RECORD OF DECISION FACT SHEET
EPA REGION II

Site:

Site Name: Virgin Island Chemical Superfund Site

Site Location: St. Croix, U.S. Virgin Island

HRS Score: 50.00

Date Listed on the NPL: June 17, 1996

Record of Decision:

Date Signed:

Selected Remedy:

The major components of the Selected Remedy are as follows:

1. Treatment of contaminated soils and groundwater in the Above-ground Storage Tank (AST) Area using Soil Vapor Extraction and Air Sparging (SVE/AS)

2. Monitored Natural Attenuation (MNA) of contaminated groundwater in the Former Process Pit (FPP) Area.

3. Institutional controls to restrict land and groundwater use at the Site until the remedial action objectives are met.

In addition, groundwater extraction and treatment has been retained as a contingency remedy for the AST and FPP Area, which would be implemented in the event that SVE and MNA is subsequently determined after implementation to not be adequately protective or reasonably effective.

Estimated Date of Construction Completion:		September 2002
Incurred Capital Cost:		$565,000
Additional Capital Cost	:	$285,760
Present Worth O&M Cost for SVE/AS Treatment:		$84,000
Present Worth O&M Cost for MNA and Long-term Monitoring:		$469,500
Total Present Worth Cost:		$1,404,260

Lead:

Lead Agency:	U.S. Environmental Protection Agency, Region II Emergency and Remedial Response Branch
Primary Contact:	Caroline Kwan, RPM (212) 637-4275
Secondary Contact:	Melvin Hauptman, Leader - Sediments/Carribean Team (212) 637-3952
Main PRPs:	Pharmacia, Berlex Laboratories

Waste:

Waste Type:	Volatile organic compounds - (*i.e.*, mainly ethylbenzene, xylene, chloroform)
Waste Origin:	Pharmaceutical manufacturing and blending operations
Estimated Waste Quantity:	8,700 cubic yards of contaminated soils, 980,000 gallons of contaminated groundwater
Contaminated Media:	Subsurface soils, groundwater

RECORD OF DECISION

VIRGIN ISLAND CHEMICAL SUPERFUND SITE
ST. CROIX, U.S. VIRGIN ISLANDS

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION II
NEW YORK, NEW YORK

DECLARATION FOR THE RECORD OF DECISION

SITE NAME AND LOCATION

Virgin Island Chemical Superfund Site
Estate Bethlehem Middle Works
St. Croix, U.S. Virgin Islands
CERCLIS ID No. VID980651095

STATEMENT OF BASIS AND PURPOSE

This decision document presents the U.S. Environmental Protection Agency's (EPA's) Selected Remedy for the Virgin Island Chemical Superfund Site ("the Site"), located in Estate Bethlehem Middle Works in the south-central portion of St. Croix in the U.S. Virgin Islands, which was chosen in accordance with the requirements of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), 42 U.S.C. Sections 9601-9675, as amended, and to the extent practicable, the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), 40 CFR Part 300. This decision document explains the factual and legal basis for selecting the remedy for the Site. The information supporting this remedial action decision is contained in the administrative record for the Site. The administrative record index is attached (see Appendix D).

The Virgin Islands Department of Planning and Natural Resources (VIDPNR) has been consulted and concurs with the Selected Remedy (see Appendix E).

ASSESSMENT OF THE SITE

The response action selected in this Record of Decision (ROD) is necessary to protect public health or welfare or the environment from actual or threatened releases of pollutants or contaminants from the Site which may present an imminent and substantial endangerment to public health or welfare or the environment.

DESCRIPTION OF THE SELECTED REMEDY

The remedy selected is the only operable unit for the Site.

EPA's Selected Remedy for the Site includes soil vapor extraction/air sparging (SVE/AS), monitored natural attenuation (MNA), and institutional controls. The Selected Remedy was presented in the Final Feasibility Study Report (FS) and is described in further detail below. The FS evaluated and screened remedial alternatives for contaminated soil and groundwater at the Site. The FS used a comparative analysis to evaluate five alternatives and identify the advantages and disadvantages of each. EPA selected the remedy for the Site based upon the results of the FS.

The Selected Remedy for contaminated soil and groundwater includes the following features:

- Use and expansion of the existing SVE/AS system to treat contaminated groundwater, saturated soil, and unsaturated soil at the Aboveground Storage Tank (AST) source area;

- Use of MNA to address low-level residual contamination in groundwater at the Former Process Pit (FPP) area and downgradient areas; and

- The Department of Planning and Natural Resources in consultation with EPA, will utilize institutional controls (in the form of existing well permitting laws and regulations) to limit the pumping of groundwater at the Site to prevent interference with the selected remedy and to also prevent human exposure to contaminated groundwater until MCLs are achieved.

The Selected Remedy is protective of human health and the environment through the following:

1. Active source control and contaminant mass removal will occur at the AST area via use of an SVE/AS system to remove ethylbenzene and xylene from the source area soils and from groundwater to achieve soil SSLs and groundwater MCLs. AS treatment will also enhance conditions for aerobic biodegradation of these contaminants.

2. Natural attenuation of low-level residual volatile organic compound (VOC) contamination, mainly chloroform, in groundwater will continue in the FPP area under closely monitored conditions until groundwater MCLs are achieved.

3. The Department of Planning and Natural Resources will utilize institutional controls (in the form of existing well permitting laws) to limit the pumping of groundwater at the Site to prevent interference with the selected remedy and to also prevent human exposure to contaminated groundwater until MCLs are achieved.

In addition to the Selected Remedy, EPA has retained groundwater extraction and treatment as a contingency remedy for the groundwater in the AST and FPP areas. This contingency remedy will be implemented in the event that analyses of groundwater monitoring data indicate that: 1) the groundwater plume exceeding MCLs is migrating downgradient and could potentially move beyond the Island Chemical property boundary line or 2) MCLs will not be achieved anywhere in the aquifer within a time frame that is reasonable compared to that offered by the contingency remedy.

The decision to implement the contingency remedy will be made by EPA, in its sole discretion, according to criteria specified in Section 11.3 of the ROD.

STATUTORY DETERMINATIONS

The Selected Remedy attains the mandates of CERCLA Section 121 and, to the extent practical, the NCP. Specifically, the Selected Remedy is protective of human health and the environment, complies with federal and territorial requirements that are applicable or relevant and appropriate to the remedial action, is cost-effective, and utilizes permanent solutions and alternative treatment technologies to the maximum extent practicable.

This remedy also satisfies the statutory preference for treatment as a principal element of the remedy (*i.e.*, reduces the toxicity, mobility, or volume of hazardous substances, pollutants, or contaminants as a principal element through treatment).

Because this remedy may result in hazardous substances, pollutants, or contaminants remaining on-Site above levels that allow for unlimited use and unrestricted exposure for approximately 5 years, a review will be conducted no less often than once every five years after initiation of remedial action to ensure that the remedy is, or will be, protective of human health and the environment.

ROD DATA CERTIFICATION CHECKLIST

The following information is included in the Decision Summary section of this ROD. Additional information can be found in the Administrative Record file for this Site.

- Chemicals of concern (COCs) and their respective concentrations.
- Baseline risk represented by the COCs.
- Cleanup levels established for COCs and the basis for these levels.
- Techniques for addressing source materials that constitute principal threats.
- Current and reasonably anticipated future land use assumptions and current and potential future beneficial uses of ground water used in the baseline risk assessment and ROD.
- Potential land and ground-water use that will be available at the Site as a result of the Selected Remedy.
- Estimated capital, annual operation and maintenance, and total present worth costs, discount rate, and the number of years over which the remedy cost estimates are projected.
- Key factors that led to selecting the remedy.

Jane M. Kenny
Regional Administrator
U.S. Environmental Protection Agency, Region II

8/13/02
Date

RECORD OF DECISION
DECISION SUMMARY

VIRGIN ISLAND CHEMICAL SUPERFUND SITE
ST. CROIX, U.S. VIRGIN ISLANDS

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1.0 INTRODUCTION

1.1 Site Name, Location, and Description

The Virgin Island Chemical Superfund Site ("the Site") includes a former chemical facility and properties located at Plot 13Q (approximately 3.5 acres) of Estate Bethlehem Middle Works in the south-central portion of St. Croix in the U.S. Virgin Islands (see Figure 1). Site access is via Route 66, which traverses the island east and west and abuts the south-southwest boundary of the Site. Plot 13Q is bordered to the north and east by an intermittent stream, the River Gut, which originates north of the Site and drains to the Caribbean Sea. The River Gut joins the Bethlehem Gut approximately 800 feet southeast of the Site. They are collectively then called the Fairplain Gut. The groundwater underlying the Site flows predominantly to the south-southeast.

Land use surrounding the Site is mostly industrial and commercial. A water service company and an undeveloped lot exist immediately to the west and northwest of the Site. A concrete batch plant and two automobile repair shops are located east-northeast of the Site, on the opposite side of the River Gut. Two paving companies are located north-northwest of the Site across the River Gut. The Henry Rohlsen Airport (formerly known as the Alexander Hamilton Airport) is situated about 1,500 feet south of the Site and a prison lies 0.25 mile to the northwest. Two residential properties are located about 0.33 mile north and 0.75 mile northwest of the Site.

Plot 13Q is owned by CHS Holding Corporation and is currently unoccupied and overgrown with heavy vegetation. A chain-link fence was installed in Spring 2000 along the property line to secure the area from unauthorized access.

Over half of the property was covered by buildings and/or process equipment from past pharmaceutical manufacturing and blending operations. Certain of the potentially responsible parties demolished the buildings in the Spring of 2002. There are no remaining structures except a concrete pad that housed the buildings.

Two storm drains are located on-Site. The Central Storm Drain runs beneath the paved area between the former laboratory and maintenance buildings. The Southern Storm Drain, where observed, is a concrete-lined depression along the southern wall of the former maintenance building and the edge of the reactor area. Both storm drains discharge to the River Gut.

1.2 Site History and Removal Action

From 1968 to 1982, the Site was used for a variety of pharmaceutical manufacturing and blending operations under a number of different corporate entities. In general, toluene, pyridine, and quinidine (chemicals used by many of the occupants) have been historically spilled or otherwise released in significant volumes at the Site.

In October 1982, EPA was notified of the facility's impending closure and off-Site removal of waste materials. Between 1984 and 1991, several investigations were conducted at the Site by EPA and a former tenant, Island Chemical Company, which was later acquired by Berlex

Laboratories Inc. (Berlex). This investigative work identified six areas of potential environmental concern (see Figure 2):

(1) Laboratory and Warehouse Building
(2) Aboveground Storage Tank (AST) Area
(3) Former Process Pit (FPP) Area
(4) Loading Dock/Former Laboratory Pit Area
(5) Soil Beneath Concrete Pad Near ASTs (northern corner of the Site), and
(6) Concrete Storage Pad (north of the laboratory and warehouse buildings).

During the initial assessment stages of the Site by regulatory agencies, both EPA and Berlex conducted several response activities. These activities included soil excavation with on-Site treatment (e.g., drying trays) or off-Site disposal, drum removals, and off-Site disposal of AST contents.

Between September 1989 and October 1991, EPA conducted a removal action at the Site. At that time, the laboratory/warehouse building was found to contain approximately 400 drums (some extremely deteriorated), leaking cylinders of chlorine and hydrogen chloride, and over 800 containers of laboratory reagents that included sodium metal, potassium cyanide, and ethyl ether. EPA removed 354 drums containing 14,720 gallons of various chemicals and 8,061 pounds of lab pack chemicals from the laboratory/warehouse building.

On June 17, 1996, the Site was placed on the National Priorities List. On September 29, 1994, EPA entered into an Administrative Order on Consent (AOC), Index No. II CERCLA-94-0401, with Berlex and Island Chemical Company. Pierrel S.p.A, a subsidiary of Pharmacia Corporation and also a former tenant at the Site, was added as a Respondent to this AOC in April 1999. The AOC required the performance of a Remedial Investigation and Feasibility Study (RI/FS) at the Site.

The primary objectives of the RI were to: 1) collect the data needed to characterize the nature and extent of contamination and adequately support human health and ecological baseline risk assessments and 2) provide a basis on which a subsequent, cost-effective, remedial action plan would be recommended. The following specific data requirements were addressed:

- Background concentrations of inorganic contaminants in surface soil through sampling and analysis;
- Nature and extent of potential surface and subsurface soil impacts on the Site through sampling and analysis;
- Nature and extent of potential groundwater impacts through monitoring well installation and sampling and analysis;
- Site-specific geologic and hydrogeologic conditions through lithologic evaluation, water level measurements, etc.; and

- Nature and extent of potential soil/sediment contamination in the Gut System (*i.e.*, River, Bethlehem, and Fairplain Guts) through sampling and analysis.

All six areas of potential concern were investigated during the initial assessment and the subsequent RI. Based on the data collected, only the AST and FPP areas were determined to require remediation.

2.0 HIGHLIGHTS OF COMMUNITY PARTICIPATION

Public participation in the remedy selection process is required by CERCLA Sections 113 and 117, 42 U.S.C. Sections 9613 and 9617, and 40 CFR Section 300.430(f)(3) of the NCP. These sections require that, before adoption of any plan for remedial action to be undertaken by EPA, the State, or an individual (e.g., potentially responsible party), the lead agency shall:

1. Publish a notice and make the Proposed Plan available to the public, and

2. Provide a reasonable opportunity for submission of written and oral comments and an opportunity for a public meeting at or near the Site regarding the Proposed Plan and any proposed findings relating to cleanup standards. The lead agency shall keep a transcript of the meeting and make such transcript available to the public. The information made available to the public under item 1, above, shall provide a reasonable explanation of the Proposed Plan and alternative proposals considered.

Additionally, notice of the final remedial action plan set forth in the ROD must be published, and the plan must be made available to the public before commencing any remedial action. Such a final plan must be accompanied by a discussion of any significant changes to the preferred remedy presented in the Proposed Plan along with the reasons for the changes. A response (Responsiveness Summary) to each of the significant comments, criticisms, and new data submitted in written or oral presentations during the public comment period must be included with the ROD.

A summary of community involvement activities at the Site follows:

November 1994 - EPA visited the Site and spoke to representatives or owners of the businesses and restaurants adjacent to the Site about upcoming sampling activities.

January 1995 - EPA delivered a fact sheet door-to-door to affected businesses and nearby residents. The fact sheet explained the nature of the contamination and the need for the RI.

February 15, 1995 - EPA held a public meeting at the Department of Education Curriculum Center to present the RI work plan and to answer questions from the community.

August 1995 - EPA completed a Community Relations Plan for the Site, which documented community concerns expressed during the November 1994 visits and the February 1995 pubic meeting.

September 1997 - EPA prepared and distributed another fact sheet describing completed and ongoing remedial investigation activities.

June 27, 2001 - EPA released the RI and FS reports and the Proposed Plan for public comment. These documents were made available to the public in the EPA Docket Room in Region II, New York and the information repository at the University of the Virgin Islands, St. Croix Campus Library, Kingshill, St. Croix. A notice announcing the public comment period and a public meeting, along with the availability of the RI and FS reports and Proposed Plan, was published on June 27, 2001. The public comment period originally was scheduled from June 27 through July 27, 2001. In response to public request for additional time, EPA extended the public comment period an additional 15 days to August 11, 2001.

July 12, 2001 - EPA and VIDPNR hosted a public meeting to present the conclusions of the RI/FS, further elaborate on the reasons for recommending the Preferred Alternative, and to receive public comments. The meeting was held at 7:00 p.m. at the Department of Education Curriculum Center on Centerline Road in Kingshill, St. Croix. Representatives from EPA presented the Proposed Plan, which discussed the following five alternatives:

- Alternative 1: No Further Action
- Alternative 2: Monitored Natural Attenuation (MNA) with Institutional Controls
- Alternative 3: Soil Vapor Extraction/Air Sparging (SVE/AS) for the AST area, MNA for the FPP area, and Institutional Controls
- Alternative 4: SVE/AS for the AST area, Groundwater Extraction and Treatment for the FPP area, and Institutional Controls
- Alternative 5: Groundwater Extraction and Treatment for the AST area, MNA for the FPP area, and Institutional Controls

Alternative 3 was presented as EPA's Preferred Alternative. In addition, EPA proposed to retain Alternative 4 as a contingency remedy that would be implemented in the event that the analyses of future groundwater monitoring data indicate that active remediation of the contaminated groundwater is appropriate. A portion of the meeting was dedicated to answering questions and accepting formal oral comments from the public. Community acceptance of the Selected Remedy is discussed in Section 9.0, Summary of Comparative Analysis of Alternatives, of this Decision Summary.

EPA's response to comments received during the public comment period is included in the Responsiveness Summary, which is part of this ROD, and is designated as Appendix C.

3.0 SCOPE AND ROLE OF RESPONSE ACTION

This is the first and only operable unit at the Site.

The Selected Remedy addresses soil and groundwater contamination in the AST area and groundwater contamination in the FPP area at the Virgin Island Chemical Superfund Site. The Selected Remedy will use a soil vapor extraction/air sparging system to treat groundwater, saturated soil, and unsaturated soil at the AST area and MNA to address groundwater in the FPP area. The Department of Planning and Natural Resources will utilize institutional controls (in the form of existing well permitting laws) to limit the pumping of groundwater at the Site to prevent interference with the selected remedy and to also prevent human exposure to contaminated groundwater until MCLs are achieved.

The Selected Remedy is necessary to protect human health and the environment.

4.0 SUMMARY OF SITE CHARACTERISTICS

RI/FS activities were conducted at the Site, with EPA and VIDPNR oversight, from 1994 to 2000. The primary objectives of the RI were to: 1) collect the data needed to characterize the nature and extent of contamination and adequately support human health and ecological baseline risk assessments and 2) provide a basis on which a subsequent, cost-effective, remedial action plan would be recommended.

The RI field investigation was completed in four phases from 1995 through 1998. Six areas of potential environmental concern were investigated (see Figure 2):

(1) Laboratory and Warehouse Building
(2) Aboveground Storage Tank (AST) Area
(3) Former Process Pit (FPP) Area
(4) Loading Dock/Former Laboratory Pit Area
(5) Soil Beneath Concrete Pad Near ASTs (northern corner of the Site)
(6) Concrete Storage Pad (north of the laboratory and warehouse buildings)

The following Site-specific data were collected as part of these investigations:

- Background concentrations of constituents in surface soils
- Nature and extent of potential surface and subsurface soil impacts on Site
- Nature and extent of potential groundwater impacts on Site/off Site
- Site-specific geologic and hydrogeologic conditions
- Nature and extent of potential soil/sediment impacts in the Gut system (*i.e.*, River, Bethlehem, and Fair Plains Guts).

The FS was initiated subsequent to completion of the RI, which included the collection of supplemental RI data and the performance of an SVE/AS pilot study in the AST and FPP areas in 2000.

The results of the RI investigation are summarized below. The results of the SVE/AS pilot study, which was conducted as part of the FS, are further discussed in Section 8.0.

4.1 Geology and Hydrogeology

Geology

The Site geology generally consists of approximately 90 feet of fill and alluvium overlying the clayey marl of the Kingshill Formation (see Figures 2 and 3).

- Fill material [thickness varies from 0 to approximately 10 feet below ground surface (bgs)]- Consists of reworked alluvium material, as described below.

- Alluvium (to approximately 90 feet bgs) - Consists of brown and grey clay-rich sediments with lesser and varying amounts of silt and fine sand. Entrained within the clay-rich matrix to approximately 30 to 40 feet bgs are more permeable sand and gravel lenses. These lenses are localized and not uniform or continuous across the Site.

- Kingshill Formation (below approx. 90 feet bgs) - Consists of white to light brown and grey, stiff clay with lesser amounts of sand.

Hydrogeology

The water table depth fluctuates from approximately 10 to 30 feet bgs according to precipitation, which generally varies according to an annual cycle.

Multiple rounds of groundwater level measurements were taken during the RI to characterize groundwater flow during both the wet and dry periods. Based upon the results of these measurements, it was determined that two distinct water-bearing zones exist within the alluvium. The "shallow" alluvium zone corresponds to the interval between 0 to approximately 50 feet bgs, and the "deep" alluvium zone refers to the interval between approximately 50 to 100 feet bgs. The characteristics of these zones are illustrated on the groundwater elevation iso-contour maps (see Figures 4 to 7) and hydrographs (see Figures 8 and 9) included in Appendix A.

Figures 4 through 7 contain interpreted groundwater elevation contours in the shallow and deep alluvium during high (*i.e.*, March 6, 2000) and low (*i.e.*, October 21, 1998) water table conditions. The predominant groundwater flow direction within both the shallow and deep alluvium is to the south-southeast, with a localized easterly flow component also apparent in the shallow alluvium proximal to monitoring well MW-10 during high water table conditions. Horizontal gradients in the shallow and deep alluvium range from approximately 0.002 to 0.014 feet per foot (ft/ft) and from 0.003 to 0.014 ft/ft, respectively. The vertical gradients between the shallow and deep

alluvium are consistently downward and range from -0.005 to -0.11 ft/ft. The hydraulic conductivities for the shallow and deep alluvium ranged from 0.90 to 18.14 feet per day (ft/d) and from 2.73 to 5.65 ft/d, respectively.

Figures 8 and 9 contain the results of continuous water level measurements from two shallow/deep well pairs (MW-6/MW-8 in the AST area, MW-2/MW-7 in the FPP area), respectively, along with corresponding precipitation data for a period of approximately 3 weeks. In both cases, the hydrograph for the deep well exhibited a response (*i.e.*, a corresponding change in water level) to off-site pumping, whereas the shallow well exhibited a steady decline and no response to off-site pumping. This information supports the conclusion that an aquitard exists between the shallow and deep alluvium, which prevents direct hydraulic communication between theses two zones. This conclusion is further supported by the distribution of groundwater contaminants, as further discussed in Section 4.3.

4.2 Soil

Surface Soil

The analytical results from surface soil samples were compared to EPA's SSLs, risk-based screening levels derived from other EPA guidance documents, and Site background concentrations (for metals only). Arsenic was detected above the risk-based screening level of 3.83 parts per million (ppm) (non-detected to 8.8 ppm); iron was detected above twice the Site background concentration of 31,933 ppm (18,100 ppm to 63,400 ppm); and manganese was detected above the risk-based level of 1,600 ppm (311 ppm to 2,100 ppm) in several samples. Based upon further evaluation of the data as part of the risk assessment (see Section 6.0), no contaminants of significant concern were identified in the surface soil.

Subsurface Soil

The analytical results from subsurface soil samples were compared to EPA's SSLs for protection of groundwater and to Site background concentrations (for metals only). Based on these comparisons and the groundwater data collected during the RI, metals and semi-volatile organic compounds (SVOCs) were not considered to be a significant concern.

The predominant contaminants determined to have impacted subsurface soils in the AST area were ethylbenzene (7 parts per billion (ppb) to 320,000 ppb) and xylene (2 ppb to 2,000,000 ppb). The SSLs for ethylbenzene and xylene are 6,500 ppb and 90,000 ppb, respectively. The impacted subsurface soils generally encompass an on-Site area between Tanks 3 and 10 (see Figure 10). The zone of impact was estimated to be approximately 7,800 square feet (sf) in area and to extend from two feet bgs to the water table interface (approximately 25 feet bgs).

While concentrations of chloroform were not detected above the SSL of 600 ppb (maximum concentration of chloroform was 410 ppb), this chemical was included as a contaminant of potential concern (COPC) based upon its detection in groundwater. The subsurface soils within a 400-square-foot area, from 20 to 25 feet bgs, near monitoring well MW-2 (*i.e.*, the location where

highest concentrations of chloroform were detected in groundwater; see Figure 13), were conservatively assumed to be impacted with chloroform.

4.3 Groundwater

The following volatile organic compounds (VOCs) were detected above the federal Maximum Contaminant Levels (MCLs) in groundwater: ethylbenzene, xylene, and chloroform. Groundwater quality in the AST area was determined to be impacted by ethylbenzene (700 ppb to 23,000 ppb) and xylene (27,000 ppb to 110,000 ppb). The MCLs for ethylbenzene and xylene are 700 ppb and 10,000 ppb, respectively. Concentration iso-contour maps illustrating the 1998 extent of the ethylbenzene and xylene contamination exceeding MCLs in groundwater are included as Figures 11 and 12, respectively. In 1998, the area and depth of groundwater impact above MCLs were estimated to be approximately 14,000 sf and 40 to 50 feet bgs, respectively, based upon the results of groundwater samples collected from shallow monitoring wells MW-1, MW-6 and MW-10, deep monitoring well MW-8, and multiple geoprobe and temporary well sampling locations. The most recent results from groundwater sampling completed during the period of March to May 2000 indicate that the groundwater plume is not expanding. Ethylbenzene and xylene were not detected in any of the existing off-Site production wells.

Groundwater quality in the FPP area was determined to be impacted by chloroform. The MCL for chloroform is 100 ppb. A concentration iso-contour map illustrating the 1998 extent of chloroform contamination exceeding MCLs in groundwater is included as Figure 13. In 1998, the area and depth of impact above the MCL was estimated to be approximately 3,000 sf and 40 to 50 feet bgs, respectively, based upon the results of groundwater samples collected from shallow monitoring wells MW-2 and MW-11, deep monitoring well MW-7, and multiple geoprobe and temporary well sampling locations (96 ppb to 3,800 ppb). The most recent results from groundwater sampling completed during the period of March to May 2000 indicate that chloroform concentrations (38 ppb to 76 ppb) have decreased below the MCL, excluding the localized area of temporary well FPP-VMP-1D (25 - 137 ppb; located 10 feet from MW-2). Chloroform was not detected in any off-Site production wells.

Methylene chloride was also notably detected in groundwater at both the AST and FPP areas. However, methylene chloride was also detected in field, trip, and laboratory blanks and at concentrations that can be attributed to laboratory contamination rather than actual Site conditions. To be conservative, this chemical was included as a COPC.

4.4 Gut System

Several metals were detected at the reference location (RG-2), uspstream of Plot 13Q, in the River Gut. The distribution of these metals was generally variable throughout the Gut System. However, a slight increase in the concentration of certain metals was noted at several locations downstream of the facility and at one location in the Bethlehem Gut.

These elevated concentrations in the River Gut are likely the result of the depositional nature of the locations. No metals were detected above EPA SSLs and, thus, they are not of concern.

4.5 Fate and Transport

The existing data obtained during the RI/FS support the following conclusions:

1) An active source of ethylbenze and xylene contamination exists in the unsaturated zone soils at the AST area, which will continue to impact the underlying groundwater quality at concentrations exceeding MCLs. However, the existing groundwater data indicate that ethylbenzene and xylene plumes exceeding MCLs have reached steady state as a result of natural attenuation processes (e.g., biodegradation, adsorption, dilution) and, hence, are not expanding or migrating beyond their current position. The groundwater plumes exceeding MCLs in this area generally coincide, extend just north of the Site property boundary, and have not impacted off-Site production wells. The current impact to groundwater quality will persist so long as the active source remains present.

2) An active source of chloroform contamination was not identified in the FPP area. Existing groundwater data indicate that the chloroform plume is contracting as a result of natural attenuation processes, with current groundwater quality in this area predominantly conforming with MCLs. The groundwater plume exceeding MCLs is within the Plot 13Q property boundary and has not impacted off-Site production wells.

5.0 CURRENT AND POTENTIAL FUTURE LAND USE

The Revised Final Human Health Risk Assessment (2000) considered both current and potential future land use scenarios. The Site and the surrounding area have been generally developed for various commercial/ industrial uses, and it is reasonable to assume that such uses will continue into the extended future. The exposure pathways of ingestion, inhalation, and dermal absorption via contact with the COPCs in groundwater, soils, and sediments were identified for evaluation. Potential human receptor populations were evaluated for each pathway and either ruled out or included in the risk assessment. This evaluation identified the following possible exposure pathways:

5.1 Current Land Use

- Residential (child/adult) exposure to groundwater via six off-Site wells was evaluated. This pathway was deemed incomplete as no COPCs were identified for the groundwater from these off-Site wells in the immediate vicinity of the Site.

