Final

Phase II
RCRA Facility Investigation Report
SWMU 30 - Former Incinerator Area

Naval Station Roosevelt Roads

RCRA/HSWA Permit No. PR2170027203

Ceiba, Puerto Rico

Prepared For

Department of the Navy
Atlantic Division
Naval Facilities Engineering Command

Norfolk, Virginia

Contract No. N62470-95-D-6007
CTO-0099

February 15, 2000

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LIST OF ACRONYMS

AQUIRE	Aquatic Toxicity Information Retrieval
ASTM	American Society of Testing Materials
Baker	Baker Environmental, Inc.
BBL	Blasland, Bouck and Lee
BTEX	benzene, toluene, ethylbenzene, and xylene
CCC	criterion continuous concentration
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CF	Conversion Factor
CMC	criterion maximum concentration
COPCs	Chemicals of Potential Concern
D	duplicate
DoN	Department of the Navy
DRMO	Defense Reutilization and Marketing Office
DRO	diesel range organics
EC	effective concentration
ER/RB	equipment rinsate sample
ER-L	effects range low
FB	field blank
ft bgs	feet below ground surface
GC	gas chromatograph
GRO	gasoline range organics
HHSE	Human Health Screening Evaluation
HI	Hazard Index
HSWA	Hazardous and Solid Waste Amendments
HQ	Hazard Quotient
HxCDD	Hexachlorodibenzo-p-dioxin
IAS	Initial Assessment Study
ID	inside diameter
ICR	incremental lifetime cancer risk
IR	Installation Restoration
LANTDIV	Atlantic Division, Naval Facilities Engineering Command
LC	lethal concentration
LOEC	Lowest Observed Effect Concentration
MCL	maximum contaminant level
MDLs	method detection limits
mgd	million gallons per day
mg/kg	milligrams per kilogram
µg/kg	micrograms per kilogram
µg/l	micrograms per liter

NAWQC	National Ambient Water Quality Criteria
NOAA	National Oceanographic and Atmospheric Administration
NSRR	Naval Station Roosevelt Roads
OD	outside diameter
ORNL	Oak Ridge National Laboratory
OU	Operable Unit
OVA	organic vapor analyzer
PAH	polyaromatic hydrocarbons
PCB	polychlorinated biphenyls
PID	photo ionization detector
ppm	parts per million
PREQB	Puerto Rico Environmental Quality Board
QA/QC	quality assurance/quality control
QC	quality control
RBCs	Risk Based Concentrations
RCRA	Resource Conservation and Recovery Act
RFA	RCRA Facility Assessment
RFI	RCRA Facility Investigation
SC	Site Characterization
SOP	standard operating procedures
SVOCs	Semivolatile Organic Compounds
SWMU	Solid Waste Mangement Unit
TB	trip blank
TCLP	Toxicity Characteristic Leachate Procedure
TPH	total petroleum hydrocarbons
TSCA	Toxic Substance Control Act
USEPA	United States Environmental Protection Agency
UST	underground storage tank
VOC	volatile organic compounds

1.0 INTRODUCTION

This document presents the results from the Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) at Solid Waste Management Unit (SWMU) 30, Naval Station Roosevelt Roads, Ceiba, Puerto Rico. This RFI was conducted in June 1999. It should be noted that the data obtained during previous investigations has been incorporated into this document at the request of United States Environmental Protection Agency (USEPA) Region II. This report has been prepared by Baker Environmental, Inc. (Baker) under contract to the Atlantic Division, Naval Facilities Engineering Command (LANTDIV), Contract Number N62470-95-D-6007.

On October 20, 1994, a Final RCRA Part B Permit (RCRA/HSWA Permit No. PR2170027203) was issued by the USEPA Region II to Naval Station Roosevelt Roads (NSRR). This permit contains requirements for RFI activities at 24 SWMUs and three areas of concern (AOCs). Prior to 1993, environmental activities at NSRR, exclusive of underground storage tanks (USTs), were conducted in compliance with Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) regulations under the Department of the Navy=s (DoN=s) Installation Restoration (IR) Program. The RCRA Part B Permit, issued for the Defense Reutilization and Marketing Office (DRMO) at NSRR, included provisions for corrective action under the Hazardous and Solid Waste Amendments (HSWA) provisions of RCRA.

