	0.5 U	R	0.5 U	0.5 U	
Methoxyethane	5 U	0.5 U	0.5 U	R	0.5 U	0.5 U	
Methylene chloride	16 B	0.44 JB	0.73 B	0.65 BJ	0.89 B	1.6 B	
Acetone	85 BJ	2 UJ	2 UJ	R	2 UJ	2 UJ	
Carbon disulfide	5 U	0.096 J	0.5 U	R	0.92	0.5 U	
1,1-Dichloroethene	5 U	0.5 U	0.5 U	R	0.5 U	0.5 U	
1,1-Dichloroethane	5 U	0.5 U	0.5 U	R	0.5 U	0.5 U	
2-Dichloroethene (cis/trans)	290	0.5 U	0.5 U	R	0.5 U	0.5 U	
Monoform	3.6 J	0.11 J	0.5 U	R	0.15 J	0.5 U	
2-Dichloroethane	5 U	0.5 U	0.5 U	R	0.5 U	0.5 U	
Butanone	20 U	2 U	2 U	R	2 U	2 U	
1,1,1-Trichloroethane	5 U	0.5 U	0.5 U	R	0.5 U	0.5 U	
Carbon tetrachloride	5 U	0.5 U	0.5 U	R	0.5 U	0.5 U	
1,1-Dichloromethane	5 U	0.5 U	0.5 U	R	0.5 U	0.5 U	
2-Dichloropropane	5 U	0.5 U	0.5 U	R	0.5 U	0.5 U	
trans-1,3-Dichloropropene	5 U	0.5 U	0.5 U	R	0.5 U	0.5 U	
1,1-Dichloroethene	62	0.5 U	0.5 U	R	0.5 U	0.5 U	
Bromochloromethane	5 U	0.5 U	0.5 U	R	0.5 U	0.5 U	
1,2-Trichloroethane	5 U	0.5 U	0.5 U	R	0.5 U	0.5 U	
1,2-Dichloroethane	7	0.5 U	0.5 U	R	0.5 U	0.5 U	
trans-1,3-Dichloropropene	5 U	0.5 U	0.5 U	R	0.5 U	0.5 U	
Monoform	5 U	0.5 U	0.5 U	R	0.5 UJ	0.5 U	
Methyl-2-pentanone	20 U	2 U	2 U	R	2 U	2 U	
Hexanone	R	R	R	R	R	R	
1,2,2-Tetrachloroethane	5 UJ	0.5 UJ	0.5 UJ	R	0.5 U	0.5 U	
Trichloroethene	140	0.5 U	0.5 U	R	0.5 U	0.5 U	
Toluene	0.5 J	0.5 U	0.5 U	R	0.5 U	0.074 J	
Monoethane	5 U	0.5 U	0.5 U	R	0.5 U	0.5 U	
Methylbenzene	1.5 J	0.5 U	0.5 U	R	0.5 U	0.5 U	
Xylene	5 U	0.5 U	0.5 U	R	0.5 U	0.5 U	
Arenes (total)	5 U	0.5 U	0.5 U	R	0.5 U	0.5 U	

Analyte concentrations in micrograms per liter (parts per billion [ppb]).

Analyses were performed by Enseco-East of Somerset, New Jersey, using USEPA Method 524.2, Revision 3.0.

Analyte is detected in the laboratory blank.

Result is detected below the reporting limit and/or is an estimated concentration.

Compound or element analyzed for, but not detected at the corresponding reporting limit.

All reporting limits raised due to high levels of target analytes.

Result rejected.

Field replicate of previous sample.

TUT 003 0527

GERAGHTY & MILLER, INC.

Table A-5. Concentrations of Tentatively Identified Volatile Organic Compounds in Ground-Water Samples Collected in September 1992 at the Tutu Wells Site, St. Thomas, U.S. Virgin Islands.

	Sample ID: Eglin II	Eglin III	Four Winds I	Four Winds II	Gassett	Steele	Tillett	Field Blank
Analyte	Date: 16-Sep-92	16-Sep-92	15-Sep-92	15-Sep-92	15-Sep-92	14-Sep-92	16-Sep-92	15-Sep-92
tert-Butyl methyl ether	3 JN	17 JN	15 JN	8 JN	NA	NA	NA	NA
Hexane	NA	NA	NA	NA	7 JN	NA	NA	22 JN
Ethyl cyclobutane	NA	NA	NA	NA	2 JN	NA	NA	8 JN
Tetramethyl silane	NA	NA	NA	NA	NA	8 JN	NA	NA
Unknown Record 1	NA	NA	NA	NA	NA	NA	70 J	NA
Cyclohexane	NA	NA	NA	NA	NA	NA	10 JN	NA

Analyte concentrations in micrograms per liter (parts per billion [ppb]).
Analyses were performed by Ensenco-East of Somerset, New Jersey, using USEPA Method 524.2, Revision 3.0.

J Result is detected below the reporting limit and/or is an estimated concentration.
N Presumptive evidence to make a tentative identification.
NA Not applicable.

12/16/92 11:04 am

TUT 003 0528

ATTACHMENT NO. 3

ANALYTICAL DATA PACKAGES

(The contents of this attachment have been provided separately to the USEPA).

TUT 003 0529