- Trespasser (pre-adolescent/adult) exposure to COPCs in the surface soil/sediment collected from the Site and the stream system (Gut System) was evaluated for three pathways (incidental ingestion, dermal contact, and inhalation of particulates). Pre-adolescent children were assumed to be those between 7 and 12 years of age.

5.2 Future Land Use

- Industrial/Commercial (adult) exposures on-Site to COPCs in groundwater, surface soil, and sediment were evaluated for three pathways (ingestion, inhalation of VOCs (groundwater) and particulates (soil and sediment), and dermal contact).

- Construction worker (adult) exposures on-Site to COPCs in surface soil, subsurface soil (up to 12 feet bgs), and soil/sediment in the Gut System were evaluated for three pathways (incidental ingestion, dermal contact, and inhalation of particulates). Exposure to groundwater was not evaluated for this receptor since groundwater at the Site is generally encountered at depths between 18 and 20 feet bgs. Since construction activities are not anticipated to occur at such depths, exposure to groundwater was not considered. In addition to evaluating the potential for risk associated with direct contact with contaminants in subsurface soil, the same data also were compared to EPA's SSLs to determine if concentrations could adversely impact groundwater through migration (leaching).

- Off-Site residential (child/adult) exposures to COPCs in groundwater were evaluated for three pathways (ingestion, dermal contact, and inhalation of particulates or VOC vapors). For this scenario, it was assumed that on-Site concentrations could be present in an off-Site well for the entire exposure duration. In reality, no COPCs were detected in the off-Site wells or in the wells at the edge of the Site nor are they expected to reach these areas in the future, as discussed in Sections 4.1 and 4.3. Therefore, the exposure assumptions used in this scenario are extremely conservative.

6.0 SUMMARY OF SITE RISKS

Based upon the results of the RI, a baseline risk assessment was conducted to estimate the risks associated with current and future Site conditions. A baseline risk assessment is an analysis of the potential adverse human health and ecological effects caused by hazardous substance releases from a Site in the absence of any actions to control or mitigate these under current and future land uses. The results of the baseline risk assessment are discussed below and summarized on Tables 1 through 10.

6.1 Human Health Risk

An evaluation was made of all potential exposure routes which cause exposure to chemicals of potential concern at the Site for people living or working in the area. The estimated carcinogenic risks and noncarcinogenic hazards were compared to EPA guidelines and generally-accepted target risk levels. Carcinogenic risks falling within the target range of 1×10^{-6} to 1×10^{-4} and noncarcinogenic hazards less than 1 were considered to be below the statutory threshold.

Under a future land use scenario, the cumulative carcinogenic risk estimates for exposure to groundwater for the industrial/commercial worker (9×10^{-4}), the adult resident (8×10^{-4}) and the child resident (4×10^{-4}) exceed EPA's target risk range. These exposure scenarios assumed that the on-Site groundwater would be used as a potable water source for drinking and bathing. Inhalation of volatilized chloroform accounts for most of the cumulative risk for this medium. Although the maximum detected concentrations of ethylbenzene and xylene exceeded their respective MCLs in the AST area, the results of the Human Health Risk Assessment showed that

exposure to these two COPCs alone over time did not present unacceptable risks or hazards to human health based upon their levels of detection throughout the entire Site.

For the evaluation of noncancer human health hazards, potential future industrial/commercial and residential groundwater use exceeded EPA's target hazard index (HI) of 1. For the industrial/commercial worker exposure and both residential scenarios, chloroform was the major contributor. Both adult and child residential HIs exceeded 1 (255 and 600, respectively), as did the industrial/commercial worker (330). Ingestion and inhalation of chloroform contributed to virtually all of the noncancer hazard for the industrial/commercial worker and residential groundwater use scenario. Ingestion of iron and manganese also contributed less significantly to the hazard estimates.

All contaminants in the subsurface soil were below levels of concern, and were not carried into the human health risk assessment. On-Site surface soil and soil/sediment in the Gut System did not demonstrate carcinogenic risks for the adult industrial/commercial worker, adult and pre-adolescent trespassers and construction workers above EPA's target risk range. Noncancer hazards were near or below EPA's HI of 1.0. For the construction worker scenario, the total HI was 1.2, although no individual chemical exceeded the HI of 1.0. Arsenic, iron and manganese were included in the Human Health Risk Assessment. However, all risks and hazards associated with exposure to these chemicals are within EPA's acceptable levels and by themselves are not considered to be a health concern. They do, however contribute to the overall risk at the Site.

In summary, chloroform in the groundwater is the main risk and hazard driver for the industrial/commercial worker and the adult and child resident for the future groundwater use scenario, with methylene chloride and arsenic contributing to the risk as well. Manganese and iron also contributed to the estimated non-cancer risk; however, these compounds are naturally occurring in groundwater and do not have MCLs. Ethylbenzene and xylene did not significantly contribute to the calculated risks, as described above. However, ethylbenzene and xylene exceeded their respective MCLs in groundwater in the AST area and, therefore are considered contaminants of concern.

6.2 Environmental Concerns

A Screening Ecological Risk Assessment (SERA) focused on the drainage channels adjacent to and downstream of the Site, including the River Gut (which serves as the northeastern and southeastern Site boundary), Bethlehem Gut, and Fairplain Gut. The SERA was developed using data obtained through a surface soil/sediment sampling program conducted within the three drainage channels.

In general, aluminum exposure may potentially impact herbivorous, insectivorous, and piscivorous wildlife foraging in the River, Bethlehem and Fairplain Guts. Aluminum, chromium, vanadium and zinc, identified for plants, measured adjacent to or downstream of the Site were found at similar or lower concentrations to those measured at the upstream reference location (RG-2). This finding suggests that the contaminants of potential ecological concern have been transported from upgradient sources. Historical (1986) and current (1997) data for soil collected

from the Central and Southern Storm Drains suggest that several metals (e.g., aluminum, manganese, and zinc) may have been historically discharged to downstream areas of the River Gut (near sample location RG-13).

The potential contribution of aluminum has decreased over the years, as evidenced by the substantial reduction in concentrations measured in 1997, as compared to 1986. In addition, the aluminum concentrations measured in soil from the storm drains collected in 1997 were similar to those measured in soil collected from the River Gut upstream of the drain discharge points. Therefore, a current on-Site source of aluminum to the River Gut is unlikely. The Bethlehem Gut, which contained the second highest concentration of aluminum, also is a potential source of exposure in the Fairplain Gut. A bauxite plant is located in close proximity to the Site and serves as a likely source of the aluminum concentrations detected.

7.0 REMEDIAL ACTION OBJECTIVES

The remedy outlined in this ROD is intended to be the final remedial action for the Site. Remedial action objectives (RAOs) are medium-specific (e.g., soil, groundwater, etc.) goals for protecting human health and the environment.

The RAOs for the Virgin Island Chemical Superfund Site are to:

- Mitigate the toxicity, mobility, and/or volume of VOCs (ethylbenzene and xylene) in soils in the AST area so as to minimize continued leaching to groundwater;
- Mitigate the toxicity, mobility, and/or volume of VOCs (ethylbenzene and xylene) in groundwater in the AST area and downgradient so as to achieve MCLs and protect potential future groundwater users;
- Mitigate the toxicity, mobility, and/or volume of chloroform in groundwater in the FPP area and downgradient so as to achieve MCLs and protect future potential groundwater users; and
- Restrict on-Site groundwater use to non-potable purposes until the water quality is restored to MCLs.

The Applicable or Relevant and Appropriate Requirements (ARARs) and other To-Be-Considered criteria (TBCs) for soil and groundwater remediation at the Virgin Islands Chemical Site are summarized in Table 13. The groundwater cleanup goals are based upon the primary MCLs for drinking water, as established by federal regulations. There are no promulgated federal or territory cleanup standards for soils. In addition, the results of the baseline risk assessment did not identify any unacceptable human health risks associated with direct exposure to the contaminated soils at the Site. Therefore, Site-specific cleanup goals for Site soil contaminants were developed as TBCs using the EPA Soil Screening Level (SSL) methodology for the migration to groundwater pathway.

Additional ARARs and/or TBC, specific to remedial treatment system design and operation, will be dictated by the applicable federal and territorial regulations (e.g., for surface water and air discharges) as referenced in Table 13.

8.0 DESCRIPTION OF ALTERNATIVES

Based on the results of the RI, EPA evaluated five remedial alternatives that would address soil and groundwater contamination at the Virgin Island Chemical Superfund Site.

As part of evaluating alternatives, a soil vapor extraction/air sparging pilot study was performed in Spring 2000 at both the AST and FPP areas to better assess the effectiveness of SVE/AS treatment in these areas. The results of the pilot test supported the following conclusions:

- SVE/AS would be an effective combined technology for removing ethylbenzene and xylene from the AST source area soils and groundwater. AS treatment would also enhance the conditions for aerobic biodegradation of these contaminants.

- SVE/AS would not be effective for treatment of the FPP area, based upon the low air permeability of soils and the low chloroform concentrations remaining in the soils and groundwater in this area. The analytical results of groundwater samples collected prior to, during, and after SVE/AS testing further indicated that chloroform concentrations in groundwater have decreased since 1998 to below the MCL as a result of natural attenuation, excluding a localized area near temporary monitoring well FPP-VMP-1D.

Following completion of the pilot study, five remedial alternatives were developed for evaluation. Four alternatives involved active cleanup measures. One alternative evaluated MNA. Two alternatives evaluated SVE/AS, combined with MNA in one case and groundwater extraction and treatment in the other case. Groundwater extraction and treatment with MNA was evaluated as the remaining alternative. All of these active cleanup alternatives included institutional controls. As required by CERCLA, a No Further Action alternative was evaluated as a basis for comparison with the other active cleanup methods. The FS Alternatives have been modified to reflect institutional controls that are appropriate to current Site conditions and implementation responsibilities.

The following section describes the remedial alternatives evaluated in the FS for the Site. The Selected Alternative is Alternative 3 (*i.e.*, Soil Vapor Extraction/Air Sparging for the AST area, MNA for the FPP area, and Institutional Controls). The Contingency Alternative for groundwater is a combination of Alternative 4 and Alternative 5 (*i.e.*, Soil Vapor Extraction/Air Sparging for the AST Area, Groundwater Extraction and Treatment for the AST and FPP Areas, and Institutional Controls).

Note that the capital cost presented in this section of the ROD includes expenses related to the labor, equipment, and material costs of construction. Operations and Maintenance (O&M) cost refers to the cost over time of operating labor, maintenance, materials, energy, disposal, and administrative activities. Present-worth provides an analysis of the current value of all costs.

Present-worth cost is calculated based on a predetermined interest rate and the time period over which an alternative will be completed.

8.1 Alternative 1: No Further Action

Under the No Further Action alternative, no new response actions would be initiated at the Site. The security fence installed in Spring 2000 would remain and be maintained, but the existing SVE/AS system installed for the pilot study in the Spring of 2000 would be rendered non-operational. The potential risks associated with the contamination would not be minimized by this action.

- Incurred capital costs of existing fence: $45,000
- Estimated present-worth O&M costs: $12,000
- Total estimated present-worth cost: $57,000
  (based upon 30 years of maintenance)

8.2 Alternative 2: MNA with Institutional Controls

Alternative 2 would include MNA for COPCs in groundwater in the AST area and FPP area.

Under this alternative, groundwater conditions would be monitored over an assumed period of 15 years using existing wells at the Site, plus additional monitoring wells would be installed at the AST and FPP areas.

The following parameters would be monitored: ethylbenzene and xylene isomers (AST area only), chloroform and dichloromethane (FPP area only), dissolved oxygen, reduction/oxidation (redox) potential, total organic carbon, ferrous iron, sulfate, sulfide, and methane. The monitoring frequency is assumed to consist of quarterly sampling for Year 1, semi-annual sampling for Years 2 and 3, and annual sampling thereafter to Year 15.

The Department of Planning and Natural Resources in consultation with EPA, will utilize institutional controls (in the form of existing well permitting laws and regulations) to limit the pumping of groundwater at the Site to prevent interference with the selected remedy and to also prevent human exposure to contaminated groundwater until MCLs are achieved.

- Estimated capital costs: $116,560
- Estimated present-worth O&M costs: $545,530
- Total estimated present-worth cost: $662,090

8.3 Alternative 3: SVE/AS for the AST Area, MNA for the FPP Area, and Institutional Controls

In addition to the institutional controls identified in Alternative 2, this alternative includes expansion and use of the existing SVE/AS system to treat groundwater, saturated soil, and unsaturated soil at the AST area.

For the AST area, Alternative 3 includes using the existing air sparging system for volatilizing VOCs in shallow groundwater and the soil vapor extraction system to capture sparged vapors from the groundwater and to remove VOCs in the soils above the water table. Additional air sparging/soil vapor extraction wells would be installed during implementation of the remedy to remediate contaminated groundwater and soil in the AST area.

This alternative includes periodic monitoring of the SVE/AS system. Alternative 3 assumes: 1) one year of SVE/AS operation to achieve the SSLs and groundwater MCLs and 2) three years of verification groundwater monitoring after shutdown of the SVE/AS system in the AST area to assure that MCLs are achieved in groundwater.

For the FPP area, MNA would be implemented for low-level residual VOC contamination in groundwater. Alternative 3 includes the same sampling scheme for groundwater monitoring as stated in Alternative 2 for an assumed period of 15 years.

• Incurred capital costs:	$ 565,000
• Estimated additional capital costs:	$ 285,760
• Estimated present-worth O&M costs:	$ 553,500
• Total estimated present-worth cost:	$1,404,260

8.4 Alternative 4: SVE/AS for the AST Area, Groundwater Extraction and Treatment for the FPP Area, and Institutional Controls

In addition to the institutional controls identified in Alternative 2, this alternative includes:

- SVE/AS to treat groundwater, saturated soil, and unsaturated soil at the AST area, and
- A groundwater extraction and treatment system to hydraulically control and treat impacted groundwater at the FPP area.

The SVE/AS portion of the remedy in the AST area would be the same as described in Alternative 3.

At the FPP area, the groundwater extraction system would be comprised of two extraction wells located approximately 70 feet apart. Each well would be equipped with a submersible pump. The primary extraction well would be located in the area where the highest concentrations of chloroform in groundwater were historically encountered. The secondary extraction well would

be located downgradient of the first well. The combined capture zone from both wells would encompass the FPP area and the historic extent of the chloroform plume.

The treatment system would consist of a storage/equalization tank, from which groundwater would be pumped to a low profile air stripper for removal of chloroform. Treated water would be discharged via pipeline to the River Gut.

It is estimated that 5 years would be required for operation of the groundwater treatment and extraction system to meet MCLs.

Alternative 4 includes the following monitoring scheme:

- Pre- and post-air stripper water sampling to evaluate removal efficiency in the air stripper and compliance with surface water discharge limits;
- Periodic air flow monitoring to ensure sufficient air flow from the blower for mass transfer in the stripper;
- Monitoring of differential pressure across the air stripper, in addition to periodic visual inspection of the trays to evaluate whether fouling or other impediments to air flow have occurred;
- Calculation of mass emissions from the air stripper by using the measured concentrations of chloroform in the influent water and treated water and the flow rate from the storage tank to the stripper.
- Assessment of the cone of depression and extent of capture zone induced by the extraction wells by measuring water levels at new and existing groundwater monitoring wells.

Alternative 4 includes the same sampling scheme for groundwater monitoring described in Alternative 2. It was assumed that monitoring in the FPP area would continue through the operation of the extraction system (i.e., until the attainment of MCLs), plus two years of post-shutdown monitoring.

• Incurred capital costs:	$ 565,000
• Estimated additional capital costs:	$ 654,240
• Estimated present-worth O&M costs:	$ 877,330
• Total estimated present-worth cost:	$2,096,570

8.5 Alternative 5: Groundwater Extraction and Treatment for the AST Area, MNA for the FPP Area, and Institutional Controls

In addition to the institutional controls identified in Alternative 2, this alternative includes:

- MNA for impacted groundwater in the FPP area, and a groundwater extraction and treatment system to capture and treat impacted groundwater at the AST area.

At the FPP area, the MNA portion of the remedy would be the same as described in Alternative 2.

At the AST area, the groundwater extraction system would consist of two extraction wells located within the zone of highest xylene and ethylbenzene impacts. The expected combined capture zones of these wells would encompass the entire AST area and the extent of the xylene and ethylbenzene plumes.

The treatment system would be comprised of the same components and be subject to the same monitoring scheme as described in Alternative 4. Treated water would be discharged to the River Gut at a location northeast of the AST area.

Alternative 5 includes the same sampling scheme for groundwater monitoring as identified in Alternative 2. In the FPP area, the assumed duration of monitoring would be 15 years. In the AST area, the assumed duration of monitoring would be seven years (i.e., five years during extraction system operation and two years of post-shutdown monitoring).

• Incurred capital costs:	$ 565,000
• Estimated additional capital costs:	$ 556,480
• Estimated present-worth O&M costs:	$1,030,370
• Total estimated present-worth cost:	$2,151,850

9.0 SUMMARY OF COMPARATIVE ANALYSIS OF ALTERNATIVES

Section 300.430(e)(9) of the NCP requires that EPA evaluate and compare the remedial cleanup alternatives based on the nine criteria listed below. The first two criteria, (1) overall protection of human health and the environment and (2) compliance with applicable or relevant and appropriate requirements (ARARs), are threshold criteria that must be met for the Selected Remedy. The Selected Remedy must then represent the best balance of the remaining primary balancing and modifying criteria.

9.1 NCP Evaluation and Comparison Criteria

9.1.1 Threshold Criteria

(1) **Overall protection of human health and the environment** addresses whether or not a remedy provides adequate protection and describes how risks posed through each exposure pathway (based on a reasonable maximum exposure scenario) are eliminated, reduced, or controlled through treatment, engineering methods, or institutional controls.

(2) **Compliance with applicable or relevant and appropriate requirements (ARARs)** addresses whether or not a remedy would meet all of the applicable or relevant and

appropriate requirements of other federal and state environmental statutes and regulations or provide grounds for invoking a waiver.

9.1.2 Primary Balancing Criteria

(3) **Long-term effectiveness and permanence** refer to the ability of a remedy to maintain reliable protection of human health and the environment over time, once cleanup goals have been met. It also addresses the magnitude and effectiveness of the measures that may be required to manage the risk posed by treatment residuals and/or untreated wastes.

(4) **Reduction of toxicity, mobility, and volume through treatment** is the anticipated performance of the treatment technologies, with respect to these parameters, that a remedy may employ.

(5) **Short-term effectiveness** addresses the period of time needed to achieve protection and any adverse impacts on human health and the environment that may be posed during the construction and implementation period until cleanup goals are achieved.

(6) **Implementability** is the technical feasibility (*e.g.*, the difficulty of the alternative to construct and operate) and administrative ease (*e.g.*, the amount of coordination with other government agencies) of a remedy, including the availability of necessary materials and services.

(7) **Cost** includes the estimated capital, operation and maintenance, and net present-worth costs.

9.1.3 Modifying Criteria

(8) **Territorial acceptance** indicates whether, based on its review of the RI/FS reports and the Proposed Plan, the Territory (VIDPNR) concurs with, opposes, or has no comment on the preferred remedy at the present time.

(9) **Community acceptance** refers to the public's general response to the alternatives described in the Proposed Plan and the RI/FS reports.

9.2 Evaluation of the Alternatives Against the NCP Criteria

This section summarizes the evaluation of the remedial alternatives against the nine NCP criteria. The following subsections are a brief summary of the evaluation and comparison of the alternatives against each criteria. Additional details of the evaluation of the alternatives are presented in the FS.

9.2.1 Overall Protection of Human Health and the Environment

The No Further Action alternative does not address Site risks.

All of the remaining alternatives include a monitoring component to evaluate the protectiveness of the remedy.

Although natural attenuation would still occur under the No Further Action alternative, there would be no verification or measure of the extent to which these processes are occurring.

Alternative 3 would be more effective than MNA alone (Alternative 2) in overall protection of human health, since the inclusion of SVE/AS would remove mass from the AST area more quickly and reduce the amount of time to achieve MCLs and SSLs. Similarly, Alternative 3 would be more effective than Alternative 5 in three ways: (1) SVE would rapidly remove and reduce the contaminant source in the unsaturated zone, whereas groundwater extraction alone would not address the unsaturated zone; (2) AS is expected to be more effective at remediating contaminated groundwater than conventional groundwater extraction and treatment based upon the localized nature of contaminant distribution, higher silt/clay content of the Site soils, and poor yield of the shallow aquifer. AS would also better facilitate aerobic biodegradation processes via introduction of air; and (3) SVE/AS would be more readily implemented considering that a system is already in place from the pilot study.

With respect to Alternative 4, the existing groundwater data indicate that cleanup via groundwater extraction and treatment in the FPP area would occur no more rapidly than via natural attenuation (included as a component in Alternatives 1, 2, 3, and 5). The groundwater data from Spring 2000 indicate that only one temporary monitoring point exhibits chloroform concentrations above its MCL. These findings support the conclusion that natural attenuation is adequately protective without the need for any active extraction system.

9.2.2 Compliance with ARARs

The No Further Action alternative does not include a monitoring component to verify compliance with chemical-specific ARARs for groundwater or soil. Alternatives 1 (No Further Action) and 2 would not achieve compliance with chemical-specific ARARs in the AST area within a time frame that is comparable to that offered by other active remedial alternatives based upon the presence of a residual source. All other alternatives can be implemented to achieve and verify compliance with ARARs within a reasonable time frame.

9.2.3 Long-Term Effectiveness and Permanence

Alternatives 1 and 2 will not provide long-term protection against the risks posed by contaminated groundwater and soils in the AST area. Also, Alternative 1 does not provide a monitoring component to verify the long-term effectiveness of natural attenuation. Alternative 2 will allow Site contaminants to remain in the AST area for a greater period of time than Alternatives 3, 4 and 5. However, off-Site risks to human health and the environment are not expected with any

alternative. A permanent remedy will be achieved more quickly by Alternatives 3 and 4, since contaminant mass will be removed more quickly from the AST area soil and groundwater, rather than by reliance on solely natural biological and physical processes under Alternative 2 or by groundwater treatment alone under Alternative 5. Alternatives 3, 4 and 5 are expected to perform similarly in the FPP area over the long-term, based upon the low concentrations of chloroform remaining in soil and groundwater.

9.2.4 Reduction of Toxicity, Mobility, and Volume through Treatment

Alternatives 1 and 2 do not include remedies that involve active treatment in the AST or FPP areas. Therefore, these alternatives would not actively reduce contaminant toxicity, mobility, or volume. Passive reduction would occur in both areas as a result of natural attenuation processes.

For Alternatives 3 and 5, active control and removal of mass would occur via SVE/AS or groundwater extraction in the AST area, but would not occur in the FPP area. Alternative 4 would control and remove contaminant mass at both the FPP and AST areas using SVE/AS treatment and groundwater extraction and treatment, respectively. However, the relative reduction achieved in the FPP area by pump and treat Alternative 4 would be comparable to that offered by natural attenuation under Alternatives 1, 2, 3 and 5, based upon the low concentrations and limited mass of contamination present in the FPP area.

Alternatives 3 and 4 would also provide secondary reduction of toxicity, mobility, and volume through treatment by enhancing natural biodegradation processes that will reduce ethylbenzene and xylene mass in the AST area. The oxygen delivered to groundwater via air sparging will likely augment aerobic biodegradation of these contaminants.

9.2.5 Short-Term Effectiveness

The relative short-term effectiveness provided by Alternatives 1 and 2 is comparable and greater than that provided by Alternatives 3, 4 and 5, because Alternatives 1 and 2 do not involve the completion of intrusive remedial construction work within areas containing contaminated groundwater or soils.

Alternatives 3, 4 and 5 include the construction of an active remediation system in the AST and/or FPP areas. A limited amount of intrusive construction work (i.e., new SVE/AS wells, groundwater extraction wells, new monitoring wells/points) will be required for these alternatives, within areas containing contaminated groundwater and/or soils, to complete remedial system installation. This work can be completed using conventional construction equipment and techniques and standard measures to ensure worker health and safety. The relative short-term effectiveness achieved by Alternative 3 is greater than that achieved by Alternatives 4 and 5, because a pilot SVE/AS system is already in-place and would only require minor modifications for full-scale implementation. The relative short-term effectiveness provided by Alternatives 4 and 5 is comparable, since both require the installation of groundwater extraction and treatment systems.

9.2.6 Implementability

In general, all five alternatives are implementable. Alternative 1 is the simplest to implement, followed in order of ease by Alternatives 2, 3, 5, and 4, considering that an operational SVE/AS system for Alternatives 3 and 4 already exists at the Site. Materials, services, and equipment associated with the implementation of each remedial alternative are generally available on the U.S. mainland and on larger islands, such as Puerto Rico. Certain units, such as the low-profile air stripper (i.e., Alternatives 4 and 5), and associated spare parts are somewhat less widely available in the Virgin Islands, and would need to be manufactured and shipped from the U.S. mainland, necessitating a longer lead time. Also, Alternatives 3, 5, and 4 (in that order) are increasingly more intensive in terms of operation and maintenance than Alternatives 1 and 2.

9.2.7 Cost

Costs for each remedial alternative increase in the following order: Alternative 1, Alternative 2, Alternative 3, Alternative 4, and Alternative 5. However, most of the capital costs for the SVE/AS system associated with Alternatives 3 and 4 have already been incurred as a result of the pilot SVE/AS system.

9.2.8 Territorial Acceptance

VIDPNR has been consulted throughout this process and concurs with the Selected Remedy, Alternative 3, and the Contingency Remedy, a combination of Alternatives 4 and 5 for groundwater only.

9.2.9 Community Acceptance

Public comment on the RI, FS, and Proposed Plan was solicited during a formal public comment period originally designated from June 27 to July 27, 2001. In response to public request for additional time, EPA extended the public comment period an additional 15 days to August 11, 2001. Comments generally favored the Preferred Alternative. Appendix C contains a summary of community responses to the Selected Remedy.

10.0 PRINCIPLE THREAT WASTES

The NCP establishes an expectation that EPA will use treatment to address the principle threats posed by a Site wherever practicable (NCP Section 300.430(a)(1)(iii)(A)). Identifying principle threat wastes combines concepts of both hazard and risk. In general, principle threat wastes are those source materials considered to be highly toxic or highly mobile that generally cannot be contained in a reliable manner or would present a significant risk to human health or the environment should exposure occur. Conversely, non-principle threat wastes are those source materials that generally can be reliably contained and that would present only a low risk in the event of exposure. The manner in which principle threats are addressed generally will determine whether the statutory preference for treatment as a principle element is satisfied.

The source materials identified at the Site include contaminated soils and groundwater in the AST area. The predominant contaminants of potential concern are ethylbenzene, xylene, and chloroform. These source materials constitute principle threat wastes; therefore, the statutory preference for treatment is applicable to the AST area.

In the FPP area, groundwater is impacted by chloroform. However, recent groundwater sampling results indicate that the chloroform concentration has decreased since 1998 to below its MCL as a result of natural attenuation, excluding a localized area near temporary monitoring well FPP-VMP-1D.

In Spring 2000, a soil vapor extraction/air sparging pilot study was performed at both the AST and FPP areas to better assess the effectiveness of SVE/AS treatment in these areas. Results of the pilot study supported these conclusions:

- SVE/AS would be an effective technology for removing ethylbenzene and xylene from the AST source area soils and groundwater. AS treatment would also enhance the conditions for aerobic biodegradation of these contaminants.

- SVE/AS would not be effective for treatment of the FPP area, based upon the low air permeability of soils and the low chloroform concentrations remaining in the soils and groundwater in this area.