The Former Incinerator (SWMU 30) was investigated as a part of Operable Unit 1 and a Phase I RFI Report was submitted in July 1996. No comments were received from the EPA regarding this SWMU until receipt of the November 14, 1997 EPA letter. In this letter, comments pertained to the apparent presence of PCBs and antimony at levels exceeding certain screening criteria. Additional site characterization investigations were requested for surface and subsurface soils. It was at this time when the Phase II RFI was conducted for this site.

This RFI report addresses SWMU 30 - Former Incinerator Area.

1.1 Objectives

The objective of this report is to present and evaluate the data collected during the investigations performed at SWMU 30 - The Former Incinerator:

Investigations conducted at SWMU 30 included:

- UST Site Characterization (1993 and 1994)
- Phase I RFI (1995)
- Background Investigation (1996)
- Well Replacement (1998)
- Phase II RFI (1999)

The evaluation consists of comparing the data to established standards/criteria and performing a human health screening evaluation and ecological risk screening to assess whether any contaminants detected on-site pose an unacceptable risk to human health or a significant adverse risk to possible ecological receptors. This report will assist in assessing if any further action is warranted at the site investigated to assist in mitigating any present or future risks.

1.2 Report Organization

Section 1.0 of this document includes this introduction and the objectives of this RFI Report. Section 2.0 provides a description of the facility and provides the facility's historical background. Section 3.0 describes the field activities undertaken during the RFI. It also describes the purpose of the study of individual media, sampling procedures, sampling locations for all media, and quality control (QC) conducted during the sampling activities. Section 4.0 provides a description of the physical characteristics (i.e., geology and hydrology) of the SWMU. Section 5.0 describes the nature and extent of contaminants detected in the environmental samples from each media sampled. Section 6.0 presents the human health screening evaluation for SWMU 30, and Section 7.0 presents the ecological screening evaluation. Section 8.0 presents conclusions and recommendations and the references utilized in this report are provided in Section 9.0.

2.0 BACKGROUND

This section contains a description of the physical facility and NSRR background history.

2.1 Facility Background

NSRR occupies part of the northern side of the east coast of Puerto Rico, along Vieques Passage with Vieques Island lying to the east about 10 miles off the harbor entrance. The north entrance to NSRR is about 35 miles east along the coast road (Route 3) from San Juan. The closest large town is Fajardo (population approximately 37,000), which is about four miles north of NSRR off Route 3. Ceiba (population approximately 17,000) adjoins the west boundary of NSRR (see Figure 2-1, Regional Location Map).

NSRR occupies over 33,500 acres and has administrative and command responsibilities for some operations separated from the main base on Vieques Island.

NSRR was commissioned in 1943 as a Naval Operations Base, and finally redesignated a Naval Station in 1957. The primary mission of NSRR today is provision of full support for Atlantic Fleet weapons training and development activities.

2.2 SWMU 30 Background

The location of SWMU 30 is shown on Figure 2-2. A more detailed site layout is provided on Figure 2-3. SWMU 30 was first described in the RCRA Facility Assessment (RFA) Report (ATKearney, 1988) as the Former Incinerator. The original incinerator was installed in 1973 and subsequently dismantled in 1983. According to records, the incinerator burned classified material, contaminated diesel oil, JP-5 fuel (usually mixed with some lube oil), solvents, and sludge residue. It is estimated that, during the period of operation, 600 gallons of oil were processed each week.

Associated with the incinerator was a 550 gallon steel UST that held diesel fuel used to operate the incinerator. The UST was removed in 1993 in accordance with the UST regulations for which Puerto Rico Environmental Quality Board has primacy. Petroleum contamination was detected during the tank removal project, however, no free product was encountered.