In addition, recent groundwater sampling (November 2001) in the AST area has shown that concentration of toluene, ethylbenzene and xylenes are below the MCLs. Thus, SVE/AS is a reliable remedy to accomplish active source control and contaminant mass removal in the AST area. Based upon the low concentrations and limited mass of contamination in the FPP area, natural attenuation is expected to continue to reduce chloroform levels.

11.0 SUMMARY OF THE SELECTED REMEDY

Based upon consideration of CERCLA requirements, the detailed analysis of alternatives, and public comments, EPA has determined that Alternative 3 (SVE/AS for the AST Area, MNA for the FPP Area, and Institutional Controls) is the appropriate remedy for the Virgin Island Chemical Superfund Site. EPA has also selected a contingent remedy in the AST and FPP areas which includes a groundwater extraction and treatment remedy to assure the MCLs for groundwater are achieved in a reasonable time frame.

11.1 Rationale for Selected Remedy

Alternative 3 either meets or exceeds benefits associated with the selecting criteria when compared to the other alternatives. The Selected Remedy will reduce risk to human health and the environment through the following:

- As required, Alternative 3 meets the threshold cleanup evaluation criteria (overall protection of human health and the environment and compliance with ARARs).

- Alternative 3 provides very good long-term effectiveness and permanence.
- Alternative 3 actively controls the source materials and removes contaminant mass in the AST area.
- Alternative 3 mitigates the human health risks (defined by the risk assessment).
- Alternative 3 is readily implementable. An operational SVE/AS system for Alternative 3 already exists at the Site.
- Alternative 3 offers a cost-effective solution that meets the cleanup goals for the Site.

The Selected Remedy achieves the appropriate balance considering Site-specific conditions and criteria identified in CERCLA and the NCP. The contingency remedy (Alternatives 4 and 5) also achieves these criteria.

11.2 Description of the Selected Remedy

The principle components of the Selected Remedy (Alternative 3) are as follows:

SVE/AS for the AST Area

- The existing SVE/AS system will be expanded to actively treat the entire volume of: 1) contaminated groundwater exceeding MCLs and 2) contaminated soils exceeding SSLs. Air sparging will be used to strip VOCs from groundwater, and soil vapor extraction will be used to recover sparged VOC vapors and to remove VOCs from the unsaturated zone soils.
- SVE/AS system performance monitoring will be required throughout the duration of the system operation and maintenance to verify and monitor treatment system performance and to assess remedial progress, as approved by EPA.
- SVE/AS system operation will continue to operate until the EPA's SSLs in soils and groundwater MCLs are achieved. It is anticipated that SSLs and MCLs will be achieved in less than five years.
- Air discharge criteria and compliance monitoring will be in accordance with federal and territorial requirements.
- Achievement of soil cleanup goals will be verified by collecting confirmatory soil samples across the impacted area. Sampling will be performed using an appropriate grid system, with samples collected at appropriate depth intervals to the water table at each grid node within the contaminated area.

- Long-term groundwater monitoring and reporting will be initially performed on a quarterly basis. Groundwater samples will be collected for VOCs analysis, and field measurements will be taken for water quality parameters (*i.e.*, dissolved oxygen, conductivity, temperature, pH, and oxidation reduction potential) at MW-1, MW-6, MW-8, MW-10, and at least three additional monitoring wells to be installed at locations approved by EPA. Water level measurements will be taken at all existing monitoring wells/points. The frequency of long-term monitoring will be subjected to annual review and may be modified, as approved by EPA. Long-term groundwater monitoring will continue until the groundwater quality achieves MCLs.

MNA for the FPP Area

- Long-term groundwater monitoring and reporting will be initially performed on a quarterly basis. Groundwater samples will be collected for VOCs analysis, and field measurements will be taken for water quality parameters at MW-2, MW-7, MW-11, MW-13, and at least three additional, existing and/or new monitoring wells approved by EPA. In addition, samples will be collected for analysis of intrinsic biodegradation parameters (*e.g.*, total organic carbon, nitrate, sulfate, ferrous iron, hydrogen sulfide, methane) at MW-2, MW-11, and at least two other well locations approved by EPA. Water level measurements will be taken at all existing monitoring wells/points. The frequency of long-term monitoring will be subjected to annual review and may be modified, as approved by EPA. Long-term groundwater monitoring will continue until the groundwater quality conforms with MCLs.

- The environmental monitoring results from the FPP area will be used to confirm that the VOC plume is attenuating and that its leading edge is not advancing downgradient. Downgradient monitoring wells, as identified above, will be used to track the VOC plume exceeding MCLs. The monitoring results will also be compared against feasibility study estimates regarding natural attenuation rates, with the results of updated trend analyses included as part of quarterly remedial progress reports.

- Groundwater extraction and treatment has been retained as a contingency remedy for this and the AST area, as described in Section 11.3, which will be implemented in the future, if warranted based upon monitoring results. The decision to implement the contingency remedy will be based upon evidence (e.g. statistical analysis, modeling) that the VOC plume is attenuating at rates that are significantly less than feasibility study predictions and that are less than cleanup rates that could otherwise be achieved by the contingency remedy.

Institutional Controls

- The Department of Planning and Natural Resources in consultation with EPA, will utilize institutional controls (in the form of existing well permitting laws and regulations) to limit the pumping of groundwater at the Site to prevent interference with the selected remedy

and to also prevent human exposure to contaminated groundwater until MCLs are achieved.

11.3 Description of Contingency Remedy

In addition to the Selected Remedy, EPA has retained groundwater extraction and treatment as a contingency remedy for groundwater at the AST and FPP areas. The contingency remedy will be implemented in the event that the VOC plume is attenuating at rates that are significantly less than feasibility study predictions and that are less than cleanup rates that could otherwise be achieved by the contingency remedy. The total capital cost of the contingency groundwater remedy for the AST and FPP areas is $1,067,840.

The contingency remedy for the AST Area and FPP Area groundwater includes:

- Installation of one or more groundwater extraction wells to achieve hydraulic control of groundwater exceeding MCLs and to actively remove VOCs from the aquifer.

- Above-ground treatment of groundwater using air stripping to reduce VOC concentrations below the VIDPNR criteria permitted for subsequent surface water discharge to the River Gut.

- Completion of treatment system performance and compliance monitoring and long-term groundwater monitoring, as generally described in Section 11.2, until MCLs are achieved.

12.0 STATUTORY DETERMINATIONS

Under CERCLA Section 121, EPA must select a remedy that is protective of human health and the environment, that complies with ARARs, is cost effective, and uses permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable. In addition, CERCLA includes a preference for remedies that include treatment as a principle element, which permanently and significantly reduces the volume, toxicity, or mobility of hazardous substances.

12.1 Protection of Human Health and the Environment

The Selected Remedy will protect human health and the environment through the use of an SVE/AS system which will remove ethylbenzene and xylene from the AST source area soils and groundwater to achieve MCLs and SSLs. AS treatment will also enhance conditions for aerobic biodegradation of these contaminants. Natural attenuation will continue to be implemented in the FPP area for low-level residual VOC contamination in groundwater. Additionally, institutional controls will be implemented at the Site to reduce the potential for human exposure to contaminants. These controls will restrict land and/or groundwater use until the SSLs and MCLs are achieved.

In addition to source control via SVE/AS, a groundwater extraction and treatment system to capture and treat impacted groundwater at the AST area was considered in the FS process. Of the two treatment options, SVE/AS treatment was considered more effective for these reasons: (1) SVE would rapidly remove and reduce the contaminant source in the unsaturated zone, whereas groundwater extraction alone would not address the unsaturated zone; (2) AS is expected to be more effective at removing contaminants from groundwater than conventional groundwater extraction and treatment based upon the localized nature of contaminant distribution, higher silt/clay content of the Site soils, and poor yield of the shallow aquifer. AS would also better facilitate aerobic biodegradation processes via introduction of air; and (3) SVE/AS would be more readily implemented considering that a system is already in place from the pilot study.

12.2 Compliance with ARARs

The Selected Remedy will comply with all ARARs for the Site; no waivers will be necessary. The Site groundwater quality will be restored to federal MCLs for drinking water (40 CFR Part 141), and the impacted subsurface soils will be restored to EPA SSLs (which are TBCs) for protection of groundwater quality. The SVE/AS system will operate in accordance with national emissions standards for hazardous air pollutants (NESHAPS; 40 CFR Part 161) and territorial air pollution control requirements (VIC, Title 12, Chapter 9). Well installation and abandonment will be performed in accordance with Territorial requirements (VIC Title 12, Chapter 5).

12.3 Cost Effectiveness

The Selected Remedy is cost-effective and represents a reasonable value for the money to be spent. In making this determination, the following definition was used: "A remedy shall be cost-effective if its costs are proportional to its overall effectiveness" [NCP Section 300.430(f)(ii)(D)]. This was accomplished by evaluating the "overall effectiveness" of those alternatives that satisfied the threshold criteria (*i.e.*, were both protective of human health and the environment and ARAR-compliant). Overall effectiveness was evaluated by assessing three of the five balancing criteria in combination (*i.e.*, long-term effectiveness and permanence; reduction of toxicity, mobility, and volume through treatment; and short-term effectiveness). Overall effectiveness was then compared to costs to determine cost-effectiveness. The estimated present worth cost of the Selected Remedy is $1,404,260. A significant portion of the capital costs for the SVE/AS system associated with the remedy have already been incurred as a result of the pilot SVE/AS system.

12.4 Utilization of Permanent Solutions and Alternative Treatment Technologies (or Resource Recovery Technologies) to the Maximum Extent Practicable

The Selected Remedy utilizes permanent solutions and treatment technologies to the maximum extent practicable. In the AST area, the existing SVE/AS system will be used to actively treat and remove contaminant mass from AST area soil and groundwater. SVE/AS provides is a permanent remedy, which will be achieved more quickly than other alternatives relying on natural biological and/or physical processes alone. In the FPP area, MNA will be implemented to achieve reduction in chloroform levels in groundwater comparable to that offered by an active extraction system. Based upon the low concentrations of chloroform remaining in soil and groundwater, natural

attenuation is expected to perform similarly in the FPP area over the long-term. Together, SVE/AS and MNA provide the highest effectiveness at the least cost.

Of those alternatives that are protective of human health and the environment and comply with ARARs, EPA has determined that the Selected Remedy for the Site provides the best balance in terms of long-term effectiveness and permanence, treatment, implementability, cost, and territorial and community acceptance.

12.5 Preference for Treatment as a Principle Element

An SVE/AS pilot study was performed in Spring 2000 at both the AST and FPP areas to better assess the effectiveness of SVE/AS treatment in these areas. The results of the pilot test supported the conclusions that: (1) SVE/AS would be an effective technology for removing ethylbenzene and xylene from the AST source area soils and groundwater, (2) AS treatment would also enhance the conditions for aerobic biodegradation of these contaminants, and (3) SVE/AS would not be effective for treatment of the FPP area, based upon the low air permeability of soils and the low chloroform concentrations remaining in the soils and groundwater in this area.

The Selected Remedy satisfies the statutory preference for treatment by using the operational SVE/AS system that already exists at the Site to treat groundwater, saturated soil, and unsaturated soil at the AST source area. Additionally, MNA will be implemented in the FPP area for low-level residual VOC contamination in groundwater, supported by recent data which indicate that natural attenuation is adequately protective without the need for active treatment. The Selected Remedy is both technically practicable and cost effective as a result of implementation of the pilot system.

12.6 Five-Year Review Requirements

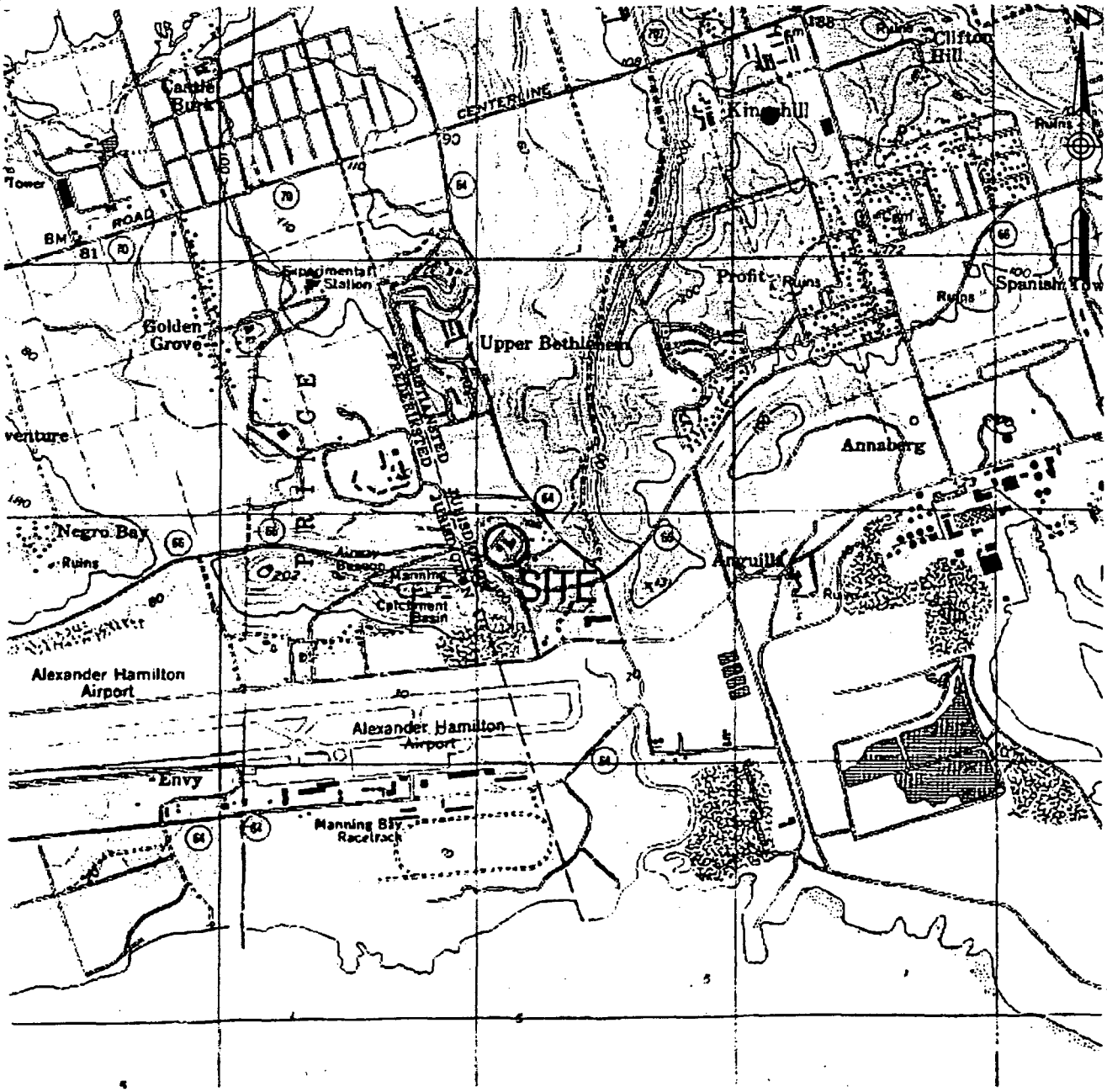
Because contaminated soils and groundwater may remain on-Site above levels that allow for unlimited use and unrestricted exposure for approximately 5 years, the Selected Remedy will be reviewed no less often than once every five years consistent with Section 121 of CERCLA and Section 300.430(f)(4)(ii) of the NCP. The 5-year review includes a review of the groundwater monitoring data and an evaluation as to how well the Selected Remedy is achieving the RAOs and ARARs that it was designed to meet.

13.0 DOCUMENTATION OF SIGNIFICANT CHANGES

The Proposed Plan for soil and groundwater contamination in the AST and FPP areas at the Virgin Island Chemical Superfund Site was released for public comment in June 2001. The Proposed Plan identified Alternative 3, Soil Vapor Extraction/Air Sparging (SVE/AS) with MNA and Institutional Controls, as the Preferred Alternative. Alternative 4 was also identified as the Contingency Remedy at that time. Comments were received during the public comment period. No significant changes were made to the Preferred Alternative with the exception of including a contingent remedy for groundwater in the AST area in the event that the SVE/AS remedy fails to

meet performance standards. The contingent remedy shall be groundwater extraction and treatment in the AST and FPP areas to assure that MCLs for groundwater are achieved in a reasonable time frame.

APPENDIX A
FIGURES



REFERENCE

1.) MAP TAKEN FROM U.S.G.S. 7.5 MINUTE QUADRANGLE OF CHRISTIANSTED, VIRGIN ISLANDS.

2000 0 2000

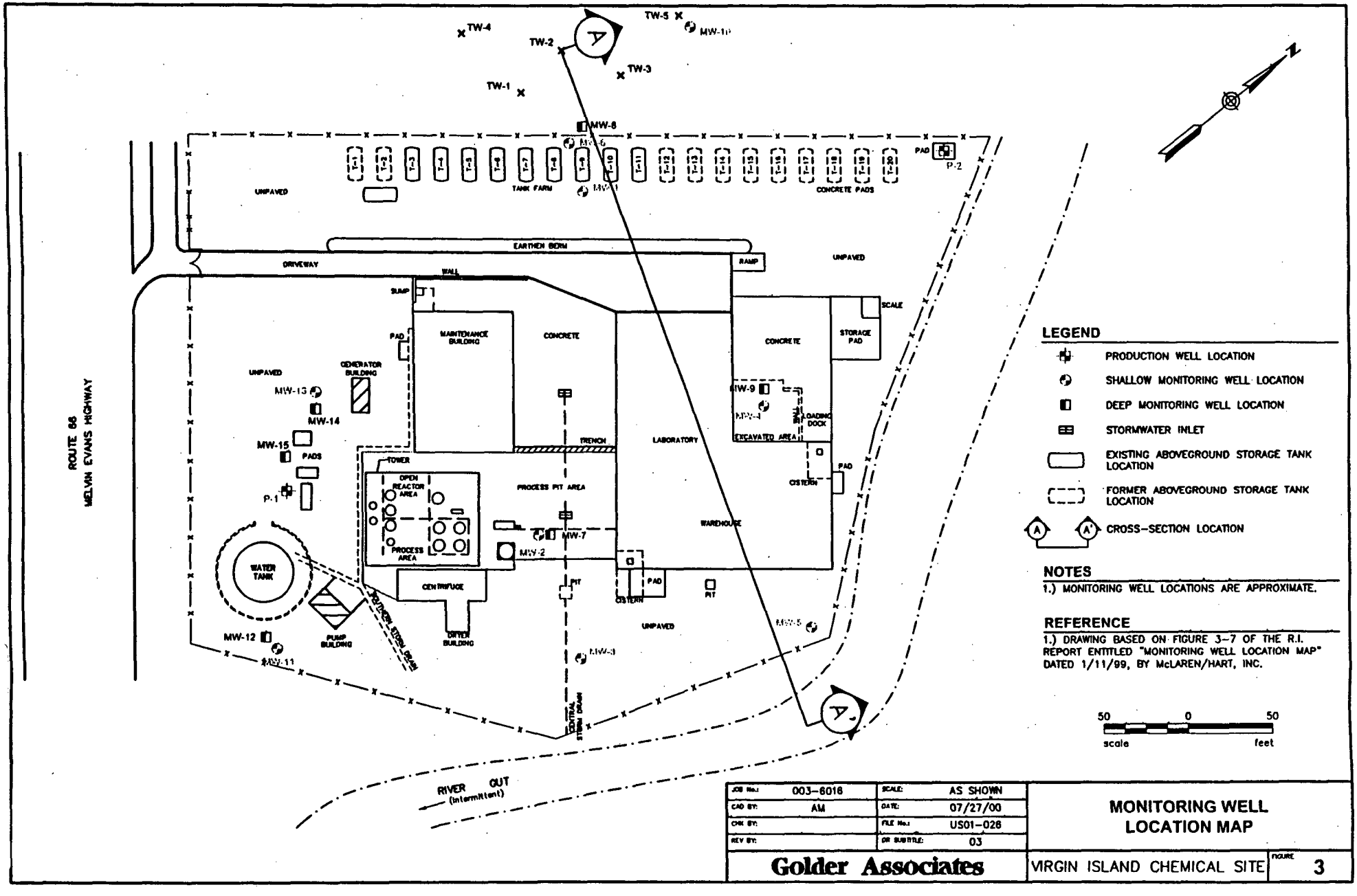
scale feet

JOB No.:	003-6016	SCALE:	AS SHOWN
CAD BY:	AM	DATE:	11/07/00
CHK BY:		FILE No.:	US01-029
REV BY:		DR SUBTITLE:	03

SITE LOCATION MAP

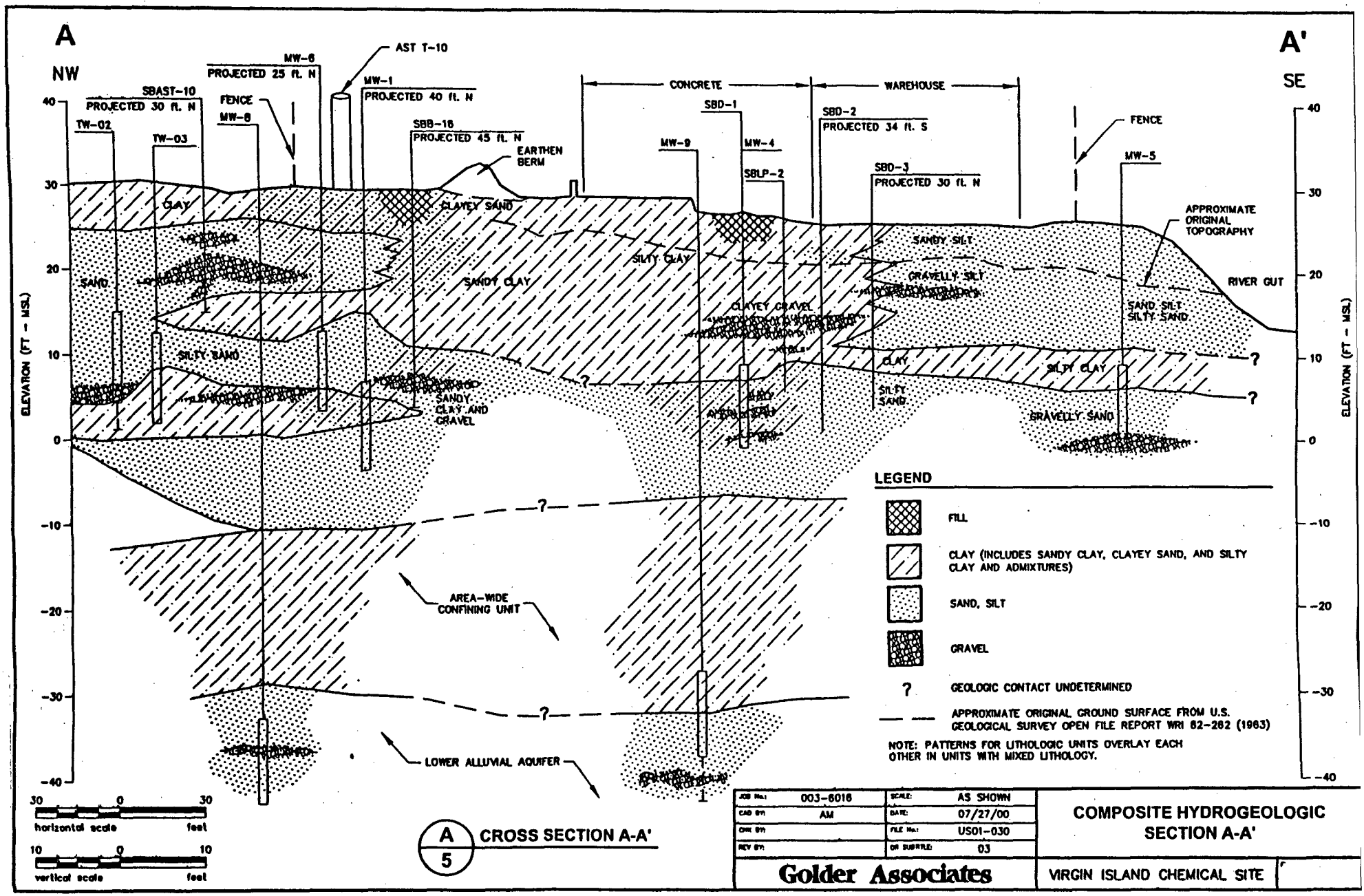
Golder Associates | VIRGIN ISLAND CHEMICAL SITE | FIGURE 1

FIGURE 1



500044

FIGURE 2



500045

FIGURE 3

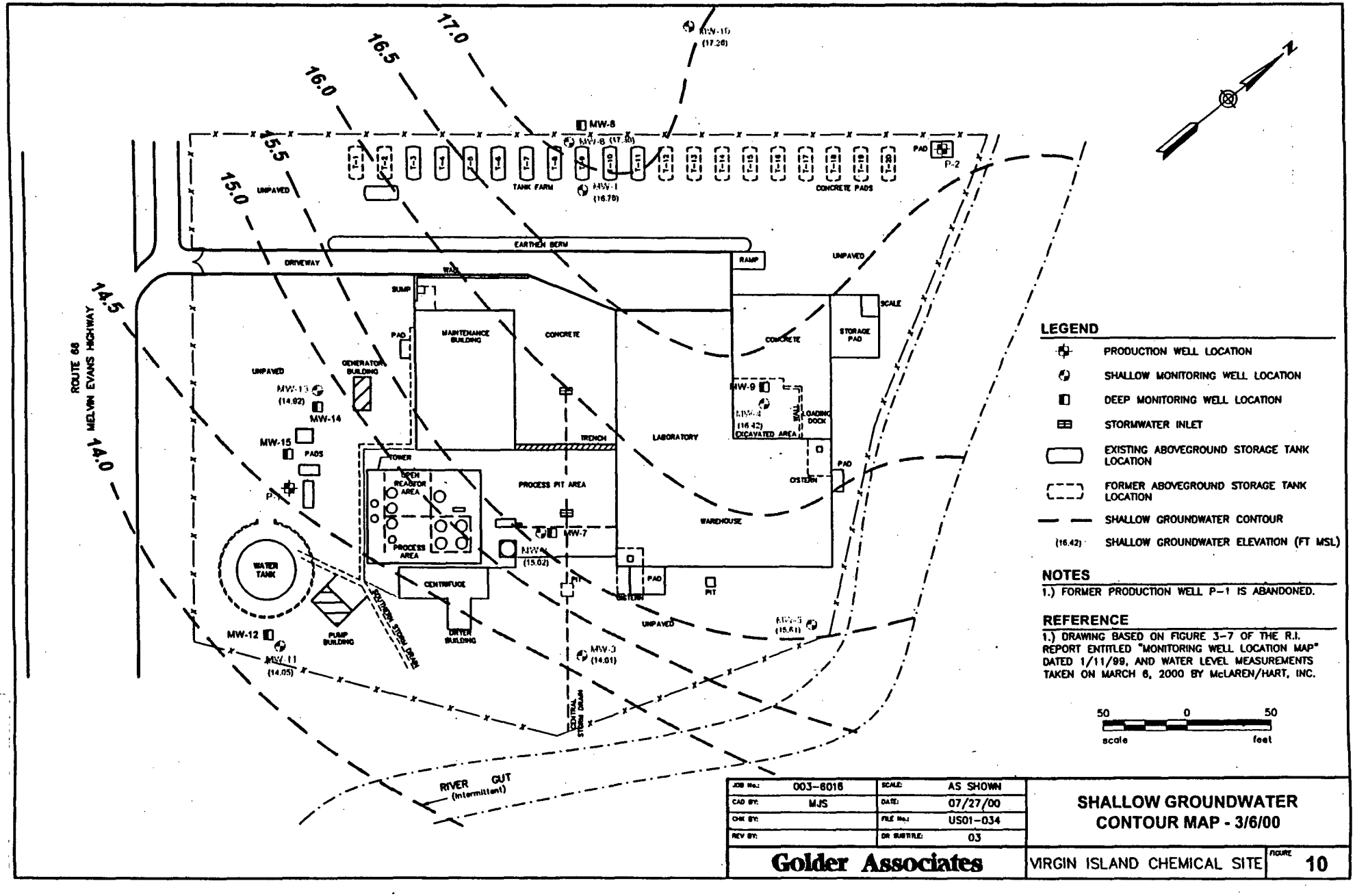


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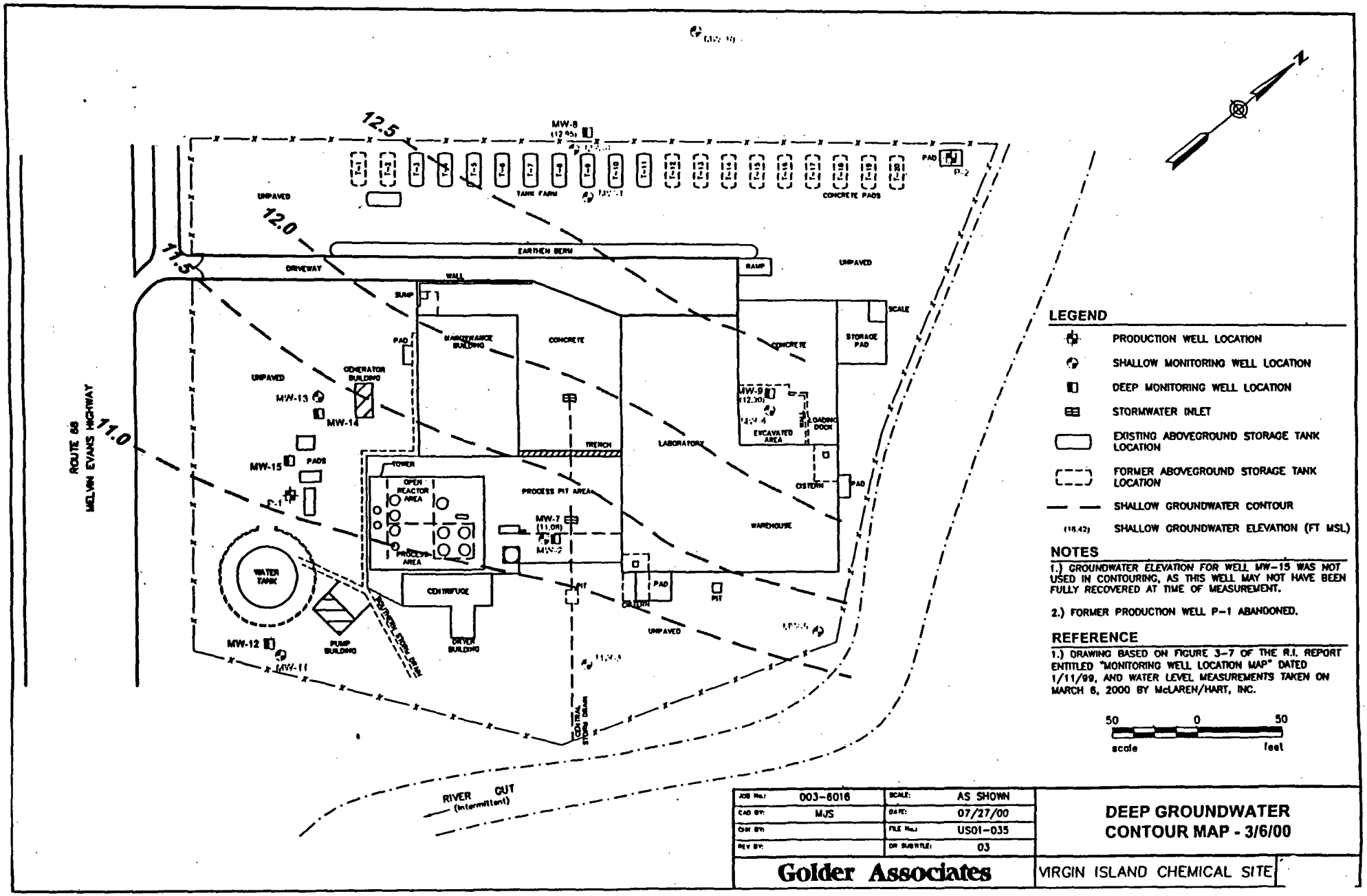
FIGURE 4



500047

FIGURE 5

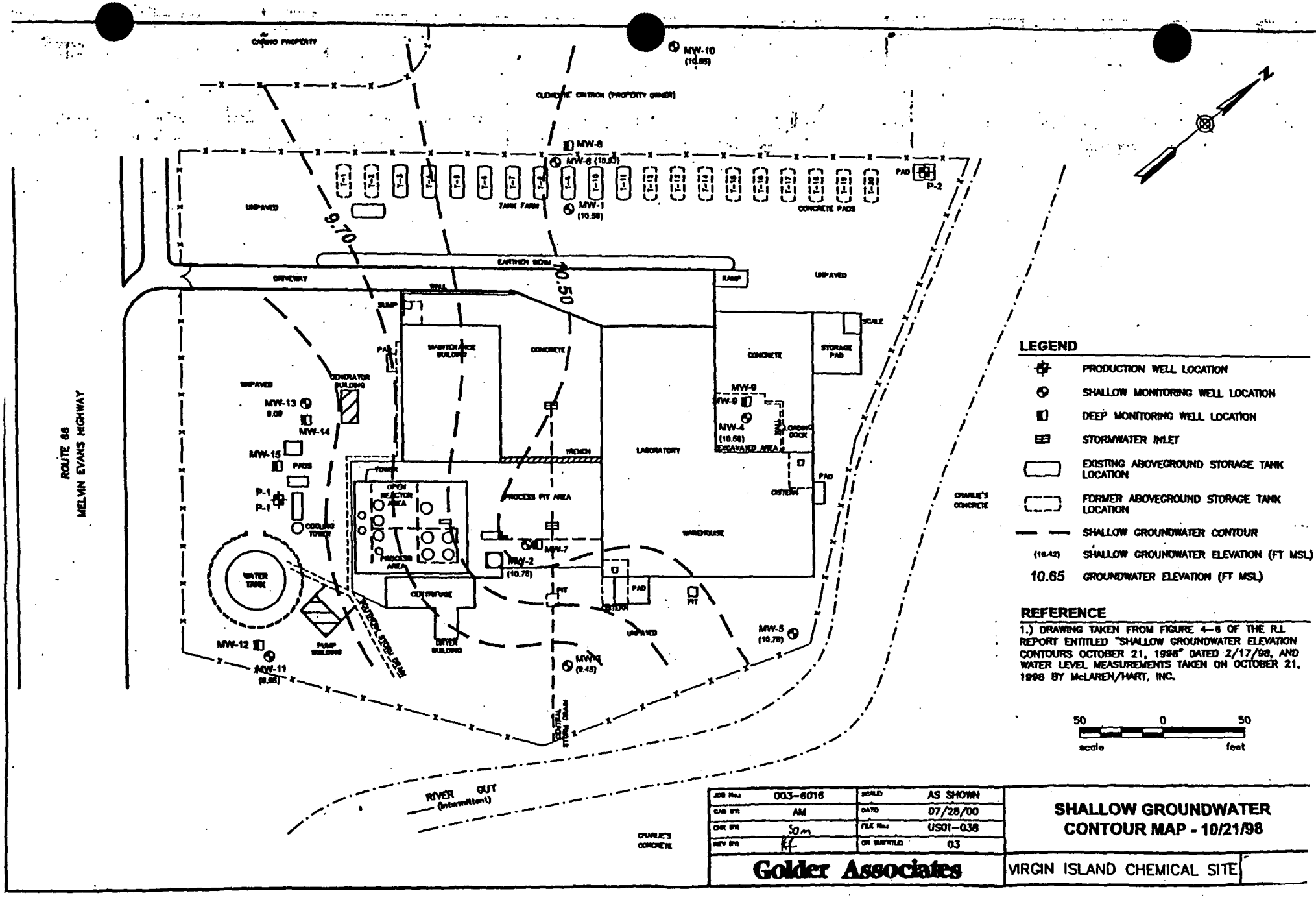


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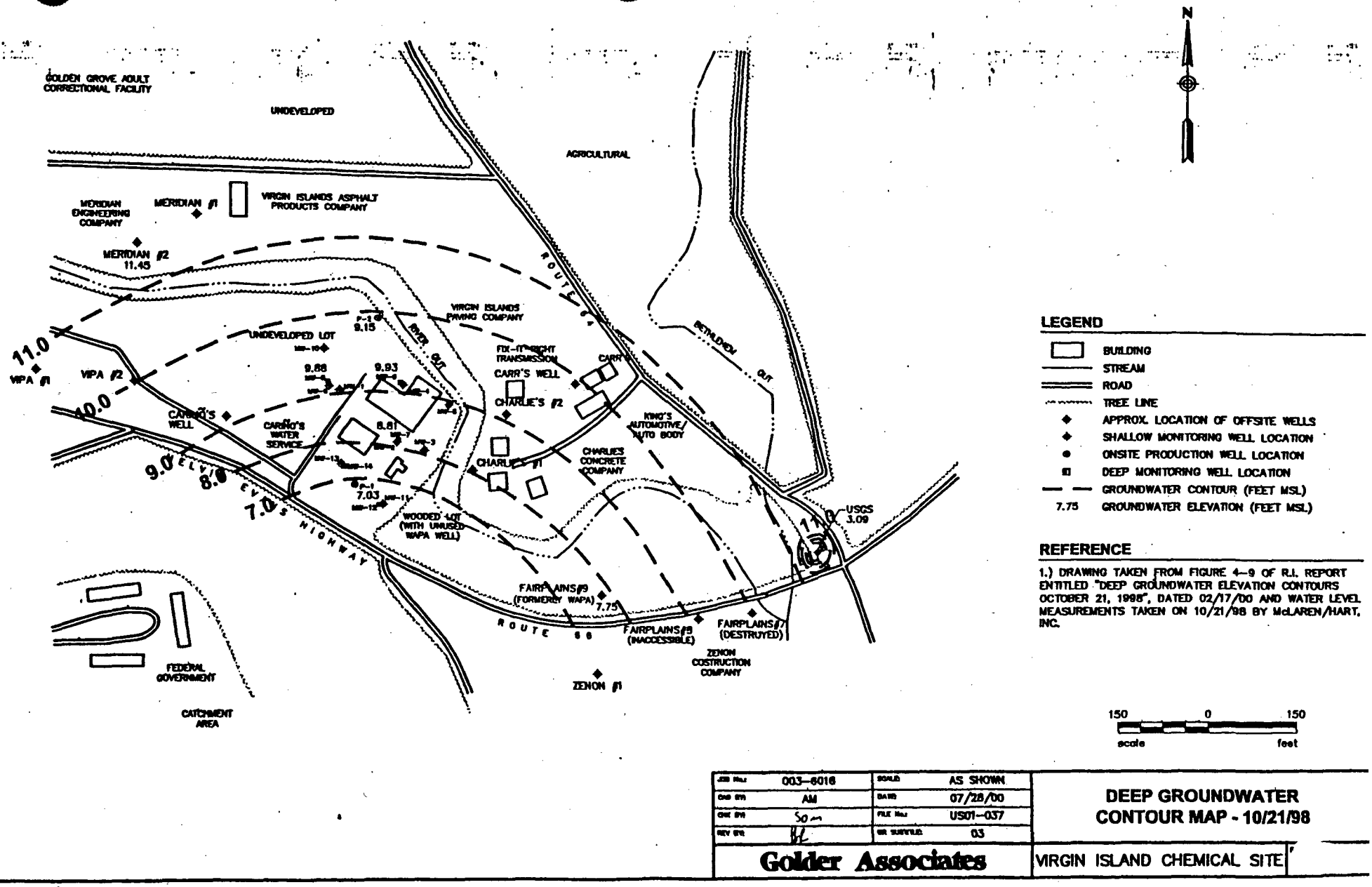
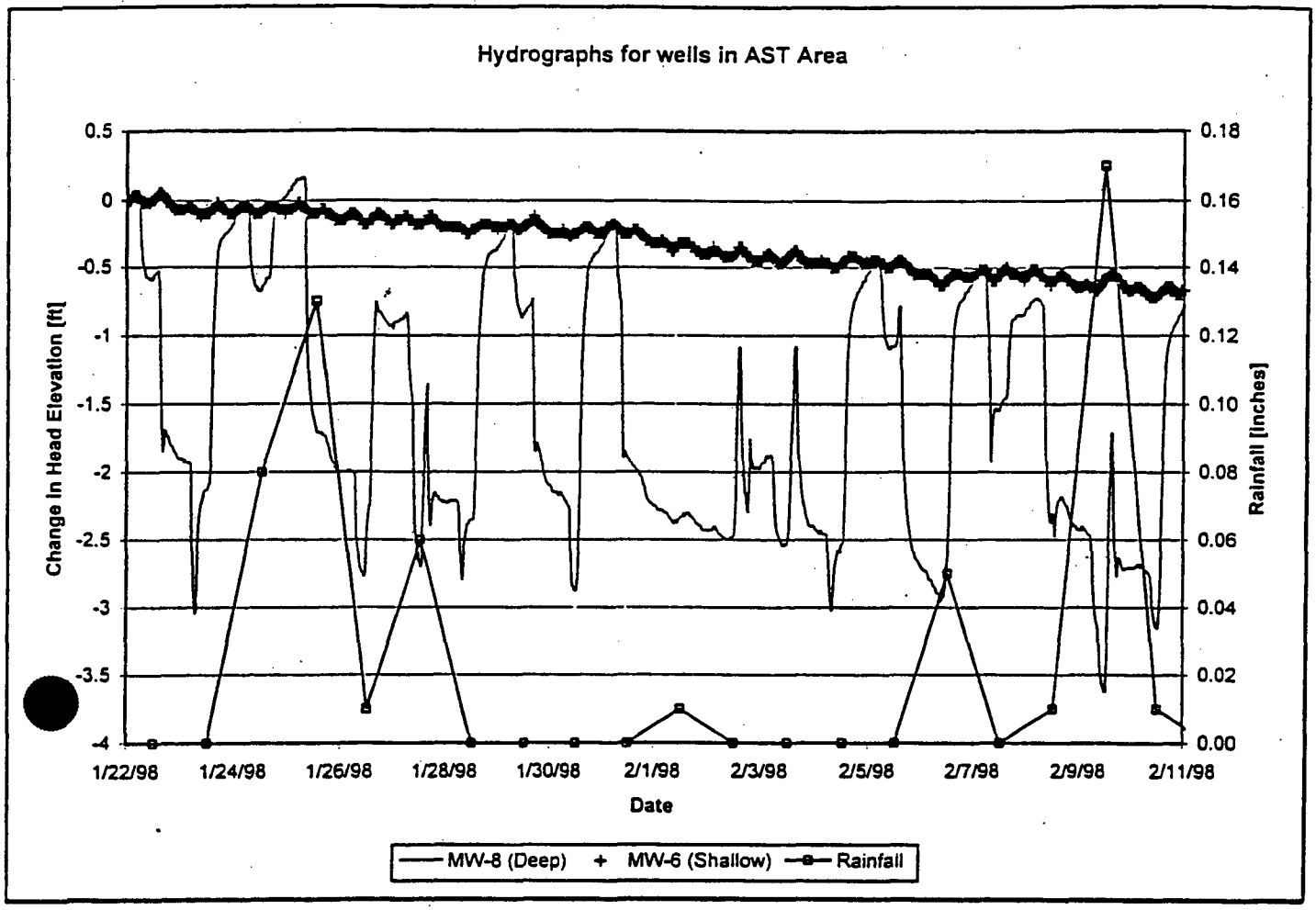
FIGURE 6



500049

FIGURE 7



JB No.:	003-6016	SCALE:	AS SHOWN
T BY:	DSL	DATE:	07/27/00
IK BY:	DSL	FILE No.:	Hydrographs.XLS
V B	SAS	DIRECTORY:	Golden\FS\Hydrogeo

HYDROGRAPHS FOR SHALLOW AND DEEP WELLS IN AST AREA

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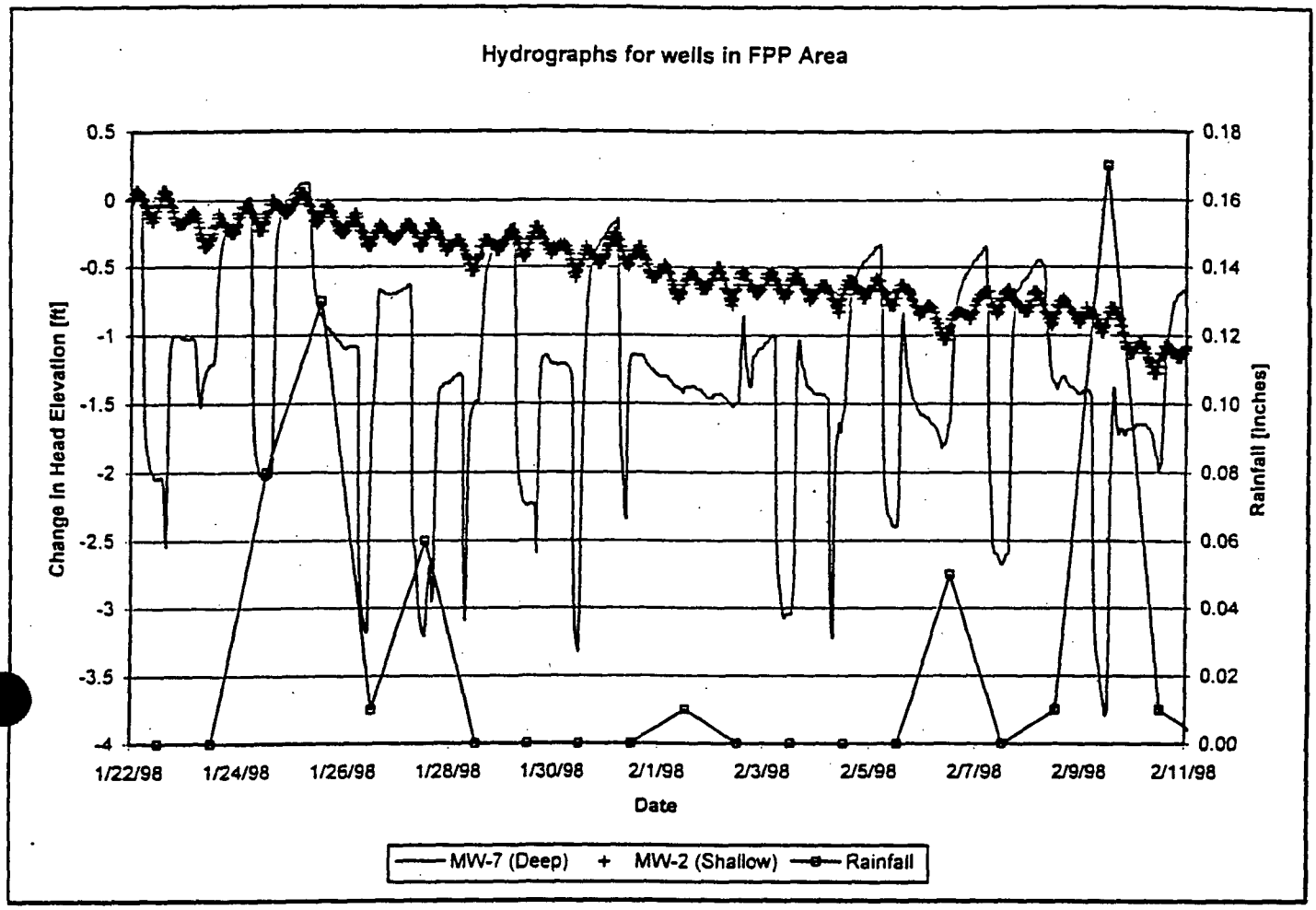
VIRGIN ISLAND CHEMICAL SITE

FIGURE 8

500050



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DR BY:	DSL	DATE:	07/27/00
CHK BY:	DSL	FILE No.:	Hydrographs.XLS
APP BY:	SAS	DIRECTORY:	Golder\FS\Hydrogeo

HYDROGRAPHS FOR SHALLOW AND DEEP WELLS IN FPP AREA

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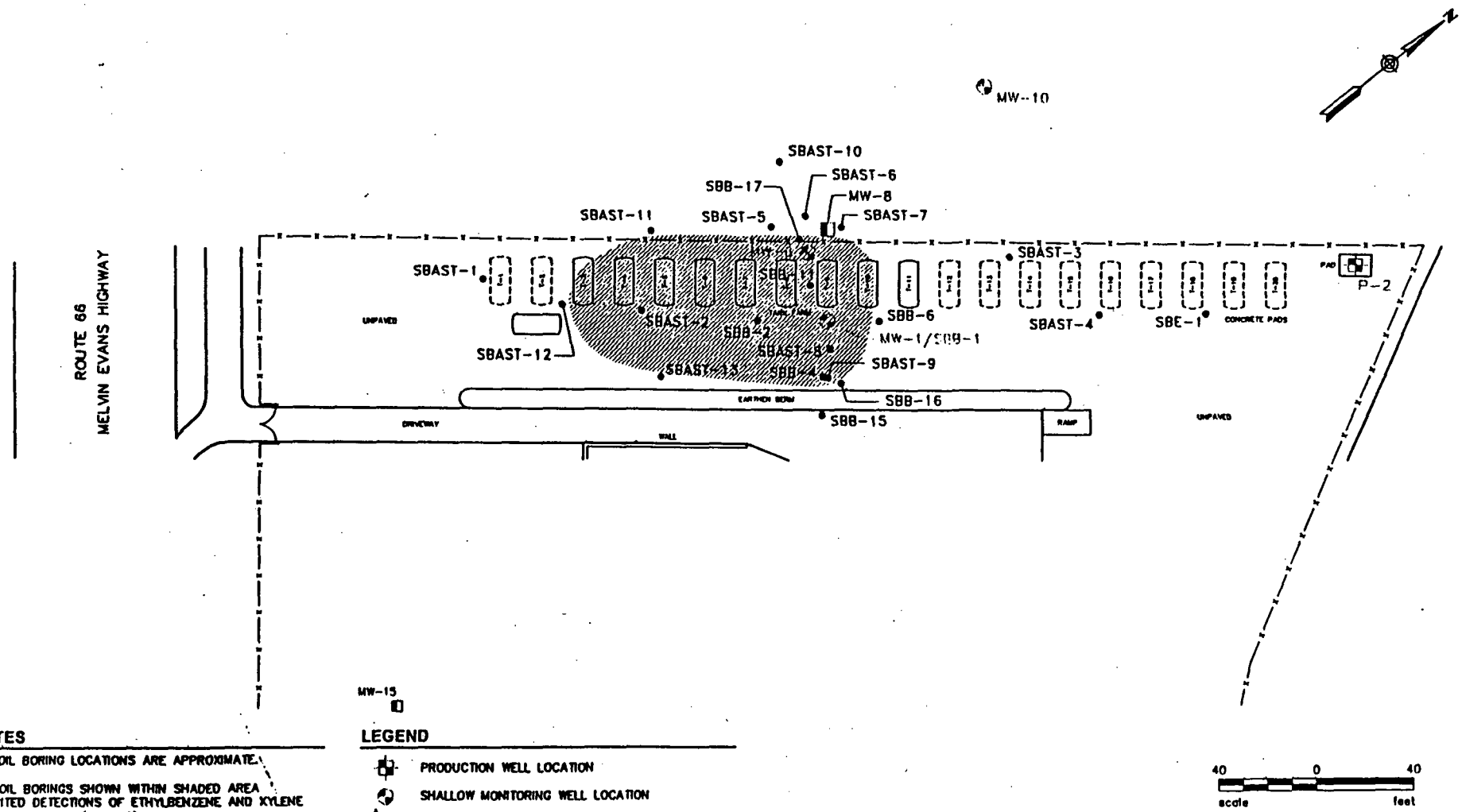
VIRGIN ISLAND CHEMICAL SITE

FIGURE 9

500051



NOTES

1.) SOIL BORING LOCATIONS ARE APPROXIMATE.

2.) SOIL BORINGS SHOWN WITHIN SHADED AREA EXHIBITED DETECTIONS OF ETHYLBENZENE AND XYLENE ABOVE MGW SSLs (DAF=10)

REFERENCE

1.) DRAWING BASED ON FIGURE 4-11 OF THE R.I. REPORT ENTITLED "ESTIMATED AREAL EXTENT OF IMPACTED SOIL - AST AREA" DATED 2/17/00, PROVIDED BY McLAREN/HART, INC.

LEGEND

- PRODUCTION WELL LOCATION
- SHALLOW MONITORING WELL LOCATION
- DEEP MONITORING WELL LOCATION
- SOIL BORING SAMPLE LOCATION
- EXISTING ABOVEGROUND STORAGE TANK LOCATION
- FORMER ABOVEGROUND STORAGE TANK LOCATION
- APPROXIMATE AREA OF IMPACTED SOIL ABOVE SSLs

JOB No.:	003-6016	SCALE:	AS SHOWN
CAD BY:	MJS	DATE:	11/07/00
CHK BY:		FILE No.:	US01-022
REV BY:		OR SUBFILE:	03

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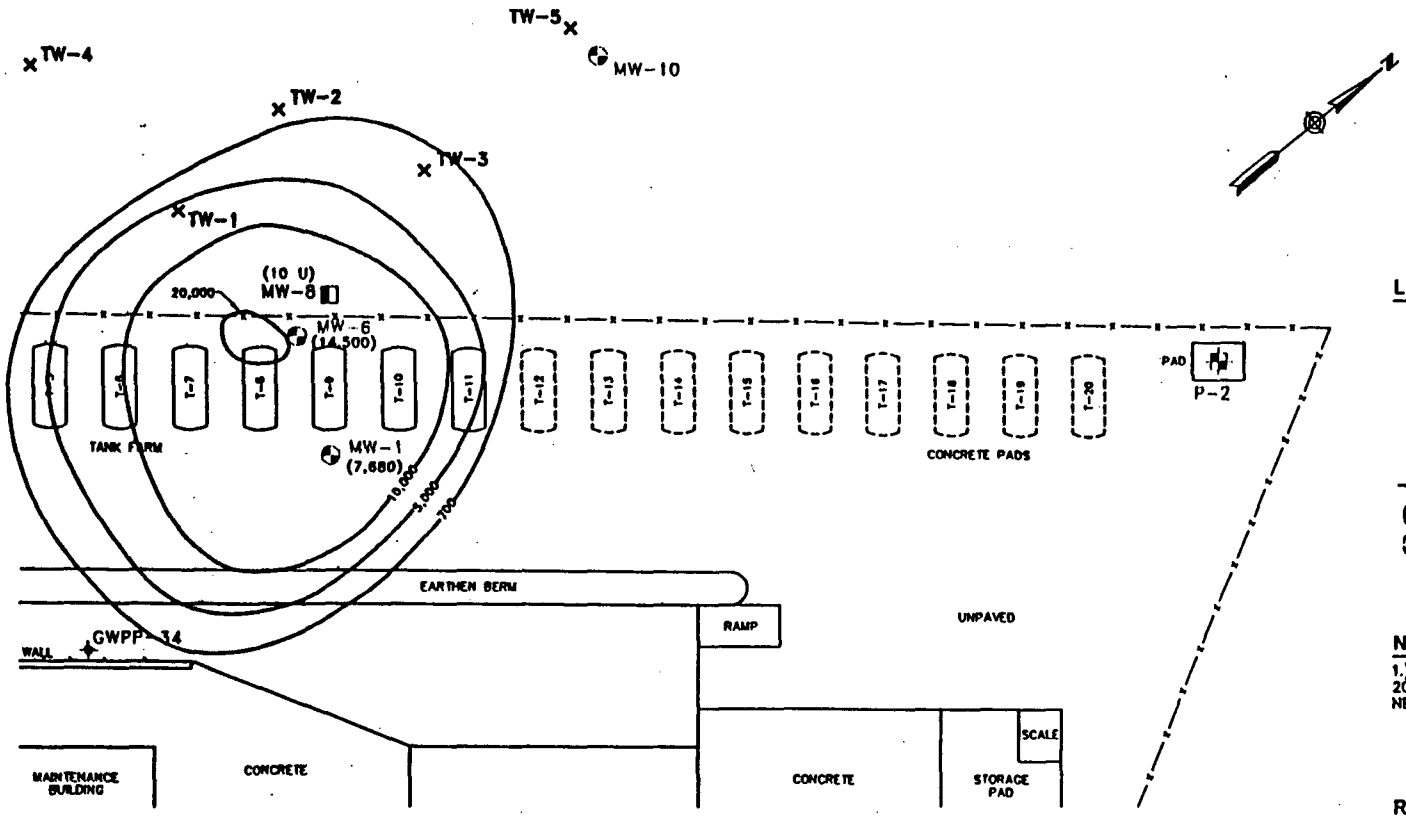
ESTIMATED AREAL EXTENT OF IMPACTED SOIL - AST AREA

VIRGIN ISLAND CHEMICAL SITE

500052

FIGURE 10



LEGEND

- PRODUCTION WELL LOCATION
- SHALLOW MONITORING WELL LOCATION
- DEEP MONITORING WELL LOCATION
- GEOPROBE GROUNDWATER SAMPLE LOCATION
- TEMPORARY WELL LOCATION
- —700— ETHYLBENZENE CONTOUR (ppb)
- EXISTING ABOVEGROUND STORAGE TANK LOCATION
- FORMER ABOVEGROUND STORAGE TANK LOCATION

NOTES

1.) FOR COMPARISON, CONCENTRATIONS FROM THE MAY 2000 SAMPLING EVENT ARE REPORTED IN PARENTHESES NEXT TO WELL ID. ALL UNITS ARE ppb.