The SWMU 30 area is transited by the cooling water tunnel that arises at the Old Power Plant (SWMU 11). This tunnel has been cleaned and abandoned in place by filling with low density concrete.

The incinerator that presently occupies the site was installed in 1984, but was never activated.

3.0 FACILITY INVESTIGATIONS

Investigations conducted at SWMU 30 included:

- UST Site Characterization (1993 and 1994)
- Phase I RFI (1995)
- Background Investigation (1996)
- Well Replacement (1998)
- Phase II RFI (1999)

The following sections present a description of the activities conducted at SWMU 30 during the investigations performed.

3.1 1994 UST Site Characterization

SWMU 30 is comprised of the Former Incinerator and an associated 550 gallon UST that was used to hold diesel fuel for the incinerator. In 1993, as a part of the Station-wide UST program, the tank was excavated, removed and properly disposed. Petroleum contamination was detected in soil and groundwater samples obtained by the UST removal contractor. No free product was encountered (Blasland, Bouck and Lee, 1994).

A Site Characterization (SC) investigation under the UST program was performed by Blasland, Bouck and Lee (BBL) in 1994. The goal of the investigation was to A . . . determine if soil or groundwater contamination, or both, are still present at the site.@ (BBL, 1994). Field investigations were performed from February 22 through June 10, 1994.

The site characterization included the following elements:

- $ Soil borings
- $ Field screening of soils
- $ Field screening of groundwater
- $ Installation of monitoring wells
- $ Slug testing of wells
- $ Groundwater elevation measurements
- $ Groundwater sampling and analysis

Each of these investigation activities is discussed briefly below. Further information is provided in the BBL, 1994 report.

3.1.1 Soil Borings

Nine soil borings (1983-SB1 through 1983-SB9) [Note: the A1983" refers to the site designation under the UST program] were installed to assess site conditions. Borings were advanced with hollow stem augers. All borings were continuously sampled at two-foot intervals to the water table using standard penetration test methodology in accordance with American Society for Testing and Materials (ASTM) method D-1586. The locations of the soil borings are shown on Figure 3-1. Boring logs are contained in Appendix A-1.

3.1.2 Screening of Soils

Soil samples were collected during advancement of the soil borings in jars that were first covered with aluminum foil and then securely capped. Each sample was screened with an organic vapor analyzer (OVA) within five minutes of being collected. Of the 52 samples screened, only 12 produced detectable concentrations of organic vapors above two parts per million (ppm). Eighteen samples were submitted to a Puerto Rican laboratory for screening with a gas chromatograph (GC) and screening for Total Petroleum Hydrocarbons (TPH). A portion of the 18 samples that were screened by the Puerto Rican laboratory were forwarded to Savannah Laboratories for confirmatory analysis. Savannah analyzed all the samples for Benzene, Toluene, Ethylbenzene, Xylenes (BTEX) (EPA Method 602) and TPH (EPA Method 418.1). In addition, six of the samples (one of which was the cuttings from drilling) were subjected to analysis for an expanded list of parameters including:

- Toxicity Characteristic Leachate Procedure (TCLP) metals (Method 6010 and 7470)
- Polychlorinated Biphenyls (PCBs) (Method 8080)
- Volatile Organics (method 8240)
- Semi-Volatile Organics (Method 8270)

A sample matrix for this investigation is provided in Table 3-1.

The screenings were used to assist in siting the permanent monitoring wells. The results of the screening are discussed in Section 5.0.

3.1.3 Groundwater Field Screening

After each soil boring was completed, groundwater samples were collected from the open borehole using a disposable bailer. The samples were analyzed for benzene, toluene, ethylbenzene and xylenes (BTEX) by a local laboratory using a GC (modified EPA Method 602) and for TPH using a TPH analyzer (modified EPA Method 418.1). The screening was performed to assist in determining the location for permanent monitoring wells. The results of the groundwater screening are provided in Section 5.0.