REFERENCE

1.) DRAWING BASED ON FIGURE 4-13 OF THE R.I. REPORT ENTITLED "ESTIMATED AREAL EXTENT OF ETHYLBENZENE-IMPACTED SHALLOW GROUNDWATER – AST AREA" DATED 2/17/00, PROVIDED BY McLAREN/HART, INC.

SAMPLE ID	DEPTH (ft bgs)	CONCENTRATION (ppb)	SAMPLE ID	DEPTH (ft bgs)	CONCENTRATION (ppb)
MW-1	23-33	TOLUENE – 400 UJ ETHYLBENZENE – *18,000* XYLENE – *88,000*	TW-1*	19-29	TOLUENE – 5 U ETHYLBENZENE – *8,000 E* XYLENE – *18,000 E*
MW-6	17.4-26.7	TOLUENE – 800 UJ ETHYLBENZENE – *20,000* XYLENE – *88,000*	TW-2*	19-29	TOLUENE – 5 U ETHYLBENZENE – 5 U XYLENE – 5 U
MW-8	63-73	TOLUENE – 0.2 UJ ETHYLBENZENE – 17 XYLENE – 79	TW-3*	19-29	TOLUENE – 5 U ETHYLBENZENE – *720 J* XYLENE – 5 U
MW-10	22-32	TOLUENE – 1 U ETHYLBENZENE – 0.8 UJ XYLENE – 3 U	TW-4*	22-62	TOLUENE – 5 U ETHYLBENZENE – 5 U XYLENE – 5 U
P-2	UNKNOWN	TOLUENE – 1 U ETHYLBENZENE – 1 U XYLENE – 7 U	TW-5*	20-30	TOLUENE – 5 U ETHYLBENZENE – 3 J XYLENE – 5 U
GWPP-34	32-35	TOLUENE – 8 ETHYLBENZENE – 10 U XYLENE – 13			

NOTES:

- J ESTIMATED CONCENTRATION
- U ANALYTE NOT DETECTED ABOVE REPORTING LIMIT
- E ESTIMATED CONCENTRATION
- *18,000* CONCENTRATION EXCEEDS MCL (ETHYLBENZENE – 700 ppb, XYLENE – 10,000 ppb)
- * CONCENTRATIONS FROM TEMPORARY WELLS ARE SCREENING RESULTS FROM ONSITE GC (SEPTEMBER 1997)

ALL RESULTS ARE FROM MARCH/APRIL 1998 INVESTIGATION EXCEPT SCREENING RESULTS FROM TEMPORARY WELLS (SEPTEMBER 1997)

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scale feet

JOB No.:	003-6018	SCALE:	AS SHOWN
CAD BY:	MJS	DATE:	11/07/00
CHK BY:		FILE No.:	US01-024
REV BY:		DR SUBFILE:	03

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ESTIMATED AREAL EXTENT OF ETHYLBENZENE-IMPACTED SHALLOW GROUNDWATER IN 1998 - AST AREA

VIRGIN ISLAND CHEMICAL SITE

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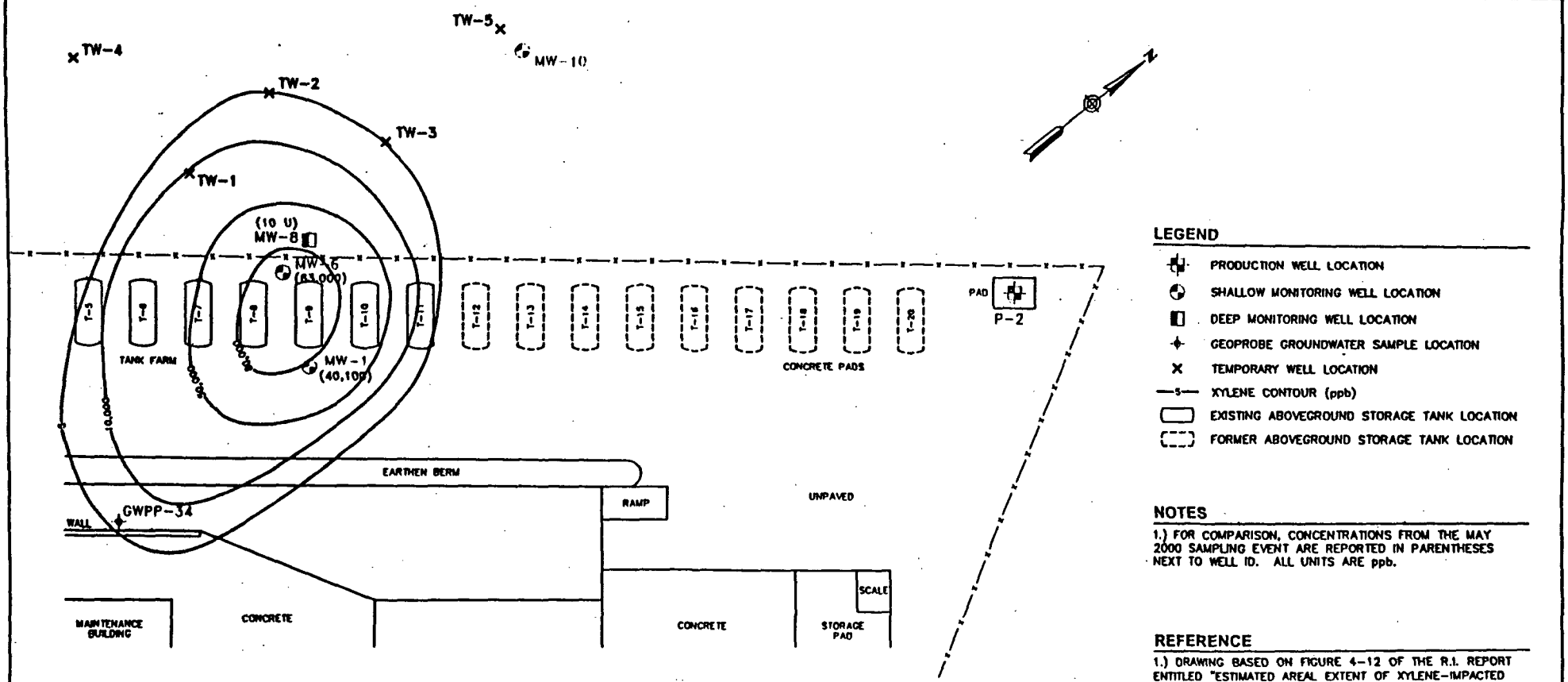
FIGURE 11



LEGEND

- PRODUCTION WELL LOCATION
- SHALLOW MONITORING WELL LOCATION
- DEEP MONITORING WELL LOCATION
- GEOPROBE GROUNDWATER SAMPLE LOCATION
- TEMPORARY WELL LOCATION
- —5— XYLENE CONTOUR (ppb)
- EXISTING ABOVEGROUND STORAGE TANK LOCATION
- FORMER ABOVEGROUND STORAGE TANK LOCATION

NOTES

1.) FOR COMPARISON, CONCENTRATIONS FROM THE MAY 2000 SAMPLING EVENT ARE REPORTED IN PARENTHESES NEXT TO WELL ID. ALL UNITS ARE ppb.

REFERENCE

1.) DRAWING BASED ON FIGURE 4-12 OF THE R.I. REPORT ENTITLED "ESTIMATED AREAL EXTENT OF XYLENE-IMPACTED SHALLOW GROUNDWATER - AST AREA" DATED 2/17/00, PROVIDED BY McLAREN/HART, INC.

SAMPLE ID	DEPTH (ft bgs)	CONCENTRATION (ppb)	SAMPLE ID	DEPTH (ft bgs)	CONCENTRATION (ppb)
MW-1	23-33	TOLUENE - 480 UJ ETHYLBENZENE - *18,000* XYLENE - *88,000*	TW-1*	19-29	TOLUENE - 5 U ETHYLBENZENE - *8,000 E* XYLENE - *16,000 E*
MW-6	17.4-26.7	TOLUENE - 600 UJ ETHYLBENZENE - *20,000* XYLENE - *83,000*	TW-2*	19-29	TOLUENE - 5 U ETHYLBENZENE - 5 U XYLENE - 5 U
MW-8	63-73	TOLUENE - 0.2 UJ ETHYLBENZENE - 17 XYLENE - 78	TW-3*	19-29	TOLUENE - 5 U ETHYLBENZENE - *720 J* XYLENE - 5 U
MW-10	22-32	TOLUENE - 1 U ETHYLBENZENE - 0.8 UJ XYLENE - 5 U	TW-4*	22-32	TOLUENE - 5 U ETHYLBENZENE - 5 U XYLENE - 5 U
P-2	UNKNOWN	TOLUENE - 1 U ETHYLBENZENE - 1 U XYLENE - 7 U	TW-5*	20-30	TOLUENE - 5 U ETHYLBENZENE - 3 J XYLENE - 5 U
GWPP-34	32-38	TOLUENE - 6 ETHYLBENZENE - 10 U XYLENE - 13			

NOTES:

- J — ESTIMATED CONCENTRATION
- U — ANALYTE NOT DETECTED ABOVE REPORTING LIMIT
- E — ESTIMATED CONCENTRATION
- *18,000* — CONCENTRATION EXCEEDS MCL (ETHYLBENZENE - 700 ppb, XYLENE - 10,000 ppb)
- * — CONCENTRATIONS FROM TEMPORARY WELLS ARE SCREENING RESULTS FROM ONSITE GC (SEPTEMBER 1997)

ALL RESULTS ARE FROM MARCH/APRIL 1998 INVESTIGATION EXCEPT SCREENING RESULTS FROM TEMPORARY WELLS (SEPTEMBER 1997)

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scale feet

JOB No.:	003-6018	SCALE:	AS SHOWN
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CHK BY:		FILE No.:	US01-023
REV BY:		OR SUBFILE:	03

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ESTIMATED AREAL EXTENT OF XYLENE-IMPACTED SHALLOW GROUNDWATER IN 1998 - AST AREA

VIRGIN ISLAND CHEMICAL SITE

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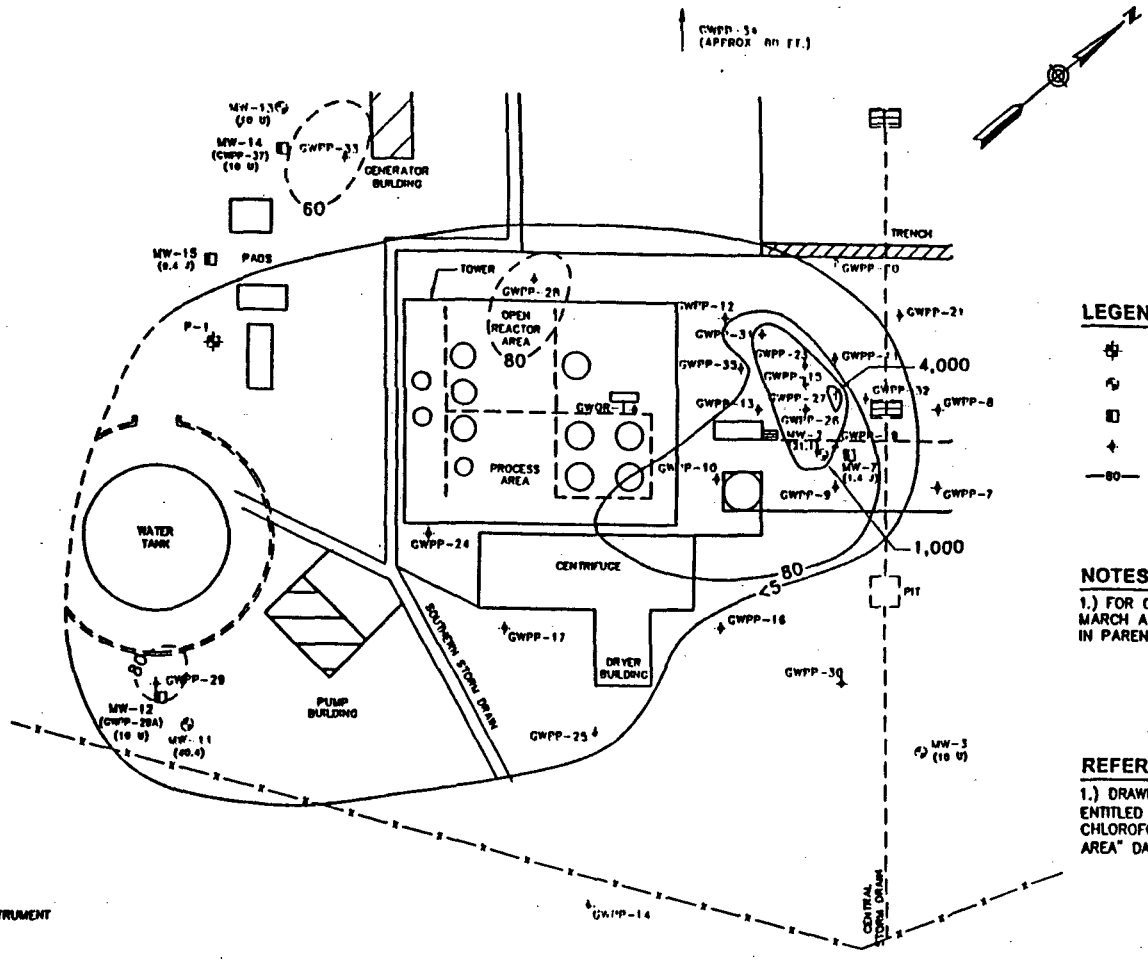
FIGURE 12

SAMPLE ID	DEPTH (ft bgs)	CHLOROFORM CONCENTRATION (ppb)
GWPP-7	20-25	ND
GWPP-8	20-25	ND
GWPP-9	22-27	*310*
GWPP-10	28-33	*94*
GWPP-11	21-26	74
GWPP-12	26-31	78
GWPP-13	22-30	*167*
GWPP-14	21-24	ND
GWPP-15	8-10	*1,170*
GWPP-16	27-30	ND
GWPP-17	27-32	3
GWPP-19	8-12	*460*
GWPP-20	23-28	7
GWPP-21	21-26	ND
GWPP-23	22-27	*1,000*
GWPP-24	23-28	53
GWPP-25	24-29	3
GWPP-26	8-10	54
GWPP-27	24-29	*3,994*
GWPP-28	26-31	*234*
GWPP-29*	31-34	*96*
GWPP-30	34-37	ND
GWPP-31	22-27	*1,661*
GWPP-32	23-28	8
GWPP-33*	31-34	63
GWPP-34	32-35	ND
GWPP-35	27-30	29
GWOR-1	22-29	31
MW-2	18.8-28.2	*2,400*
MW-3	18.5-28.5	ND
MW-7	64-74	4
MW-11	30-40	33
MW-12	137-147	ND
MW-13	30-40	ND
MW-14	124-134	ND
P-1	UNKNOWN	48E
MW-15	88-98	SEE NOTE 1

NOTES:

- E — EXCEEDS CALIBRATION RANGE OF INSTRUMENT
- J — ESTIMATED CONCENTRATION
- ND — NON DETECTED
- *1,700* — CONCENTRATION EXCEEDS MCL (80 ppb)
- * — FOR PREPARATION OF PLUME MAP, RESULTS FROM SCREENING POINTS GWPP-29 AND GWPP-33 WERE REPLACED WITH RESULTS FROM MONITORING WELLS MW-11 AND MW-13 RESPECTIVELY. THESE PERMANENT POINTS ARE ASSUMED TO BE MORE REPRESENTATIVE OF ACTUAL GROUNDWATER CONDITIONS.
ALL RESULTS ARE FROM MARCH/APRIL 1998 INVESTIGATION EXCEPT MONITORING WELLS MW-11 THROUGH MW-14 (OCTOBER 1998) AND MW-15 (MAY 2000).



LEGEND

- PRODUCTION WELL LOCATION
- SHALLOW MONITORING WELL LOCATION
- DEEP MONITORING WELL LOCATION
- GEOPROBE GROUNDWATER SAMPLE LOCATION
- —80— CHLOROFORM CONTOUR (ppb)

NOTES

1.) FOR COMPARISON, CONCENTRATIONS FROM THE MARCH AND MAY 2000 SAMPLING EVENT ARE REPORTED IN PARENTHESES NEXT TO WELL ID. ALL UNITS ARE ppb.

REFERENCE

1.) DRAWING BASED ON FIGURE 4-16 OF THE R.I. REPORT ENTITLED "ESTIMATED AREAL EXTENT OF CHLOROFORM-IMPACTED SHALLOW GROUNDWATER - AST AREA" DATED 2/17/00, PROVIDED BY McLAREN/HART, INC.

30 0 30
scale feet

JOB No.: 003-6016	SCALE: AS SHOWN	ESTIMATED AREAL EXTENT OF CHLOROFORM-IMPACTED SHALLOW GROUNDWATER IN 1998 - PROCESS PIT AREA	
CAD BY: MJS	DATE: 11/07/00		
CHK BY:	FILE No.: US01-025		
REV BY:	DR SUBFILE: 03		
Golder Associates	VIRGIN ISLAND CHEMICAL SITE	FIGURE 15	

500055

FIGURE 13

APPENDIX B
TABLES

Table 1
Summary of Chemicals of Concern and Medium-Specific Exposure Point Concentrations

Scenario Timeframe:	Future
Medium:	Surface Soil
Exposure Medium:	Surface Soil/Air

Exposure Point	Chemical of Concern	Concentration Detected		Units	Frequency of Detection	Exposure Point Concentration	Exposure Point Concentration Units	Statistical Measure
		Min	Max					
Soil On-Site	Arsenic	0.81	8.8	mg/kg	6/8	6.83	mg/kg	95th UCL-T
	Chromium	14.8	32	mg/kg	12/12	26	mg/kg	95th UCL-N

Key

95th UCL-T: 95% Upper Confidence Limit, lognormal distribution
95th UCL-N: 95% Upper Confidence Limit, normal distribution

Table 2
Summary of Chemicals of Concern
Medium-Specific Exposure Point Concentrations

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Local Aquifers

Exposure Point	Chemical of Concern	Concentration Detected		Units	Frequency of Detection	Exposure Point Concentration	Exposure Point Concentration Units	Statistica Measure
		Min	Max					
Local Aquifers	Chloroform	2	3880	ug/L	39/79	865	ug/L	95th UCL-T
	Methylene Chloride	2	4300	ug/L	5/79	40	ug/L	95th UCL-T
	Arsenic	2	5.2	ug/L	5/24	1.4	ug/L	95th UCL-T
	Iron	31	10100	ug/L	18/24	10100	ug/L	MAX
	Manganese	10.2	3570	ug/L	23/23	1614	ug/L	95th UCL-N

Key

95th UCL-T: 95% Upper Confidence Limit, lognormal distribution
95th UCL-N: 95% Upper Confidence Limit, normal distribution
MAX: Maximum detected concentration

Table 3
Cancer Toxicity Data

Pathway: Ingestion, Dermal

Chemical of Concern	Oral Cancer Slope Factor	Dermal Cancer Slope Factor	Slope Factor Units	Weight of Evidence/Cancer Guideline Description	Source	Date (mm/dd/yy)
Chloroform	6.1E-03	6.1E-03	1/mg/kg/d	B2	IRIS	01/15/99
Methylene Chloride	7.5E-03	7.5E-03	1/mg/kg/d	B2	IRIS	01/15/99
Arsenic	1.5E+00	1.47E+00	1/mg/kg/d	A	IRIS	01/15/99

Pathway: Inhalation

Chemical of Concern	Unit Risk	Units	Inhalation Cancer Slope Factor	Units	Weight of Evidence/Cancer Guideline Description	Source	Date (mm/dd/yy)
Chloroform	2.3E-05	ug/m3	8.1E-02	1/mg/kg/d	B2	IRIS	01/15/99
Methylene Chloride	4.7E-07	ug/m3	1.65E-03	1/mg/kg/d	B2	IRIS	01/15/99
Arsenic	4.3E-03	ug/m3	1.51E+01	1/mg/kg/d	A	IRIS	01/15/99
Chromium VI	1.2E-02	ug/m3	4.2E+01	1/mg/kg/d	A	IRIS	09/03/98

Key

IRIS: Integrated Risk Information System, U.S. EPA
EPA Weight of Evidence Group:
A - Human carcinogen
B1- Probable human carcinogen - limited human data are available
B2 - Probable human carcinogen - sufficient evidence in animals and inadequate or no evidence in humans
C - Possible human carcinogen
D - Not classified as a human carcinogen
E - Evidence of noncarcinogenicity

Table 4
Noncancer Toxicity Data

Pathway: Ingestion, Dermal									
Chemical of Concern	Chronic/ Subchronic	Oral RfD Value	Oral RfD Units	Dermal RfD	Dermal RfD Units	Primary Target Organ	Combined Uncertainty/ Modifying Factors	Sources of RfD: Target Organ	Dates of RfD: Target Organ (mm/dd/yy)
Chloroform	Chronic	1E-02	mg/kg/d	1E-02	mg/kg/d	Liver	1000/1	IRIS	01/15/99
Methylene Chloride	Chronic	6E-02	mg/kg/d	6E-02	mg/kg/d	Liver	100/1	IRIS	01/15/99
Arsenic	Chronic	3E-04	mg/kg/d	2.94E-04	mg/kg/d	Skin	3/1	IRIS	01/15/99
Chromium	Subchronic	3E-03	mg/kg/d	6E-05	mg/kg/d	NOAEL	300/3	IRIS/Hrudey et al., 1996	09/03/98
Iron	Chronic	3E-01	mg/kg/d	3E-02	mg/kg/d	Liver/Heart/Pancreas	1/NA	NCEA	07/23/96
Manganese	Chronic	2E-02	mg/kg/d	2E-03	mg/kg/d	CNS	NA/3	IRIS	09/26/98

Pathway: Inhalation									
Chemical of Concern	Chronic/ Subchronic	Inhalation RfC	Inhalation RfC Units	Inhalation RfD	Inhalation RfD Units	Primary Target Organ	Combined Uncertainty/ Modifying Factors	Sources of RfC:RfD: Target Organ	Dates (mm/dd/yy)
Chloroform	Chronic	3E-04	mg/m3	8.6E-05	mg/kg/d	Liver/Kidney	1000/NA	NCEA	12/01/97
Methylene Chloride	Subchronic/Chronic	3E+00	mg/m3	8.6E-01	mg/kg/d	Liver	100/NA	HEAST	07/01/97
Chromium	Subchronic	3E-05	mg/m3	3E-05	mg/kg/d	Lung	300/1	HEAST	07/01/97
Manganese	Chronic	5E-05	mg/m3	1.43E-05	mg/kg/d	CNS	1000/1	HEAST	07/01/97

Key

IRIS: Integrated Risk Information System, U.S. EPA
HEAST: Health Effects Assessment Summary Tables, U.S. EPA
NCEA: National Center for Environmental Assessment
NOAEL: No Observed Adverse Effect Level
CNS: Central nervous system

Table 5
Risk Characterization Summary - Carcinogens

Scenario Timeframe: Future
Receptor Population: Industrial/Commercial Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Concern	Carcinogenic Risk			
				Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	Local Aquifers	Chloroform	2E-05	N/A	4E-06	3E-05
			Methylene Chloride	1E-06	N/A	1E-07	1E-06
			Arsenic	9E-06	N/A	4E-10	9E-06
	Air	Local Aquifers	Chloroform	N/A	8E-04	N/A	8E-04
						Groundwater risk total =	9E-04
Surface Soil	Surface Soil	Surface Soil	Arsenic	2E-06	--	7E-07	2E-06
						Soil risk total =	2E-06
						Total risk =	9E-04

Key

--: Toxicity criteria are not available to quantitatively address this route of exposure
N/A: Route of exposure is not applicable to this medium.

Table 6
Risk Characterization Summary - Carcinogens

Scenario Timeframe: Future
Receptor Population: Trespasser
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Concern	Carcinogenic Risk			
				Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	Surface Soil	Arsenic	9E-07	N/A	2E-07	1E-06
	Air	Surface Soil	Arsenic	N/A	5E-10	N/A	5E-10
			Chromium	N/A	5E-09	N/A	5E-09
						Soil risk total =	1E-06
						Total risk =	1E-06

Key

N/A: Route of exposure is not applicable to this medium.

Table 7
Risk Characterization Summary - Carcinogens

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Concern	Carcinogenic Risk			
				Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	Tap Water	Chloroform	7E-05	N/A	1E-06	8E-05
			Methylene Chloride	4E-06	N/A	4E-08	4E-06
			Arsenic	3E-05	N/A	1E-10	3E-05
	Air	Water Vapors Via Bathing	Chloroform	N/A	2E-04	N/A	2E-04
						Groundwater risk total =	3E-04
						Total risk=	3E-04

Key

N/A: Route of exposure is not applicable to this medium.

Table 8

Risk Characterization Summary - Carcinogens

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical of Concern	Carcinogenic Risk			
				Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	Tap Water	Chloroform	4E-05	N/A	5E-07	4E-05
			Methylene Chloride	2E-06	N/A	1E-08	2E-06
			Arsenic	2E-05	N/A	5E-11	2E-05
	Air	Water Vapors Via Bathing	Chloroform	N/A	9E-05	N/A	9E-05
						Groundwater risk total:	2E-04
						Total risk:	2E-04

Key

N/A: Route of exposure is not applicable to this medium.

Table 9
Risk Characterization Summary - Carcinogens

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult+Child

Medium	Exposure Medium	Exposure Point	Chemical of Concern	Carcinogenic Risk			
				Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	Tap Water	Chloroform	1E-04	N/A	2E-06	1E-04
			Methylene Chloride	7E-06	N/A	4E-08	7E-06
			Arsenic	5E-05	N/A	2E-10	5E-05
	Air	Water Vapors Via Bathing	Chloroform	N/A	3E-04	N/A	3E-04
						Groundwater risk total:	5E-04
						Total risk:	5E-04

Key

N/A: Route of exposure is not applicable to this medium.

Table 10
Risk Characterization Summary - Non-Carcinogens

Scenario Timeframe: Future
Receptor Population: Industrial/Commercial Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Concern	Primary Target Organ	Non-Carcinogenic Hazard Quotient			
					Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	Local Aquifers	Chloroform	Liver	1.0E+00	N/A	2.0E-01	1.2E+00
			Manganese	CNS	9.5E-01	N/A	2.1E-01	1.2E+00
	Air	Local Aquifers	Chloroform	Liver	N/A	3.3E+02	N/A	3.3E+02
							Groundwater Hazard Index Total=	3.3E+02
							Receptor Hazard Index =	3.3E+02
							Liver Hazard Index =	3.3E+02
							CNS Hazard Index =	1.2E+00

Key

N/A: Route of exposure is not applicable to this medium.

Table 11
Risk Characterization Summary - Non-Carcinogens

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Concern	Primary Target Organ	Non-Carcinogenic Hazard Quotient			
					Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	Tap Water	Chloroform	Liver	2.8E+00	N/A	4.8E-02	2.9E+00
			Iron	Liver/Heart/Pancreas	1.1E+00	N/A	2.1E-02	1.1E+00
			Manganese	CNS	2.7E+00	N/A	5.0E-02	2.7E+00
	Air	Water Vapors Via Bathing	Chloroform	Liver	N/A	6.4E+01	N/A	6.4E+01
							Groundwater Hazard Index Total=	7.1E+01
							Receptor Hazard Index =	7.1E+01
							Liver Hazard Index =	6.8E+01
							CNS Hazard Index =	2.7E+00
							Heart/Pancreas Hazard Index =	1.1E+00

Key

N/A: Route of exposure is not applicable to this medium.

Table 12
Risk Characterization Summary - Non-Carcinogens

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical of Concern	Primary Target Organ	Non-Carcinogenic Hazard Quotient			
					Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	Tap Water	Chloroform	Liver	8.3E+00	N/A	8.9E-02	8.4E+00
			Iron	Liver/Heart/Pancreas	3.2E+00	N/A	3.9E-02	3.3E+00
			Manganese	CNS	7.7E+00	N/A	9.3E-02	7.8E+00
	Air	Water Vapors Via Bathing	Chloroform	Liver	N/A	1.5E+02	N/A	1.5E+02
							Groundwater Hazard Index Total=	1.7E+02
							Receptor Hazard Index =	1.7E+02
							Liver Hazard Index =	1.6E+02
							CNS Hazard Index =	7.8E+00
							Heart/Pancreas Hazard Index =	3.3E+00

Key

N/A: Route of exposure is not applicable to this medium.

TABLE 13

ARARs/TBCs
Virgin Islands Chemical Site, St. Croix, USVI

Chemical-Specific ARARs/TBCs:

Constituent of Concern	Preliminary Remedial Goal	Reference
Groundwater:		
Chloroform	100 ug/L	40 CFR Part 141 - Primary MCLs
Arsenic	50 ug/L	40 CFR Part 141 - Primary MCLs
Ethylbenzene	700 ug/L	40 CFR Part 141 - Primary MCLs
Methylene Chloride	5 ug/L	40 CFR Part 141 - Primary MCLs
Xylene	10,000 ug/L	40 CFR Part 141 - Primary MCLs
Subsurface Soil:		
Ethylbenzene	6,500 ug/kg	EPA SSL methodology, migration to groundwater pathway
Xylene	90,000 ug/kg	EPA SSL methodology, migration to groundwater pathway

Action-Specific ARARs/TBCs:

Action	Regulation
Earthwork	VIC, Title 12, Chapter 13, Sections 533 and 534
Air discharge from the SVE/AS system	VIC, Title 12, Section 206-20 40 CFR Part 161 (NESHAPS)
Well installation	VIC, Title 12, Section 157 (driller requirements) VIC, Title 12, Part 161 (well sealing requirements)
Hazardous waste management	VIC, Title 19, Part IV, Chapter 58
Hazardous waste transportation	49 CFR Parts 107 and 171.1 - 171.500
Contractor health and safety	29 CFR 1926 (OSHA)

Location-Specific ARARs/TBCs:

Location	Regulation
Work within flood plains and wetlands	Executive Order 11988 and 11990
Work within coastal zones	16 USC 1451 (Coastal Zone Management Act) 15 CFR 298 40 CFR 6.302(d)

Notes:
ARARs - Applicable or Relevant and Appropriate Requirements
CFR - Code of Federal Regulations
MCLs - Maximum Contaminant Levels
NESHAPS - National Emissions Standards for Hazardous Air Pollutants
OSHA - Occupational Health and Safety Act
SSL - Soil Screening Level
SVE/AS - Soil Vapor Extraction/Air Sparging
TBCs - To Be Considered criteria
ug/kg - microgram per kilogram
ug/L - microgram per liter
USC - United States Code
VIC - Virgin Islands Code

Table 11 Summary of Analytes Detected in Soil above Screening Levels
Virgin Island Chemical Site, St. Croix, U.S. Virgin Islands

Area of Site	Medium	Parameter	Screening Level	Sample ID	Sample Date	Sample Interval (ft bls)	Concentration
VOC Constituents (in ug/kg)							
AST Area	Subsurface Soil	Ethylbenzene	13,000[3]	SBB-1	Jan-95	6-8	57,000
				SBB-2	May-96	22-24	32,000
				SBB-4	May-96	10-12	150,000
				SBB-4	May-96	12-14	100,000
				SBB-4	May-96	20-22	170,000
				SBB-11	May-96	20-22	58,000 DJ
				SBB-17	May-96	14-16	320,000
				SBB-17	May-96	20-22	270,000
				SBAST-2	Jun-97	8-10	34,000 DEJ
		Xylenes (total)	190,000[3]	SBB-1	Jan-95	6-8	310,000 E
				SBB-4	May-96	12-14	630,000
				SBB-4	May-96	20-22	980,000
				SBB-11	May-96	20-22	320,000 D
				SBB-17	May-96	14-16	2,000,000 EJ
				SBB-17	May-96	20-22	1,600,000 EJ
SVOC Constituents (in ug/kg)							
Former Laboratory Pit Area	Surface Soil	Pentachlorophenol[4]	30[3]	SBF-3	Jan-95	0-1	1,900 J
Storm Drains	Surface Soil	Isophorone[4]	500[3]	SDSSD-2	Oct-97	0-1	2500
Inorganic Compounds (in mg/kg)							
AST Area	Surface Soil	Iron[5]	31933[1]	SBB-1	Jan-95	0-1	32,100 *J
				SBE-1	Jan-95	0-2	32,200 *J
		Manganese[5]	1,600[2]	SBB-1	Jan-95	0-1	1,860
Former Drum Area	Surface Soil	Iron[5]	31933[1]	SBD-4	Jan-95	0-1	37,300 *J
Former Laboratory Pit Area	Surface Soil	Iron[5]	31933[1]	SBF-3	Jan-95	0-1	63,400 *J
Storm Drains	Surface Soil	Iron[5]	31933[1]	SDCSD-2	Oct-97	0-1	58,800
		Arsenic[5]	1.64[1]	SDCSD-2	Oct-97	0-1	8.8
				SDCSD-3	Oct-97	0-1	3.7
River Gut (Fairplains)	Surface Soil	Arsenic[5]	1.64[1]	FPG-2	Sep-97	na	2.8 J
AST Area	Subsurface Soil	Cyanide[4]	40[3]	SBB-1	Jan-95	6-8	60.2 N*J
				SBB-1	Jan-95	24-26	47.3 N*J
				SBE-1	Jan-95	20-22	51.7
Former Drum Area	Subsurface Soil	Cadmium[4]	8[3]	SB64D-1	Jun-97	10-12	10.1 *

[1]Site-specific background level
[2]USEPA RBC: Risk-based screening concentration
[3]USEPA SSL: Based on migration to groundwater pathway. No SSL has been established for total xylenes, so the most conservative value for an isomer (o-xylene) has been used for screening purposes.
[4]Chemical does not constitute significant risk based on site risk assessment (McLaren-Hart, 2000).
[5]Arsenic, iron and manganese were included in the Human Health Risk Assessment. However, all risks and hazards associated with exposure to these chemicals are within EPA's acceptable levels and are not considered to be a health concern.

D - Analyte quantitated at a dilution.
E - Exceeded calibration range of instrument.
J - Estimated value.
N - Spike recovery not within control limits.
na - data not available
* - Duplicate analysis not within control limits.
- - Not applicable
ft bls - feet below land surface

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Table 15. Summary of Analytes Detected in Groundwater above Screening Levels
Virgin Island Chemical Site, St. Croix, U.S. Virgin Islands

Area of Site	Parameter	Screening Level	Well ID	Sample Date	Concentration	
VOC Constituents (in ug/L)						
FPP Area	Chloroform	100[2]	MW-2	Jun-96	470	
			MW-2	Jan-98	1500 J	
			MW-2	Mar-98	2400	
			MW-2	Oct-98	150	
			MW-2	Oct-98	580	
			MW-2	Mar-00	***37***	
AST Area	Ethylbenzene	700[2]	MW-1	Feb-95	750	
			MW-1	Jan-98	20,000	
			MW-1	Mar-98	18,000	
			MW-1	Mar-00	19,600	
			MW-1	Jun-01	28,000	*
			MW-1	Aug-01	3,500	*
			MW-1	Nov-01	***170***	*
			MW-6	Jun-96	23,000	
			MW-6	Jan-98	22,000	
			MW-6	Mar-98	20,000	
			MW-6	Mar-00	12,400	
			MW-6	Jun-01	26,000	*
			MW-6	Aug-01	12,000	*
			MW-6	Nov-01	***6***	*
	Xylenes(total)	10,000[2]	MW-1	Jan-98	86,000	
			MW-1	Mar-98	80,000	
			MW-1	Mar-00	89,000	
			MW-1	Jun-01	130,000	*
			MW-1	Aug-01	24,000	*
			MW-1	Nov-01	***850***	*
			MW-6	Jun-96	27,000	
			MW-6	Jan-98	110,000	
			MW-6	Mar-98	98,000	
			MW-6	Mar-00	60,700	
			MW-6	Jun-01	150,000	*
			MW-6	Aug-01	83,000	*
			MW-6	Nov-01	***63***	*
Inorganic Compounds (in ug/L)						
Former Drum Areas	Lead[3]	15[1]	MW-5	Feb-95	17	
			MW-5	May-95	20.3 S	
			MW-5	Jan-98	***8.7 U***	
			MW-5	Mar-98	***1.1 U***	
Upgradient of Site	Lead[3]	15[1]	MW-10	Jan-98	***7.2 U***	
			MW-10	Mar-98	50.7	
AST Area	Antimony[3]	6[2]	MW-6	Jan-98	6.2 B	

Data in bold italics does not exceed screening levels and is included to show recent data trends.

[1]Treatment Technique Action Level (intended for application to tap water concentrations)
[2]Federal MCL
[3]Chemical does not constitute significant risk based on site risk assessment (McLaren-Hart, 2000).
B - Result is between instrument detection limit and Contract Required Detection Limit.
J - Estimated value.
S - Determined by Method of Standard Additions.
U - Analyte not detected. The minimum quantitation limit is listed.
Notes:
* Soil Vapor Extraction and Air Sparging system operated in the AST Area beginning June, 2001.
Wells MW-1 and MW-6 monitor effectiveness of system.

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GROUNDWATER SAMPLING RESULTS
AST AREA SOIL VAPOR EXTRACTION/AIR SPARGING SYSTEM MONITORING WELLS
VIRGIN ISLAND CHEMICAL SITE, ST. CROIX, U.S. VIRGIN ISLANDS

	MCL[1]	MW-1						MW-6					
		Baseline 6/6/2001		3rd Quarter 8/6/2001		4th Quarter 11/14/2001		Baseline 6/6/2001		3rd Quarter 8/6/2001		4th Quarter 11/14/2001	
Volatile Organics													
Ethylbenzene	700	28000		3500		170		26000		12000		6	
Toluene	1000	320		72	U	10	U	1300	U	390	U	1	U
Total Xylenes	10000	130000		24000		850		150000		83000		63	
Total TEX		158320		27500		1020		176000		95000		69	

	MCL[1]	AST-VMP-1D						AST-VMP-2D					
		Baseline 6/6/2001		3rd Quarter 8/6/2001		4th Quarter 11/14/2001		Baseline 6/6/2001		3rd Quarter 8/6/2001		4th Quarter 11/14/2001	
Volatile Organics													
Ethylbenzene	700	180		30	U	2	U	620		680		2	
Toluene	1000	2		7	U	2		2		13	U	0.5	U
Total Xylenes	10000	550		1900		9	U	2100		3100		18	
Total TEX		732		1900		2		2722		3780		20	

	MCL[1]	AST-VMP-3D						AST-VMP-4D					
		Baseline 6/6/2001		3rd Quarter 8/6/2001		4th Quarter 11/14/2001		Baseline 6/6/2001		3rd Quarter 8/6/2001		4th Quarter 11/14/2001	
Volatile Organics													
Ethylbenzene	700	170		34	J	120		0.5	U	0.5	U	0.5	U
Toluene	1000	5		1	U	4	U	0.5	U	0.2	U	0.5	U
Total Xylenes	10000	270		160	J	500		0.5	U	0.5	U	1	U
Total TEX		445		194		620		0		0		0	

[1]MCL - Federal Maximum Contaminant Levels (40 CFR Part 141)

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Notes:
Units are µg/L
Total Xylenes were calculated by the laboratory.
Qualifiers were applied to the results by the laboratory or by Golder Associates following data evaluation.
U = non-detect
J = estimated

APPENDIX C
RESPONSIVENESS SUMMARY

RESPONSIVENESS SUMMARY

The Proposed Plan for the Virgin Island Chemical Superfund Site (the "Site") was released for public comment on June 27, 2001. The public comment period was scheduled from June 27, 2001 through July 27, 2001. In response to public request, it was extended 15 days to August 11, 2001. During the public comment period, EPA held one public meeting to discuss the Proposed Plan and receive comments on the Selected Remedy. In addition, EPA received three written comment on the Proposed Plan during the comment period. This document summarizes the questions and concerns received during the public comment period. These concerns have been grouped into several categories for ease of discussion. EPA's response to each comment follows in italics.

Residences/Businesses in Site Vicinity

1. One commenter wanted to know if the two residential communities referred to in the Proposed Plan as being north and northwest of the Site are the communities of Bethlehem and Profit.

   Estate Bethlehem and Estate Profit are the two residential communities referred to in the Proposed Plan.

2. Several people mentioned that a sheep farm is located next to the Site. They reported that sheep and goats grazed from the Site prior to it being fenced and asked if EPA had approached the farm's owners.

   EPA did not contact the farm owners. However, at EPA's request, the parties performing the RI/FS did secure the Site area with a fence in April 2000.

3. A resident was concerned that a water service company is located next to the Site.

   EPA is aware of the water service company's well (Carino Well) and its activities. The Carino well was installed during the fourth phase of the RI for the Site, within the past two years. The Water Service Company (Carino) was required to apply for territory permits to drill the well and to pump the well, respectively, both of which were received and approved by the Virgin islands Department of Planning and Natural Resources (DPNR). The Carino well is only permitted to pump water for non-potable use. In addition, the company must sample the water on a regular basis for drinking water parameters as part of its permit to verify that the water meets drinking water standards.

   EPA conducted an independent check on the Carino well to verify sampling results obtained by Carino. The data show that the groundwater results are below MCLs. The Carino well is upgradient of the Site. The hydrographs provided as Figures 8 and 9 of the ROD further indicate that the contaminated shallow zone at the Site is not influenced by Carino well pumping.

Health Risks from Site Exposure

4. Several commenters asked whether EPA would investigate reports of heightened incidents of illnesses such as cancer in the local community to determine if there is a potential link to past exposure to Site contaminants.

EPA explained that the Agency for Toxic Substances and Disease Registry (ATSDR) can perform a public health assessment to determine whether any relationship exists between current illnesses in the community and historical exposures to the Site. EPA offered to provide concerned residents with a contact name at ATSDR to call and request this service.

EPA also repeated that the Site does not pose any unacceptable risks under the current use exposures at both on-Site and off-Site locations. The contamination at both the Former Process Pit (FPP) area and the Aboveground Storage Tank (AST) area exist below the ground surface, within the unsaturated subsurface soils and groundwater, and it has remained predominantly on the Site. Within the groundwater itself, the contamination is limited to the upper aquifer, which is not in direct communication with the deeper aquifer. Also, the groundwater flows away from residential communities in the Site vicinity. Lastly, groundwater at the Site is not used for drinking purposes. Currently, the Site is unoccupied and fenced.

5. Another person suggested that EPA conduct a study of persons who consumed sheep from the farm next to the Site to determine the existence of any adverse health effects.

This was not identified as a potentially significant exposure by ATSDR in their Public Health Assessment, therefore ATSDR has determined that such a study is not warranted.

6. One person wanted to know the specific health effects of exposure to chloroform, ethylbenzene and xylene.

Short-term effects from exposure to chloroform via inhalation include central nervous system effects, such as dizziness, fatigue, and headaches. Long- term exposure to chloroform via inhalation or ingestion may result in liver or kidney damage. Dermal contact with large amounts of chloroform may result in skin rashes. EPA has identified chloroform as a probable human carcinogen, based on the results of animal studies. Exposure to ethylbenzene may result in central nervous system effects such as dizziness, throat and eye irritation, and liver or kidney effects. Short-term and long-term exposure to high levels of xylenes may cause central nervous system effects such as headaches, lack of muscle coordination, dizziness, confusion, and impairment of balance. Also, eye, nose, and throat irritation, skin rashes, and liver or kidney damage are associated with exposure to xylenes.

7. Another commenter wanted to know if benzene and xylene are cancer causing or carcinogenic compounds.

EPA has identified benzene as a known human carcinogen. Xylenes and ethylbenzene are not carcinogenic.

8. One resident wanted to know about the odor of the three contaminants of concern at the Site.

EPA described ethylbenzene and xylene as having a gasoline smell, and chloroform as having a sweet, organic smell.

9. One commenter asked if EPA could calculate the health risks associated with exposure to the Virgin Island Chemical facility when it was still operational.

EPA has no way of calculating that type of risk at this time. Information which is necessary to conduct this type of risk assessment, such as records which provide chemical usage and concentrations during the time of facility operation, is not available.

10. One commenter was concerned about the effect of volatile organic compounds (VOCs) on communities downwind of the Site over time.

Downwind populations are not at risk. Exposure to chemicals downwind of a Site would occur from inhalation of airborne surface soils at the Site. Because of the chemical properties associated with volatile organic chemicals, they are not likely to remain in surface soils over time; they will either migrate to the groundwater or volatilize to air shortly after they have been introduced to the surface soil. This phenomenon occurs until the contaminants in the surface soil are for the most part gone. Therefore, any airborne surface soils from the Site would not contain the volatile organic chemicals associated with Site activities, because the surface soils no longer contain VOCs..

11. A commenter asked what EPA means by acceptable levels of risk.

EPA evaluates exposures based on the potential risk of developing cancer and the potential for noncancer health hazards. The likelihood of an individual developing cancer is expressed as a probability. Current Superfund guidelines for acceptable levels of risk are an individual lifetime excess cancer risk in the range of 10^{-4} to 10^{-6}, corresponding to a one-in-ten-thousand to a one-in-a-million excess cancer risk. In other words, a 10^{-4} cancer risk means one additional cancer may be seen in a population of 10,000 people as a result of exposure to Site contaminants. For noncancer health effects, a hazard index (HI) is calculated. An HI represents the sum of the individual exposure levels compared to their corresponding reference doses. Whenever a noncancer HI is at the "threshold level" (measured as an HI less than 1), noncancer health effects are not expected to occur.

12. A commenter wanted to know where she could take her well water for annual testing.

It is the responsibility of private homeowners to test their well water. The Virgin Islands Department of Planning and Natural Resources (DPNR) is available to provide a list of qualified laboratories for this purpose, but the homeowner must make the arrangements and assume the sampling and analytical costs.

Sampling of private residential wells would only be performed by EPA if future groundwater monitoring results indicate that the contamination is spreading in the direction of such wells.

13. Another commenter asked how she could obtain a copy of the public health evaluation completed for the Site by ATSDR.

Persons interested in receiving a copy of this document can call Mr. Arthur Block, ATSDR regional representative. His phone number is (212) 637-4307. A copy of the report is also available in the Repository.

14. Inmates from the Golden Grove Adult Correctional Facility in Kingshill, St. Croix submitted a petition expressing concern about health problems within the inmate population. The petition cited several symptoms and illnesses that the inmates believe can be attributed to Site contamination, and requested a remedy to address their concerns.

EPA has determined that the contamination at the Site, which is predominantly located within the Site property boundary and below the ground surface, does not pose a significant off-Site health risk. EPA's remedy will reduce on-Site risk to acceptable levels. Groundwater samples were collected from selected production wells near the Site during the RI, which confirmed that the production wells have not been impacted by Site contaminants. It is further noted that groundwater flows south-southeast from the Site, whereas the Golden Grove Adult Correctional Facility is located northwest (i.e., upgradient) of the Site.

Nature/Extent of Site Contamination

15. Several commenter asked whether the groundwater contamination extends beyond the Site boundaries.

Groundwater contamination is isolated predominantly within the fence line of the property. A small portion of groundwater contamination extends beyond the fence line. Furthermore, the existing data indicates that groundwater contamination is not migrating beyond its current boundary. The SVE/AS system is expected to fully treat the contaminated groundwater in the AST area, and MNA has been and is expected to continue to address the FPP area groundwater..

16. One commenter read that a gut is present on the Site property and contaminants have entered the gut and reached the sea.

EPA has taken sediment samples from the River Gut, which originates north of the Site and drains to the Caribbean Sea. The River Gut joins the Bethlehem Gut approximately 800 feet southeast of the Site. They are collectively then called the Fairplain Gut.

In consultation with the Department of Interior, National Oceanic and Atmospheric Administration, sediment samples were taken from at least 25 locations from the facility along the River Gut to the ocean. The results showed minimal to no impact from the Site.

17. One commenter asked for an explanation of the RI finding that arsenic was detected above its risk-based level in surface soil.

The arsenic levels detected at the Site are naturally occurring, even though these levels are above the risk-based level for arsenic. Arsenic is a naturally occurring metal. The risk-based level for arsenic for exposure under a commercial/industrial scenario is 3.8 parts per million. The concentrations of arsenic detected in the soils at the Site range from 0.8 parts per million to 8.8 parts per million. These concentrations are within the range of naturally occurring arsenic associated with soils of the type found at the Site.

18. A commenter wanted to know if toluene, which was detected in earlier investigations at the Site, is currently a potential contaminant of concern.

EPA did not detect toluene above the MCL in groundwater, therefore, toluene was not included as a contaminant of concern.

19. One commenter asked about the effect of rain on benzene and xylene in the AST area, and a commenter wanted to know whether samples were taken during rainy and dry seasons.

A four-phase investigation was completed at the Site, which included multiple groundwater sampling events during different seasons to characterize the effects of the annual precipitation cycle on Site groundwater elevations and contaminant concentrations. Enhanced vertical contaminant transport from the unsaturated zone to groundwater can occur during rain events. Likewise, recharge of rain water to the aquifer can result in the dilution of contaminant concentrations in groundwater. Hence, both cases cause groundwater contaminant concentrations to fluctuate over time. However, locations subjected to significant impact by ethylbenzene and xylene within the aquifer would not loose detectable evidence of such impacts after each rain event, as these chemicals tend to adsorb to the soils and then leach off more slowly into the groundwater over time (i.e., tailing effect).

20. One commenter asked if EPA had conducted fish tissue sampling.

EPA did not detect elevated levels of contaminants in sediments in the most recent sampling event. Therefore, EPA did not conduct fish tissue sampling.

21. A commenter wanted to know what happened to the drums which were taken from the Site during previous removal activities conducted by EPA and Berlex.

EPA and Berlex transported the drums off-Site to a permitted hazardous waste disposal facility to the U.S. mainland for treatment and disposal.

22. The Committee on Planning & Environmental Protection (CPEP) of the 24th Legislature of the Virgin Islands would like to know how confident EPA is regarding its conclusion that chloroform or any other contaminant of concern does not appear to be migrating off-Site.

The existing Site data from the Former Process Pit area indicate that off-Site groundwater quality, downgradient of this area, has not been impacted by Site contaminants above MCLs. The most recent groundwater data further indicate that the current impact to on-Site groundwater quality is localized to the immediate area of the Former Process Pit and is limited to low levels of chloroform that are generally at or below the federal MCL for drinking water.

The existing Site data from the Above-ground Storage Tank area indicate that the current impact to on-Site groundwater quality is localized to the general area between former tanks T-4 and T-12 and is limited to concentrations of ethylbenzene and xylene that exceed MCLs. The existing data further indicate that: 1) off-Site impact to groundwater quality above MCLs, downgradient of this area, is limited to within 50 feet of the west property line that abuts this area and 2) the contaminant plume exceeding MCLs is not expanding. Based on all the data collected, EPA is confident that the contaminants of concerns are not migrating.

Community Involvement in Superfund Process

23. Several commenters felt that EPA does not give the community adequate notice of opportunities for public participation, such as public hearings. They suggested that EPA run the same public notice in the newspaper over several days and that EPA use radio and television to a greater extent, particularly Spanish stations.

EPA submitted a script in English to various local radio stations to broadcast for several days prior to the public meeting. EPA also has developed a mailing list of more than 100 people who attended the last public meeting (1995).. From that list, EPA mailed over 100 fliers about the public meeting during the couple of weeks preceding the public meeting. However, these materials were not translated into Spanish. EPA will consider Spanish translation in the future.

24. One commenter questioned whether the public comment period designated from June 27 to July 27, 2001 was sufficient for the public to research and respond to the Proposed Plan.

According to Superfund law, EPA must provide at least a 30-day public comment period, which was announced in the St. Croix Daily News and the St. Croix Avis on June 27,

2001. In addition, an information repository has been maintained for the Site at the St. Croix Campus Library located in the University of the Virgin Islands. If the public submits a request for additional time, EPA will always grant an extension of time.

A request for an extension was made and EPA agreed to extend the public comment period for an additional 15 days during the public meeting. The public comment period closed on August 11, 2001.

25. One commenter wanted to know if residents of the Profit and Bethlehem communities and inmates of the Golden Grove Correctional Facility were informed in advance of potential health consequences associated with airborne dust released during drum removal and soil excavation activities at the Site. Likewise, EPA should now notify nearby communities of upcoming remedial activities so that they can protect themselves from any potential contaminant releases.

Based on the levels of chemicals detected in the soils, exposure to airborne dust would not have been a concern for downwind communities during the drum removal and soil excavation activities. Nevertheless, the public was notified of this removal by publication in the Daily News on January 15, 1990.

EPA makes every effort to inform the public before initiating an action through press releases, fact sheets and public meetings, to name a few. During the Removal Action, EPA also issued several press releases on the status of the removal action. EPA will continue to issue press releases during the remedial action. Further, any potential for releases will be controlled using appropriate health and safety procedures in accordance with an approved Health and Safety Plan which will be available to the public.

Length of EPA Investigation

26. Several commenters wanted to know why it took seven years for EPA to investigate the Site and then once the Site was placed on the National Priorities List, another seven years to get to this point.

A former tenant, Island Chemical Company (acquired later by Berlex, one of the Potential Responsible Parties) performed a removal action in the early-1980s. Several investigations were conducted by EPA and the former tenant between 1984 and 1991, with an additional, more comprehensive removal action completed by EPA from 1989 to 1991 to address the immediate threats to human health and the environment at the Site. EPA entered into an Administrative Order on Consent with Berlex and Island Chemical Company in 1994 and subsequently added the Site to the NPL in 1996. The remedial investigation (RI) of the Site was completed in four phases from 1995 to 1998, which fully characterized the Site and addressed all potential human health and environmental concerns. The feasibility study (FS) was completed from 1999 to 2000, which included the performance of a comprehensive soil vapor extraction/air sparging (SVE/AS) pilot study

at the AST and FPP areas. The RI and FS reports were finalized in 2001 following technical review and comment on the draft reports by EPA and DPNR.

27. One commenter asked if the "delay" had any affect on the contaminants that EPA initially found at the Site.

For this particular Site, EPA has found that the concentration levels of the contaminants continue to decrease over time and predominantly remain limited to discrete areas within the Site boundary, despite the fact the initial releases likely occurred more than 20 years ago. For example, groundwater sampling events from last year indicated that chloroform concentrations had decreased below the MCL.

28. CPEP is concerned about the length of time it took to characterize the nature and extent of contamination at the Site. The committee wanted to know whether any samples were collected to determine what contaminants were left at the Site and their corresponding concentrations after the 1989 removal action. CPEP notes that the Proposed Plan does not indicate whether the data used to characterize Site risks were collected recently or when concentrations were higher. CPEP believes that the length of time as well as the recency of the data used to drive the risk assessment may have significantly altered the risk characterization, as well as the selected preferred remedy.

The Site conditions existing after the 1989-1991 removal action were characterized in the remedial investigation from 1994 to 1998. The risk assessment considered the Site data collected during the remedial investigation, as well as conservative exposure scenarios corresponding to both current and future land use. The remedial investigation report, which included the risk assessment, was reviewed and approved by EPA in consultation with DPNR.

The cleanup goals for the Site soils and groundwater are based upon EPA's soil screening level methodology and federal MCLs for drinking water, respectively. Hence, the cleanup goals are independent of the contaminant concentrations detected at the Site during the remedial investigation.

Potentially Responsible Parties

29. One commenter contacted the U.S. Attorney's Office to inquire about prosecution of the parties who are potentially responsible for the Site contamination. The caller was told that the statute of limitations had run out at the Site. She wanted to know why EPA had not informed the U.S. Attorney's Office of potential criminal activity at the Site in a timely fashion. Several community members shared their view that the people of the Virgin Islands should be compensated for their loss of natural resources.

EPA has no evidence at this time to suggest that a criminal prosecution is warranted. EPA has worked closely with the Virgin Islands Department of Planning and Natural Resources (VIDPNR) to keep the local agency informed about the Site. Two of the

potentially responsible parties, Berlex and Pierrel S.p.A. (a subsidiary of Pharmacia), are taking an active role in the Site cleanup. Natural Resources damages are the responsibility of the trustee agencies, which include The National Oceanic and Atmospheric Administration, Department of Interior and the Virgin Island Government. The Trustees have been actively involved with EPA's activities over the last several years.

30. A commenter wanted to know why EPA waited until the year 2000 to erect a fence around the Site. This person also believes EPA should have posted warning signs at the Site to discourage individuals from consuming animals that graze on herbs or "bush tea" that grow in the area.

The fence was installed by the PRPs after many failed attempts to have the property owner, CHS Holding Corporation, install it. The PRPs requested the consent of CHS Holding Corporation to put up the fence, which took some time to obtain. The fence was installed by the PRPs in 1999.

Cleanup Goals of Selected Remedy

31. One resident questioned whether EPA could ever restore the Site property to its original state.

EPA selects a remedy in accordance with the nine criteria outlined by the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), including cost, implementability, and effectiveness. Superfund law requires EPA to clean up a Site to acceptable levels of risk, and cleanup goals are established based on the reasonably anticipated land use. The Virgin Island Chemical Site was an industrial property; EPA's cleanup will allow the property to be used industrially. The groundwater at the Site will be remediated to drinking water standards, which do not distinguish between residential and nonresidential scenarios.

32. CPEP requested more information on the exact decision criteria (quantitative or qualitative) which will be used by EPA to determine whether to implement the contingency remedy, which consists of groundwater extraction and treatment at locations where monitored natural attenuation is proposed under the Selected Remedy. The CPEP's concern surrounded the contingency remedy and the design of the future groundwater monitoring program that could yield data necessary to trigger implementation of the contingency remedy. The CPEP indicated that is was currently unclear from the documentation provided whether the monitoring design will be statistically based and sufficiently protective to detect the criteria for determining whether the implementation of the plan is necessary to protect human health and environment. More specifically, the committee wanted to know what would be or is the acceptable decision error rate (i.e., .01, .05, 0.1 or greater) for failing to decide to implement the contingency remedy if the data indicates that it should be implemented.

Current EPA Monitored Natural Attenuation (MNA) policy and protocol do not require that statistics be used to decide when a contingency remedy should be implemented, nor do they require that EPA specify an acceptable decision error rate.

The decision to implement the contingency remedy will be based upon: 1) evidence (i.e., definitive data from groundwater sampling) that the leading edge of the VOC plume exceeding MCLs is advancing or 2) evidence (i.e., definitive data, statistical analysis, modeling) that the VOC plume is attenuating at rates that are significantly less than feasibility study predictions and that are clearly less than cleanup rates that could otherwise be achieved by the contingency remedy. For administrative purposes, the Site property boundary will be designated as the reference point, as it is generally the leading edge of the VOC plume exceeding MCLs. MW-11 and at least one other new monitoring well location approved by EPA immediately downgradient of the property boundary line will serve as sentinel, or "trigger," wells to test the first decision criterion. If the groundwater sample results from quarterly monitoring exceed MCLs, as detected in one round of sampling and confirmed by a subsequent verification round of sampling, at any sentinel well (i.e., or any well downgradient thereof), then the contingency remedy will be implemented. The second decision criterion will be evaluated on a regular basis during preparation of quarterly remedial progress reports based upon the results of data evaluation/interpretation, statistical analysis, numerical modeling, and other standard methods/protocols described in the EPA MNA guidance and other directives.

The public will be kept informed of its clean-up progress and would be advised of a decision to implement the contingency remedy.

Other Superfund Sites in St. Croix

33. One commenter wanted to know if EPA currently has other Superfund Sites in St. Croix.

The Virgin Island Chemical Site is the only federal Superfund Site in St. Croix listed on the NPL. EPA is aware of two other, the Hess and St. Croix Alumina Sites, which are facilities handled under the Resource Conservation and Recovery Act (RCRA). Superfund generally focuses more on inactive, abandoned hazardous waste facilities.

34. The commenter also asked whether EPA would take control of these RCRA facilities if the facilities were to close down.

EPA explained that oil and gasoline are generally not covered under Superfund, which is governed by the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as amended. RCRA facilities contain treatment, storage and disposal units which, when they cease to be used for that purpose, must be closed in accordance with certain RCRA requirements. So even though a RCRA facility may become inactive, it would not necessarily become a Superfund Site. It is possible that an abandoned RCRA facility could be addressed by EPA or owner/operators under CERCLA. However, EPA

would only become involved with the facility if Superfund assistance was requested. Also, a hazardous waste Site must be added to the National Priorities List before EPA can use federal funds for long-term remedial action.

Legislature of the Virgin Islands
#1 Lagoon Street Complex
Frederiksted, St. Croix, U.S.V.I. 00840

Caroline Kwan
Remedial Project Manager
United States Environmental Protection Agency
290 Broadway, 20th Floor
New York, NY 10007-1866

Dear Ms. Kwan:

On behalf of Senator Alicia "Chucky" Hansen, I would like to submit the following comments regarding the EPA's proposed plan to clean up the Virgin Islands Chemical Superfund site. Although the "EPA was notified in October of 1982 of the facility's impending closure and off-site removal of waste materials" and although "between 1984 and 1991 several investigations were conducted at the Site by EPA", it took until January 31 and February 1, 1989 for the EPA to remove "400 drums (some extremely deteriorated) leaking cylinders of chlorine and hydrogen chloride, and over 800 containers of laboratory reagents that included sodium metal, potassium cyanide and ethyl ether". The EPA also removed "354 drums containing 14,720 gallons of various chemicals and 8,061 pounds of lab pack chemicals from the laboratory/warehouse building".

It is deplorable that it took from 1982 until 1989, seven years, for the EPA to remove the drums. Furthermore, the EPA did not have the courtesy to inform or warn the adjacent prison known as Golden Grove Correctional Facility or the Profit and Bethlehem residential communities of the potential health consequences of the dust made airborne by the removal of the drums.

The area of the facility was not even fenced until the year 2000, eighteen years after EPA was first notified of the facility's closure and sixteen years after the EPA first conducted its investigation. Up until the year 2000, sheep and goats would graze from the facilities' grounds and our St. Croix residents consumed those animals.

I believe the EPA was too slow (sixteen years) in conducting its investigation and clean-up and that is unacceptable.

I believe the EPA should have notified the prosecutorial agencies about the dumped hazardous waste materials.

I believe the EPA should have immediately fenced the area and put warning signs of DO NOT ENTER so that unsuspecting individuals do not consume the animals that graze or the herbs or "bush tea" that grow in the area.

I believe the EPA should have given better notice to the community and utilize the airwaves to give notice about the public meeting.

I believe the EPA should have notified the public regarding the airborne contaminants created by the previous soil excavation and should now notify the adjacent communities so that they can protect themselves from any potential contaminants produced by the remediation plan.

I believe the people of the Virgin Islands should be compensated for their loss of natural resources.

I believe a comprehensive health study should be made on the people of the Virgin Islands to determine whether or not the Island Chemical site has impacted on the community negatively.

Cordially,

Amelia B. Joseph, Esq.
on behalf of Senator Alicia "Chucky" Hansen

500087

INMATE POPULATION
GOLDEN GROVE ADULT CORRECTIONAL FACILITY
RURAL ROUTE # 1
KINGSHILL ST. CROIX 00851

RE: PETITION FOR POTENTIAL HEALTH EFFECT OF PRISONER FROM GROUND WATER CONTAMINATION

PETITION

GREETINGS:

WE THE UNDERSIGNED OF THE INMATE POPULATION HERE AT THE GOLDEN GROVE ADULT CORRECTIONAL FACILITY ARE ADDRESSING A PETITION DUE TO A CARCINOGENIC RISK OF TOXICITY OF GROUND CONTAMINATION THAT IS AFFECTING PRISONER HEALTH FOR THE LAST (2) TWO DECADES. THIS CONTAMINATION IS RESPONSIBLE FOR SKIN DISCOLORATION AND RASH, HAIR COLORATION, SEVERE LOST OF APPETITE, ULCERS OF THE STOMACH, KIDNEY DILAPIDATION DUE TO ADVERSE HEALTH EFFECTS ASSOCIATED WITH THE SOIL IRRIGATION OF THE WATER WE ACCOMODATE. IN REGARD TO THESE SYMPTOMS THAT IS DETERIOATING AND DIMINISHING OUR HEALTH DUE TO THE DISPOSITION WE AS INMATE HERE IN THIS INSTITUTION ARE UP AGAINST, WE STRONGLY FEEL THIS ADVERSE FORMALITY ACCOUNTS FOR THE CUMULATIVE RISK OF BEING EXPOSE TO THE CARCINOGENIC RISK OF CANCER IN THE NEAR FUTURE. WE THE UNDERSIGNED OF THE INMATE POPULATION PRAY FOR AN ADOVOCATE OF SUPPORT FROM ANY ENTITY, FEDERAL AGENCY, GOVERNMENTAL AGENCY AND ANY FORM OF RESOURCE THAT CAN ASSESS AN ALTRERNATIVE FOR AN EFFECTIVE REMEDY OF OUR CONCERNS WE ARE UP AGAINST.

RESPECTFULLY SUMITTED

1. Boyd B. Brown Jr.
2. [illegible]
3. Edward Dooley
4. Alston Lambert Jis
5. Manuel Benjamin
6. Mark K
7. Dale Henry
8. H. John
9. G. Plaskett
10. [illegible]
11. Bro. Hodge
14. Antonio Rosado
15. Romain Martin
16. [illegible]
17. Jose A. Torres
18. [illegible]
19. Erbol Nelson
20. Rigoberto A. Torres
21. Julia Garcia
22. Lloyd Easton
23. Burton Glasgow
24. Tina Francis
28. Kareem Browne
29. Clemente Monsanto
30. Julian Joseph
31. [illegible]
32. [illegible]
33. [illegible]
34. [illegible]
35. [illegible]
36. [illegible]
37. Jude Joseph Jr.
Mical Davis
J. Andrews

Friday, August 10, 2001

Caroline Kwan, Remedial Project Manager
United States Environmental Protection Agency
290 Broadway, 20th Floor
New York, NY 10007-1866

Dear Ms. Kwan,

As Chairman of the Committee on Planning & Environmental Protection (CPEP) of the 24th Legislature of Virgin Islands, and on behalf of the people of the Territory, I am providing the following comments on the Proposed Plan for the Virgin Islands Chemical Superfund Site (the Site) dated June 2001..

My first concern surrounds the contingency remedy and the design of the future groundwater monitoring program that could yield data necessary to trigger implementation of the contingency remedy. It is currently unclear from the documentation provided whether the monitoring design will be statistically based and sufficiently protective to detect the criteria for determining whether the implementation of the plan is necessary to protect human health and environment. More specifically, what would be or is the acceptable decision error rate (i.e., .01,.05, 0.1 or greater) for failing to decide to implement the contingency remedy when in fact data indicates that it should be implemented.

Furthermore, the six words of the fifth paragraph states "...data indicates that it is needed", however, while this implies that quantitative criteria has been developed or will be developed for taking action, it is unclear whether in fact these criteria are quantitative and if so, what are the decision criteria.

Secondly, we are also concerned with the length of time it took to characterize the site and wonder whether any samples were collected to determine what contaminants were left at the site and their corresponding concentrations after the removal action in January and February of 1989. This document also does not indicate whether the data used to characterize site risks were data collected recently or when concentrations were higher. The length of time involved as well as the balance of data used to drive the risk assessment (i.e., recent versus old) may have significantly altered the risk characterization, as well as the selected preferred remedy.

Finally, on page six in the "Groundwater" section, what level of confidence is associated with the conclusion that chloroform does not appear to be migrating off site and for that matter, any other contaminant of concern.

We are pleased for the opportunity to provide some input on the proposed remedy and look forward to the issuance of a Record of Decision that, to the extent possible, takes all Virgin Islanders concerns into serious consideration.

Cordially,

Donald "Ducks" Cole, Chairman
Committee on Planning and Environmental Protection
24th Legislature of the Virgin Islands

APPENDIX D
ADMINISTRATIVE RECORD INDEX

ISLAND CHEMICAL SITE
ADMINISTRATIVE RECORD FILE
INDEX OF DOCUMENTS

1.0 SITE IDENTIFICATION

1.1 Background - RCRA and Other Information

P. 100001 - 100085 Report: RCRA Enforcement, Interim Report- No Analysis Data, Berlex Laboratories, St. Croix, VI, prepared by Ms. Carol Price, Environmental Scientist, Berlex Laboratories (ICC), prepared for U.S. EPA, March 13, 1986.

P. 100086 - 100271 Letter to Mr. Charles Dolan, U.S. EPA, Emergency and Remedial Response Division, Region II, from Alan L. Klyes, Ph.D., Enviro-Sciences, Inc., re: Island Chemical Company, U.S. Virgin Islands, April 17, 1986. (Attachment: Project Summary (with Attachments A - N) for Island Chemical Company, Inc., (Berlex) St. Croix, Virgin Islands).

1.2 Notification/Site Inspection Reports

P. 100272 - 100572 Report: Final Draft Site Inspection Report, VI Chemical, St. Croix, U.S. Virgin Islands, Volume 1 of 2, prepared by Halliburton NUS Environmental Corporation Superfund Division, prepared for Environmental Services Division, U.S. EPA, September 4, 1991.

P. 100573 - 100847 Report: Final Draft Site Inspection Report, VI Chemical, St. Croix, U.S. Virgin Islands, Volume 2 of 2, prepared by Halliburton NUS Environmental Corporation, prepared for Environmental Services Division, U.S. EPA, September 4, 1991. **(NOTE: Pages 100835 through 100847 are CONFIDENTIAL. These pages can be located at the U.S. EPA, Superfund Records Center, 290 Broadway, 18th Floor, N.Y., N.Y., 10007-1866.)**

2.0 REMOVAL RESPONSE

2.5 Action Memorandum

P. 200001 - 200042 Memorandum to Mr. William J. Muszynski, P.E., Acting Regional Administrator, U.S. EPA, Region II, from Mr. Douglas R. Kodama, On-Scene Coordinator, Response and Prevention Branch, U.S. EPA, Region II, re: Preliminary Assessment, Removal Site Evaluation, and Funding Authorization Request for a CERCLA Removal Action at the Virgin Island Chemical Company, Inc. Site, St. Croix, U.S. Virgin Islands, Action Memorandum, August 8, 1989.

3.0 REMEDIAL INVESTIGATION

3.2 Sampling and Analysis Data/Chain of Custody Forms

P. 300001 - 300124 Letter to Ms. Sherrel Henry, Remedial Project Manager, U.S. EPA, Region II, from Mr. Jason M. Schindler, Associate Geologist, Harding Lawson Associates, re: Non-CLP Results of Potable Water Sampling, Island Chemical Company, St. Croix, U.S. Virgin Islands, January 3, 1995. (Attachment: Non-CLP laboratory data package, Report of Laboratory Analysis, prepared by Pace Inc., Environmental Laboratories).

P. 300125 - 300227 Memorandum to Mr. Jason Schindler, Harding Lawson Associates (HLA), Philadelphia, from Mr. Mike Phillips, HLA, Denver, re: Island Chemical Company Data Review, January 10, 1995. (Attachment: 1. HLA Data Quality Assurance Review Summary, Volatile Organic Compounds Analysis, Case Number: 94195, Project Number: 29872 10.1, Island Chemical Company, reviewed January 3, 1995; 2. HLA Data Quality Assurance Review Summary, Semivolatile Organic Compounds Analysis, Case Number: 94195, Project Number: 29872 10.1, Island Chemical Company, reviewed January 4, 1995; 3. HLA Data Quality Assurance Review Summary, Metals Analysis, Case Number: 94195, Project Number: 29872 10.1, Island Chemical Company, reviewed January 5, 1995; 4. HLA Data Quality Assurance

Review Summary, Semivolatile Organic Compounds Analysis, Case Number: 94195, Project Number: 29872 10.1, Island Chemical Company, reviewed January 5, 1995; 5. HLA Data Quality Assurance Review Summary, Organochlorine Pesticides and Polychhlorinated Biphenyls Analysis, Case Number: 94195, Project Number 29872 10.1, Island Chemical Company, reviewed January 5, 1995; and 6. HLA Data Quality Assurance Review Summary, Semi-volatile Organic Compounds Analysis, Case Number: 94195, Project Number: 29872 10.1, Island Chemical Company, reviewed January 9, 1995).

P. 300228 - 300228 Letter to Mr. Jonathan Rude, U.S. EPA Contract Laboratory Program, from Ms. Pamela J. Philip, Work Assignment Manager, CDM Federal Programs Corporation, re: Completed CLP Paperwork for Case Number 23153, February 9, 1995.

P. 300229 - 300233 Letter to Ms. Sherrel D. Taylor-Domville, U.S. EPA, Region II, from Mr. Bharat Patel, C.P.G., Associate Hydrogeologist, and Mr. Jason M. Schindler, Associate Geologist, Harding Lawson Associates, re: Results of February 14 and 15, 1995 Quality Assurance Field Audit, Island Chemical Company Site, Remedial Investigation, St. Croix, U.S. Virgin Islands, March 1, 1995.

P. 300234 - 300241 Table 4-2 (Draft): Soil Sample Analytical Results - Volatile Organic Compounds, Virgin Island Chemical Company, January 31, 1995. (Attachment: Table 4-8 (Draft): Groundwater Sample Analytical Results - Volatile Organic Compounds, Virgin Island Chemical Company, May 11, 1995.

P. 300242 - 300253 Letter to Ms. Kathy Kinsella, RSCC, Lockheed, from Ms. Pamela Philip, Work Assignment Manager, CDM Federal Programs Corporation, re: Completed CLP Paperwork and Sampling Trip Report for Case Number 23237, February 28, 1995. (Attachment: Report: Sampling Trip Report, Virgin Islands Chemical Site, St. Croix, U.S. Virgin Islands, prepared by CDM Federal Programs Corporation, prepared for U.S. EPA, Region II, February 28, 1995).

P. 300254 - 300256 Letter to Mr. Jonathan Rude, U.S. EPA, Contract Laboratory Program, from Ms. Pamela Philip, Work Assignment Manager, CDM Federal Program Corporation, re: Completed CLP Paperwork for Case Number 23237, February 28, 1995. (Attachment: U.S. EPA, Inorganic Traffic Report & Chain of Custody Report (for Inorganic CLP Analysis), February 15, 1995).

P. 300257 - 300688 Letter to Ms. Sherrel Taylor-Domville, U.S. EPA, Region II, Emergency and Remedial Response Division (ERRD), from Mr. Jason Schindler, Associate Geologist, Harding Lawson Associates, re: Results of Soil and Initial Groundwater Sampling, Island Chemical Company, St. Croix, U.S. Virgin Islands, April 7, 1995. (Attachment: 1. Letter to Mr. Steve Bruckner, Harding Lawson & Associates, from Ms. Elaine Wild, QA Officer, Pace Inc. Environmental Laboratories, re: the attached pyridine analysis supporting raw data for Report Groups #95010, 95020 and 95022, April 5, 1995; 2. Raw pyridine data for Report Groups #95010, 95020, 95022.

P. 300689 - 300851 Data Package: Harding Lawson & Associates (HLA) Data Quality Assurance Review Summary, Semi-volatile Organic Compound Analysis, April 12, 1995.

P. 300852 - 300854 Letter to Ms. Sherrel D. Taylor-Domville, U.S. EPA, Region II, from Mr. Matthew Gordan, for Mr. Bharat Patel, C.P.G., Managing Associate Hydrogeologist, and Mr. Jason M. Schindler, Associate Geologist, Harding Lawson Associates, re: Results of Second Quality Assurance Field Audit, Island Chemical Company Site, Remedial Investigation, St. Croix, U.S. Virgin Islands, June 7, 1995.

P. 300855 - 300858 Letter to Ms. Sherrel Henry, Work Assignment Manager, U.S. EPA, Region II, from Ms. Pamela Philip, Work Assignment Manager, CDM Federal Programs Corporation, re: Draft Assessment of PRP Data Validation Activities, Virgin Island Chemical Site, St. Croix, U.S. Virgin Islands, July 14, 1995. (Attachment Report: Draft Data Assessment of PRP Data Validation Activities, Virgin Island

Chemical Site, St. Croix, U.S. Virgin Islands, prepared by CDM Federal Programs Corporation).

P. 300859 - 300861 Letter to Ms. Sherrel Henry, U.S. EPA, Region II, from Mr. John S. Virgie, P.G., Senior Geologist, and Mr. Edward A. Nemecek, R.G., C.P.G., Principal Hydrogeologist, Harding Lawson Associates, re: Soil Sampling Program - AST Area, Phase II Remedial Investigation, Virgin Island Chemical Site, St. Croix, U.S. Virgin Islands, June 28, 1996. (Attachment: Figure 1, Surface Soil Sample, Soil Boring Locations, AST Area, Island Chemical Co., St. Croix, U.S. Virgin Islands, prepared by Harding Lawson Associates, June 14, 1996).

P. 300862 - 300936 Letter to Ms. Caroline Kwan, Remedial Project Manager, U.S. EPA, Region II, from Mr. Perry Katz, Principal Environmental Scientist, McLaren Hart, Inc., re: VICHEM Site, St. Croix, U.S. Virgin Islands, November 1997 Monthly Progress Report, December 15, 1997. (Attachments: (1) Report: Attachment, November 1997 Monthly Progress Report, List of Tables; (2) Table 1, Virgin Island Chemical Site, Soil Boring Sampling Results, Volatile Organic Compounds; (3) Table 2, Virgin Island Chemical Site, Soil Boring Sampling Results, Semivolatile Organic Compounds; (4) Table 3, Virgin Island Chemical Site, Soil Boring Sampling Results, Metals; (5) Table 4, Virgin Island Chemical Site, Gut and Storm Drain Surface Soil Sampling Results, Semivolatile Organic Compounds; (6) Table 5, Virgin Island Chemical Site, Gut and Storm Drain Surface Soil Sampling Results, Metals; (7) Table 6, Virgin Island Chemical Site, Gut and Storm Drain Surface Soil Sampling Results, Physicochemical Parameters; (8) Table 7, Virgin Island Chemical Site, Gut and Storm Drain Surface Soil Sampling Results, Grain Size Analysis; (9) Table 8, Virgin Island Chemical Site, Fairplain Gut/Manning Bay Sediment Sampling Results, Semivolatile Organic Compounds; (10) Table 9, Virgin Island Chemical Site, Fairplain Gut/Manning Bay Sediment Sampling Results, Metals; (11) Table 10, Virgin Island Chemical Site, Fairplain Gut/Manning Bay Sediment Sampling Results, Physicochemical Parameters; (12) Table

11, Virgin Island Chemical Site, Fairplain Gut/Manning Bay Sediment Sampling Results, Grain Size Analysis; (13) Table 12, Virgin Island Chemical Site, Soil Boring Sampling Results, Biological Parameters; (14) Table 13, Virgin Island Chemical Site, Soil Boring Sampling Results, Physicochemical Parameters; (15) Table 14, Virgin Island Chemical Site, Preliminary Soil Boring Sampling Results, Process Pit Area, Volatile Organic Compounds and (16) Table 15, Virgin Island Chemical Site, Preliminary Soil Boring Sampling Results, Lab Pit Area, Volatile Organic Compounds.

3.3 Work Plan

P. 300937 - 301284 Report: Island Chemical Company, Inc., Remedial Investigation St. Croix, U.S. Virgin Islands, Draft Work Plan, Volume I of II, Work Plan and Appendices A through C, prepared by Harding Lawson Associates, prepared for Island Chemical Company, Inc., March 17, 1994.

P. 301285 - 301764 Report: Island Chemical Company, Inc., Remedial Investigation St. Croix, U.S. Virgin Islands, Draft Work Plan, Volume II of II, Work Plan and Appendices D through O, prepared by Harding Lawson Associates, prepared for Island Chemical Company, Inc., March 17, 1994.

P. 301765 - 302136 Report: Draft Remedial Investigation Work Plan, Island Chemical Company, Inc., St. Croix, U.S. Virgin Islands, prepared by Harding Lawson Associates, prepared for Island Chemical Company, Inc., August 5, 1994.

P. 302137 - 302141 Letter to Ms. Sherrel Henry, U.S. EPA, Region II, from Mr. Edward A. Nemecek, R.G., C.P.G., Principal Hydrogeologist, Harding Lawson Associates, re: Revised Draft Remedial Investigation Work Plan Schedule, Island Chemical Company, Inc., St. Croix, U.S. Virgin Islands, September 14, 1994. (Attachments: (1) Distribution List, Island Chemical Company, Inc., St. Croix, U.S. Virgin Islands, September 19, 1994; (2) Outline for Island Chemical Company

Inc. Remedial Investigation Report, September 19, 1994; (3) Figure 8-1: Work Plan Implementation Schedule, Island Chemical Company, St. Croix, U.S. Virgin Islands, September 19, 1994).

P. 302142 - 302160 Letter to Ms. Sherrel Taylor-Domville, U.S. EPA, Region II, Emergency and Remedial Response Division, U.S. EPA, Region II, from Mr. Jason M. Schindler, P.G., Associate Geologist, Harding Lawson Associates, re: Draft Phase II Work Plan, Remedial Investigation, VICHEM Site, St. Croix, U.S. Virgin Islands, November 21, 1995. (Attachment: Report: Draft Phase II Remedial Investigation Work Plan, Virgin Island Chemical Site, Remedial Investigation, St. Croix, U.S. Virgin Islands, prepared by Harding Lawson Associates, Engineering and Environmental Services, prepared for Island Chemical Company, November 21, 1995).

P. 302161 - 302188 Letter to Ms. Caroline Kwan, Remedial Project Manager, U.S. EPA, Region II, from Ms. Lori G. Singer, Sills Cummis Zuckerman Radin Tischman Epstein & Gross, re: Vichem Site/St. Croix, Virgin Islands, November 6, 1996. (Attachments: (1) Letter to Wilfredo Geigel, Esq., from Ms. Lori G. Singer, Sills Cummis Zuckerman Radin Tischman Epstein & Gross, re: CHS Holding Co., Inc., October 14, 1996; (2) Letter to Lori Singer, Esq., Sills Cummis Zuckerman Radin Tischman Epstein & Gross, from Wilfredo A. Geigel, Esq., re: Berlex v. CHS, October 17, 1996; (3) Report: Draft Remedial Investigation Work Plan Addendum - Phase III, Virgin Island Chemical Site, St. Croix, U.S. Virgin Islands, prepared by Harding Lawson Associates, Engineering and Environmental Services, prepared for Island Chemical Company, November 7, 1996).

P. 302189 - 302231 Report: Draft Remedial Investigation Work Plan Addendum - Phase III, Virgin Island Chemical Site, St. Croix, U.S. Virgin Islands, prepared by Harding Lawson Associates, Engineering and Environmental Services, prepared for Island Chemical Company, January 20, 1997.

P. 302232 - 302291 Memorandum to Ms. Caroline Kwan, Remedial Project Manager, U.S. EPA, Region II, from Mr. John S. Virgie, Senior Geologist, Harding Lawson Associates, Engineering and Environmental Services and Mr. Edward A. Nemecek, Principal Hydrogeologist, Regional Geosciences Manager, Harding Lawson Associates, Engineering and Environmental Services, re: Draft Remedial Investigation Work Plan Addendum - Phase III, Virgin Island Chemical Site, St. Croix, U.S. Virgin Islands, June 20, 1997 (Attachment: Report: Draft Remedial Investigation Work Plan Addendum - Phase III, Virgin Island Chemical Site, St. Croix, U.S. Virgin Islands, prepared by Harding Lawson Associates, Engineering and Environmental Services, prepared for Island Chemical Company, June 20, 1997).

P. 302292 - 302355 Memorandum to Ms. Caroline Kwan, Remedial Project Manager, U.S. EPA, Region II, from Mr. John S. Virgie, Senior Geologist, Harding Lawson Associates, Engineering and Environmental Services, re: Revised Draft Remedial Investigation Work Plan - Phase III, Virgin Island Chemical Site, St. Croix, U.S. Virgin Islands, July 25, 1997. (Attachment: Report: Draft Remedial Investigation Work Plan Addendum - Phase III, Virgin Island Chemical Site, St. Croix, U.S. Virgin Islands, prepared by Harding Lawson Associates, Engineering and Environmental Services, prepared for Island Chemical Company, July 25, 1997).

P. 302355A - 3023550 Letter to Ms. Caroline Kwan, U.S. EPA, Region II, from Mr. Perry Katz, Principal Environmental Scientist and Ms. Norma Eichlin, Senior Engineer, McLaren Hart, Inc., re: Island Chemical Site, St. Croix, U. S. Virgin Islands, Supplemental Remedial Investigation (Phase IV RI), August 12, 1998.

P. 302355P - 302355Q Letter to Ms.Caroline Kwan, U.S. EPA, Region II, from Mr. Perry Katz, Principal Environmental Scientist and Ms. Norma Eichlin, Senior Engineer, McLaren Hart, Inc., re: Island Chemical Site, St. Croix, U. S. Virgin Islands, Clarifications to Supplemental Remedial Investigation dated August 12, 1998, August 24, 1998.

P. 302355R-302355DD Letter to Ms. Caroline Kwan, Remedial Project Manager, U.S. EPA, Region II, from Mr. Perry Katz, Principal Environmental Scientist and Ms. Norma Eichlin, Senior Engineer, McLaren Hart, Inc., re: Island Chemical Site, St. Croix, U.S. Virgin Islands, Field Modifications During Supplemental Remedial Investigation (Phase IV RI), November 20, 1998. **(NOTE: Pages 302355AA through 302355DD are CONFIDENTIAL. These pages can be located at the U.S. EPA, Superfund Records Center, 290 Broadway, 18th Floor, N.Y., N.Y., 10007-1866.)**

3.4 Remedial Investigation Reports

P. 302356 - 302357 Report: Compendium of Well Water Data Collected at the Virgin Island Chemical Co. by the U.S. EPA (1986 - 1990), undated.

P. 302358 - 302367 Report: Draft Technical Memorandum Pathways Analysis Report and Phase I Baseline Risk Assessment Summary, Virgin Island Chemical Site, St. Croix, U.S. Virgin Islands, prepared by Harding Lawson Associates, prepared for Island Chemical Company, Inc., August 14, 1995.

P. 302368 - 302368 Letter to Ms. Sherrel D. Taylor-Domville, U.S. EPA, Region II, from Mr. Jason M. Schindler, Associate Geologist, and Mr. Edward A. Nemecek, R.G., C.P.G., Principal Hydrogeologist, Harding Lawson Associates, re: Draft Data Summary Report, Remedial Investigation, Virgin Island Chemical Site, St. Croix, U.S. Virgin Islands, August 15, 1995.

P. 302369 - 302886 Report: Draft Data Summary Report, Virgin Island Chemical Site, St. Croix, U.S. Virgin Islands, U.S. EPA Index No. II CERCLA-94-0401, Volume I of II, prepared by Harding Lawson Associates, prepared for Island Chemical Company, August 15, 1995.

P. 302887 - 303349 Report: Draft Data Summary Report, Virgin Island Chemical Site, St. Croix, U.S. Virgin Islands, U.S. EPA Index No. II CERCLA-94-0401, Volume II of

II, prepared by Harding Lawson Associates, prepared for Island Chemical Company, August 15, 1995.

P. 303350 - 303358 Letter to Ms. Alison Devine, U.S. EPA, Region II, from Mr. Robert D. Goltz, P.E., ARCS II Program Manager, CDM Federal Programs Corporation, re: Technical Review of Draft Supplemental Data Summary Report, Virgin Island Chemical Site, St. Croix, U.S. Virgin Islands, October 8, 1996. (Attachment: Report: Technical Review of the Draft Supplemental Data Summary Report, Virgin Island Chemical Site, prepared by CDM Federal Programs Corporation, prepared for U.S. EPA, Region II, October 8, 1996).

P. 303359 - 303676 Report: Revised Final Remedial Investigation Report, Volume 1 and Remedial Investigation Addendum, Virgin Island Chemical Site, St. Croix, U. S. Virgin Islands, prepared by Golder Associates Inc., prepared for Berlex Laboratories, Inc. and Pharmacia & Upjohn, October 2000.

P. 303677 - 304262 Report: Final Remedial Investigation Report, Virgin Island Chemical Site, St. Croix, Virgin Islands, Volume II, Appendices A-G, I-K, prepared by McLaren/Hart, Inc., prepared for Berlex Laboratories, Inc. and Pharmacia & Upjohn, February 2000.

P. 304263 - 304841 Report: Final Remedial Investigation Report, Virgin Island Chemical Site, St. Croix, Virgin Islands, Volume III, Appendix H, prepared by McLaren/Hart, Inc., prepared for Berlex Laboratories, Inc. and Pharmacia & Upjohn, February 2000.

P. 304842 - 305249 Report: Draft Soil Vapor Extraction/Air Sparging (SVE/AS) Pilot Study Report, Virgin Island Chemical Site, St. Croix, U. S. Virgin Islands, prepared by Golder Associates Inc., prepared for Berlex Laboratories, Inc. and Pharmacia & Upjohn, October 2000.

3.5 Correspondence

P. 305250 - 305254 Letter to Mr. Edward A. Nemecek, Principal Hydrogeologist, from Ms. Carole Petersen, Chief, New York/Caribbean Superfund Branch II, U.S. EPA, Region II, re: Comments on the Draft Phase II Remedial Investigation Work Plan, Island Chemical Site, St. Croix, U.S. Virgin Islands, undated.

P. 305255 - 305255 Letter to Mr. James Oland, Supervisor, Caribbean Field Office, U.S. Fish and Wildlife Service, from Mr. Robert Hargrove, Chief, Environmental Impacts Branch, U.S. EPA, re: initiating consultation with the U.S. Fish and Wildlife Service to determine whether there are any federal endangered/ threatened Species or critical habitats present on or in the vicinity of the Island Chemical Company National Priorities List site, located in the Christiansted Jurisdiction, St. Croix, U.S. Virgin Islands, June 30, 1995.

P. 305256 - 305259 Letter to Ms. Sherrel Henry, Remedial Project Manager, U.S. EPA, Region II, from Ms. Diane Wehner, NOAA Coastal Resource Coordinator, U.S. Dept. Of Commerce, re: review of Draft Data Summary Report for the Virgin Island Chemical Site, September 7, 1995.

P. 305260 - 305261 Memorandum to Ms. Sherrel D. Henry, Remedial Project Manager, U.S. EPA, Region II, from Ms. Shari Stevens, Environmental Scientist, U.S. EPA, Region II, re: Technical Review of the Draft Data Summary Report for the Virgin Island Chemical Site, September 8, 1995.

P. 305262 - 305268 Letter to Ms. Sherrel Henry, Work Assignment Manager, U.S. EPA, Region II, re: Technical Review of PRP Data Summary Report for the Virgin Island Chemical Site, September 18, 1995.

P. 305269 - 305270 Letter to Ms. Sherrel Taylor-Domville, U.S. EPA, Region II, from Mr. Jason M. Schindler, P.G., Associate Geologist, and Mr. Edward A. Nemecek, R.G., C.P.G., Regional Geosciences Manager, Harding Lawson Associates, re: Supplemental Work Plan, Remedial Investigation, Virgin Island Chemical Site, St. Croix, U.S. Virgin Islands, October 20, 1995.

P. 305271 - 305277 Letter to Ms. Alison Devine, U.S. EPA, Region II, from Mr. Robert D. Goltz, P.E., ARCS II Program Manager, CDM Federal Programs Corporation, re: Technical Review of Draft Phase II Work Plan, Virgin Island Chemical Site, St. Croix, U.S. Virgin Islands, December 11, 1995. (Attachment: Report: Technical Review of the Draft Phase II Work Plan, Virgin Island Chemical Site, St. Croix, U.S. Virgin Islands, prepared by CDM Federal Programs Corporation, prepared for, U.S. EPA, Region II, December 11, 1995.

P. 305278 - 305281 Letter to Ms. Sherrel Henry, Remedial Project Manager, U.S. EPA, Region II, from Ms. Diane E. Wehner, NOAA Coastal Resource Coordinator, U.S. Dept. of Commerce, re: review of the Draft Phase II Remedial Investigation (RI) Work Plan for the Island Chemical Company, Inc. Site, December 14, 1995. (Attachments: 1. Site Location Map, and 2. Figure 13 - Gut Soil Sampling Program).

P. 305282 - 305286 Letter to Mr. Edward A. Nemecek, Principal Hydrogeologist Co., from Ms. Carole Petersen, Chief, N.Y./Caribbean Superfund Branch II, U.S. EPA, Region II, re: Comments on the Draft Phase II Remedial Investigation Work Plan, Island Chemical Site, St. Croix, U.S. Virgin Islands, January 31, 1996.

P. 305287 - 305303 Letter to Ms. Sherrel Taylor-Domville, U.S. EPA, Region II, from Mr. Jason M. Schindler, P.G., Associate Geologist, and Mr. Edward A. Nemecek, R.G., Principal Hydrogeologist, Harding Lawson Associates, re: Response to Comments, Draft Phase II Remedial Investigation Work Plan, Island Chemical Company, St. Croix, U.S. Virgin Islands, February 23, 1996. (Attachments: (1) Letter to Carol Berns, Esq., U.S. EPA, Region II,. from Lori G. Singer, Esq., Sills, Cummis, Zuckerman, Radin, Tischman, Epstein, & Gross, re: Plot Q of Estate Bethlehem Middle Works off of Melvin Evans Highway (Route 66) in St. Croix, U.S. Virgin Islands (Vichem Site), Supplemental Work Plan Issues, December 11, 1995; (2) Letter to Docket Coordinator, Headquarters, U.S. EPA, CERCLA Docket Office, from Lori G. Singer, Esq., Sills, Cummis, Zuckerman, Radin, Tischman, Epstein, & Gross, re: NPL, Proposed Rule No. 16, Tuesday, January 18, 1994 ("Proposed Rule"), Island Chemical Corp./Virgin Islands Chemical Corp., St. Croix, Virgin Islands, March 21, 1994; (3) Letter to

Docket Coordinator, Headquarters, U.S. EPA, CERCLA Docket Office, from Teri L. Copeland, M.S., Principal Toxicologist, Harding Lawson Associates, re: NPL, Proposed Rule No. 16, 11894 Island Chemical Corp./Virgin Islands Chemical Corp., St. Croix, Virgin Islands, March 21, 1994).

P. 305304 - 305305 Letter to Ms. Sherrel Taylor-Domville, U.S. EPA, Region II, from Mr. Jason M. Schindler, P.G., Associate Geologist, and Mr. Edward A. Nemecek, R.G., C.P.G., Principal Hydrogeologist, Regional Geosciences Manager, Harding Lawson Associates, re: Proposed Site Activities, Phase II Remedial Investigation Work Plan, Island Chemical Company, St. Croix, U.S. Virgin Islands, April 12, 1996.

P. 305306 - 305306 Letter to Mr. Jason Schindler, P.G., Associate Geologist, Harding Lawson Associates, from Ms. Sherrel D. Henry, Project Manager, U. S. EPA, Region II, re: Proposed Site Activities Phase II Remedial Investigation Work Plan, Island Chemical Site, St. Croix, U.S. Virgin Islands, April 17, 1996.

P. 305307 - 305307 Letter to Mr. Jason Schindler, P.G., Associate Geologist, Harding Lawson Associates, from Ms. Sherrel D. Henry, Project Manager, U. S. EPA, Region II, re: Proposed Site Activities Phase II Remedial Investigation Work Plan, Island Chemical Site, St. Croix, U.S. Virgin Islands, April 18, 1996.

P. 305308 - 305309 Letter to Mr. Jason Schindler, P.G., Associate Geologist, Harding Lawson Associates, re: Comments on Proposed Site Activities, Phase II Remedial Investigation Work Plan, Island Chemical Site, St. Croix, U.S. Virgin Islands, May 2, 1996.

P. 305310 - 305312 Letter to Ms. Sherrel D. Henry, U.S. EPA, Region II, from Mr. John S. Virgie, P.G., Senior Geologist, and Mr. Edward A. Nemecek, R.G., C.P.G., Principal Hydrogeologist, Regional Geosciences Manager, Harding Lawson Associates, re: Additional Requested Information, Proposed Site Activities, Phase II Remedial Investigation Work Plan, Island Chemical Company, St. Croix, U.S. Virgin Islands, May 15, 1996. (Attachment: Figure 1, Proposed Surface Soil and Soil Boring Locations, Island Chemical Company, St. Croix, U.S. Virgin Islands, prepared by Harding Lawson Associates, May 14, 1996).

P. 305313 - 305313 Letter to Mr. Austin Moorehead, Director, Division of Environmental Protection, Department of Planning and Natural Resources, Government of the Virgin Islands of the United States, from Ms. Sherrel D. Henry, Remedial Project Manager, U.S. EPA, Region II, re: request to discuss the status of the Site, May 16, 1996.

P. 305314 - 305314 Letter to Lori G. Singer, Esq., Sills Cummis Zuckerman Radin Tischman Epstein & Gross, from Mr. Melvin Hauptman, Leader, Sediments/Caribbean Team, Emergency Remedial and Response Division, re: Approval of McLaren/Hart Inc. for Implementation of the RI/FS at the Island Chemical Site, St. Croix, USVI, August 8, 1997.

P. 305315 - 305315 Memorandum to Ms. Caroline Kwan, Remedial Project Manager, Sediments/Caribbean Team, from Ms. Grace Musumeci, Chief, Environmental Review Section, re: Virgin Islands Chemical Site, St. Croix, USVI, Compliance with the National Historic Preservation Act, March 31, 1999.

P. 305316 - 305317 Letter to Ms. Caroline Kwan, Remedial Project Manager, U.S. EPA, Region II, from Mr. Perry Katz, Principal Environmental Scientist, McLaren Hart, Inc., re: Virgin Island Chemical Site, St. Croix, U.S. Virgin Islands, Schedule for Installation of Site Fence, January 26, 2000.

P. 305318 - 305319 Letter to Mr. Perry Katz, Principal Environmental Scientist, McLaren Hart, Inc., from Ms. Caroline Kwan, Project Manager, Sediments/Caribbean Team, U.S. EPA, Region II, re: Virgin Island Chemical Site, St. Croix, United States Virgin Islands, January 27, 2000.

P. 305320 - 305320 Report: Weekly Progress Report - 2/15/00 Through 2/21/00, Implementation of Pilot-Scale Study, Virgin Island Chemical Site, St. Croix, U.S. Virgin Islands, facsimile date February 24, 2000.

P. 305321 - 305330 Letter (w/attachments) to Ms. Caroline Kwan, Remedial Project Manager, U.S. EPA, Region II, from Mr. Perry Katz, Managing Environmental Scientist and Ms. Norma Eichlin, Supervising Engineer, McLaren Hart, Inc., re: Virgin Island Chemical Site, St. Croix, U.S. Virgin Islands,

Revisions to Calculation of Site-Specific Dilution Attenuation Factor, May 16, 2000.

P. 305331 - 305345 Letter (w/attachments) to Ms. Caroline Kwan, Remedial Project Manager, U. S. EPA, Region II, from Mr. Terry E. Grimmer, M. S., R. E. A., Head of Environmental Health & Safety, Berlex Laboratories, Inc., and Mr. William G. Gierke, P. G., Corporate E&S, Environmental Remediation, Pharmacia & Upjohn, re: Notification - Replacement of Prime Contractor/Consultant, Virgin Island Chemical Site, Remedial Investigation/Feasibility Study (RI/FS), July 12, 2000.

4.0 FEASIBILITY STUDY

4.3 Feasibility Study Reports

P. 400001 - 400170 Report: Feasibility Study Report, Virgin Island Chemical Site, St. Croix, U. S. Virgin Islands, prepared by Golder Associates Inc., prepared for Berlex Laboratories, Inc. and Pharmacia & Upjohn, June 2001.

4.4 Proposed Plans (SOP, FOP)

P. 400171 - 400182 Report: Superfund Proposed Plan, Virgin Island Chemical Site, St. Croix, U. S. Virgin Islands, prepared by U.S. EPA, Region II, June 2001.

4.6 Correspondence

P. 400183 - 400190 Letter to Mr. Perry Katz, Project Manager, McLaren Hart, from Ms. Caroline Kwan, Project Manager, Sediments/Caribbean Team, U.S. EPA, Region II, re: Comments of the Feasibility Study Technical Memo and Draft Treatability Study Work Plan for the VI Chemical Site, St. Croix, USVI, April 22, 1999.

7.0 ENFORCEMENT

7.3 Administrative Orders

P. 700001 - 700037 Letter to Lori Singer, Esq., Sills, Cummis, Zuckerman, Radin, Tischman, Epstein, & Gross, from Mr. Paul Simon, Section Chief, N.Y./Caribbean Superfund Branch, ORC, U.S. EPA, Region II, re: Virgin Island Chemical Site;

Administrative Order on Consent, Index No. II CERCLA-94-0401, October 3, 1994. (Attachment: Administrative Order on Consent for Remedial Investigation/Feasibility Study, Island Chemical Co., Inc. And Berlex Laboratories, Inc., Respondents, Index No. II CERCLA-94-0401, September 29, 1994).

P. 700038 - 700039 Letter to Mr. William Whitlock, Esq., Pharmacia & Upjohn Co., from Ms. Jeanne M. Fox, Regional Administrator, U.S. EPA, Region II, re: Virgin Island Chemical Superfund Site, Administrative Order on Consent for Remedial Investigation/Feasibility Study, Index No. II, CERCLA-94-0401, April 14, 1999.

9.0 NATURAL RESOURCE TRUSTEES

9.4 Correspondence

P. 900001 - 900002 Letter to Mr. Robert Witte, U.S. EPA, Region II, from Mr. Roy E. Adams, Commissioner/SHPO, Government of the Virgin Islands of the United States, Department of Planning and Natural Resources, re: Request for Review of Proposed "Remedial Work" at the Island Chemical Site in St. Croix, USVI, May 20, 1994.

10.0 PUBLIC PARTICIPATION

10.1 Comments and Responses

P. 10.0001 - 10.0001 Mailing List form requesting additional information on the Virgin Island Chemical site, completed by Mr. Kenneth C. Haines, President, Coastal Consultants, March 27, 1995.

10.2 Community Relations Plans

P. 10.0002 - 10.0002 Letter to Mr. Eustace Carr, from Ms. Sherrel Henry, Remedial Project Manager, U.S. EPA, Region II, re: Community Relations Activities at the Virgin Island Chemical Site, February 1, 1995.

P. 10.0003 - 10.0003 Letter to Ms. Jennifer Jackson, The University of the Virgin Islands, St. Croix Campus, from Ms. Sherrel Henry, Remedial Project Manager, U.S. EPA, Region II, re: Community Relations Activities at the Virgin Island Chemical Site, February 1, 1995.

P. 10.0004 - 10.0004 Letter to Mr. Jeff Lawlor, Virgin Islands Port Authority, from Ms. Sherrel Henry, Remedial Project Manager, U.S. EPA, Region II, re: Community Relations Activities at the Virgin Island Chemical Site, February 1, 1995.

P. 10.0005 - 10.0005 Letter to Mr. Robert E. Simmons, Postmaster, from Ms. Sherrel Henry, Remedial Project Manager, U.S. EPA, Region II, re: Community Relations Activities at the Virgin Island Chemical Site, February 1, 1995.

P. 10.0006 - 10.0006 Letter to Mr. Luis Cora, Comptroller, Virgin Islands Paving, Inc., from Ms. Sherrel Henry, Remedial Project Manager, U.S. EPA, Region II, re: Community Relations Activities at the Virgin Island Chemical Site, February 1, 1995.

P. 10.0007 - 10.0007 Letter to Ms. Natalie B. Stevens, Assistant Manager, Charlie's Concrete Services, from Ms. Sherrel Henry, Remedial Project Manager, U.S. EPA, Region II, re: Community Relations Activities at the Virgin Island Chemical Site, February 1, 1995.

P. 10.0008 - 10.0008 Letter to Ms. Antoinette King, King's Automotive, from Ms. Sherrel Henry, Remedial Project Manager, U.S. EPA, Region II, re: Community Relations Activities at the Virgin Island Chemical Site, February 1, 1995.

P. 10.0009 - 10.0009 Letter to Mr. Joe C. Pitts, Vice President & General Manager, VIAPCO, from Ms. Sherrel Henry, Remedial Project Manager, U.S. EPA, Region II, re: Community Relations Activities at the Virgin Island Chemical Site, February 1, 1995.

P. 10.0010 - 10.0010 Letter to Ms. Karen V. Chapman, Administrative Specialist, University of the Virgin Islands, from Ms. Sherrel Henry, Remedial Project Manager, U.S. EPA, Region II, re: Community Relations Activities at the Virgin Island Chemical Site, February 1, 1995.

P. 10.0011 - 10.0020 Letter to Ms. Sherrel Henry, Remedial Project Manager, U.S. EPA, from Ms. Pamela J. Philip, Work Assignment Manager, CDM Federal Programs Corporation, re: Island Chemical Site, St. Croix, U.S.V.I., Updated Community Relations Mailing List, April 26, 1995. (Attachment: Mailing List, Island Chemical/Virgin Island Chemical Site, April 20, 1995.)

P. 10.0021 - 10.0063 Plan: Draft Community Relations Plan, Virgin Island Chemical, St. Croix, U.S. Virgin Islands, prepared by CDM Federal Programs Corporation, prepared for U.S. EPA, August 1995.

10.4 Public Meeting

P. 10.0064 - 10.0065 Announcement of Public Meeting to present the Work Plan for the Virgin Island Chemical Superfund Site, February 1995.

P. 10.0066 - 10.0067 Sign-in Log for, U.S. EPA, Region II, Public Meeting for Virgin Island Chemical Superfund Site, Attendees, Wednesday, February 15, 1995.

10.6 Fact Sheets and Press Releases

P. 10.0068 - 10.0071 Fact Sheet: Remedial Investigation/Feasibility Study, Virgin Island/Island Chemical Site, Christiansted, St. Croix, U.S. Virgin Island, prepared by U.S. EPA, Region II, January 1994.

P. 10.0072 - 10.0074 Fact Sheet: Remedial Investigation/Feasibility Study, Virgin Island/Island Chemical Site, Christiansted, St. Croix, U.S. Virgin Island, prepared by U.S. EPA, Region II, December 1994.

P. 10.0075 - 10.0077 Superfund Update: Virgin Island/Island Chemical Site, Christiansted, St. Croix, Virgin Island, prepared by U.S. EPA, Region II, May 1996.

11.0 TECHNICAL SOURCES AND GUIDANCE DOCUMENTS

11.3 State Guidance

P. 11.0001 - 11.0006 Report: Virgin Islands Rules & Regulations, Air Pollution Control, Title 12, Chapter 9, facsimile April 21, 1999. (Attachment: Government of the Virgin Islands of the United States Department of Planning and Natural Resources, Air Pollution Control, Application Information, General, facsimile April 21, 1999.)

APPENDIX E
VIDPNR LETTER ON CONCURRENCE

Caroline

GOVERNMENT OF THE VIRGIN ISLANDS OF THE UNITED STATES

Department of Planning & Natural Resources
Division of Environmental Protection
RAINBOW PLAZA
45 MARS HILL
FREDERIKSTED, ST. CROIX 00841
(340) 773-1082

July 23, 2002

Mr. George Pavlous
Director, ERRD
US Environmental Protection Agency
290 Broadway
New York, NY 10007-1866

RE: DPNR concurrence on the Virgin Islands Chemical Record of Decision

Dear Mr. Pavlous:

This letter provides the Virgin Islands Department of Planning and Natural Resources (DPNR) concurrence on the US Environmental Protection Agency (EPA) Record of Decision (ROD) for the Virgin Islands Chemical Superfund Site in St. Croix.

Based on discussions between your staff and DPNR on July 17, 2002, the proposed change to the language on the Institutional Control section of the ROD is acceptable as follows:

> **"The Department of Planning and Natural Resources, in consultation with EPA, will utilize institutional controls (in the form of existing well permitting laws and regulations) to limit the pumping of groundwater at the Site to prevent interference with the selected remedy and to also prevent human exposure to contaminated groundwater until MCLs are achieved."**

DPNR expects to work closely with EPA during the implementation of the selected remedy for the Site - Alternative 3 (SVE/AS for the AST Area, MNA for the FPP Area, and Institutional Controls) and Alternative 4 (SVE/AS for the AST Area, Groundwater Extraction and Treatment for the FPP Area, and Institutional Controls) as a contingency remedy which would be implemented if MNA does not reduce groundwater contamination to MCLs in a reasonable timeframe. DPNR considers this Record of Decision as an important step towards the eventual reclamation of a valuable Virgin Islands resource.

Thank you.

Sincerely,

Dean C. Plaskett, Esq.
Commissioner

GOVERNMENT OF THE VIRGIN ISLANDS OF THE UNITED STATES

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