3.1.4 Monitoring Well Installation

A total of four monitoring wells (designated 1983MW-1 through 1983MW-4) were installed to assess shallow groundwater quality and potential impacts from the UST. One additional well, 1983-DW1, was installed as a double cased deep well into the bedrock. The locations of the monitoring wells are shown on Figure 3-1. Well construction diagrams are provided in Appendix A-2.

3.1.5 Slug Testing

Slug tests were performed in monitoring wells 1983-MW2, 1983-MW3 and 1983-MW4 during May and June 1994. The tests were performed by quickly removing a volume of water from the well with a centrifugal pump and measuring the recovery rate of the well with a data logger and associated pressure transducer. Analysis of the slug test data was performed using the Bouwer and Rice method (BBL, 1994).

3.1.6 Water Elevation Measurements

Groundwater elevation measurements were taken on two occasions approximately one week apart in June, 1994. The results are discussed in Section 4.4.2.

3.1.7 Groundwater Sampling

Groundwater samples were collected from all five monitoring wells (Figure 3-1). Analyses were performed on all five samples for volatile organics (EPA Method 601), BTEX (EPA Method 602), base neutral extractables (EPA Method 625) and TPH (EPA Method 418.1). The samples from

MW-1, MW-4 and DW-1 were analyzed for lead (EPA Method 239.1) and total dissolved solids. Polynuclear aromatic hydrocarbons (EPA Method 610) were analyzed for in the samples from MW-4 and DW-1. EPA Method 608 was employed in analyzing for PCBs in the sample from MW-4. A sampling matrix for this investigation is provided on Table 3-1.

The analytical results are provided and discussed in Section 5.0.

3.2 Phase I RFI

The Phase I RFI was conducted in 1995 and included the collection of six surface soil samples and two groundwater samples in accordance with the approved workplan (Baker, 1995). It was the intent of the Phase I RFI to assess whether soils and groundwater had been impacted by waste management activities at the incinerator. Sampling locations were, therefore, spatially distributed around the incinerator. The two wells utilized were 1983DW-1 and 1983MW-3 that were available from the 1994 UST site characterization. Analysis of the groundwater samples was for the full Appendix IX list of parameters as shown on Table 3-2. Four of the surface soil samples were analyzed for VOCs, SVOCs, and RCRA metals (Table 3-3) while the remaining two samples were analyzed for full Appendix IX list of parameters. The soil and groundwater sampling locations are shown on Figure 3-2. A sampling matrix is provided in Table 3-1.

3.3 Background

A background investigation was conducted during the Operable Unit (OU) 2 RFI field activities in March 1996 and included the installation of four background monitoring wells, BGMW01 through BGMW04 located north of Gate 2 between the entrances to the Crash Crew Area and Air Operations (Figure 2-3 shows the general background location on base while Figure 3-3 provides detailed locations). The background wells were installed in undisturbed, wooded areas along the east side of the realigned Boxer Drive. The location of the background monitoring wells was described in the approved RFI work plans (Baker, 1995) as near the perimeter fence north of Gate 2. It was not possible to locate the wells along the west side of Boxer Drive since the ground had been disturbed during the road realignment; therefore, the wells were positioned in an area east of the road to ensure that they were on undisturbed soil. The area of the background wells is heavily wooded and has historically been used as a buffer zone between the station=s northeast perimeter fence and the air field.

The background investigations are described in the EPA approved Revised Draft, RFI Report for OU 2 (SWMU 7/8) submitted in June 1997 (Baker, 1997b).

Surface soil, subsurface soil, and groundwater samples were collected from each location in a manner consistent with those collected in the RFIs. Each background sample media, designation, depth and analytical parameter is discussed in Section 5.1 and displayed in Table 3-4. Appendix B contains the background analytical data. All of the background samples were analyzed for the full Appendix IX parameter list (Table 3-2). The background data was compared with the concentrations reported from SWMU 30 for assessment of potential contamination and determining chemicals of potential concern (COPCs) for use in the risk assessment.

3.4 Well Replacement

Well 1983DW-1 was damaged by heavy equipment and was rendered unusable. This well was abandoned and replaced in December 1998. In addition, the wellheads of 1983-MW1 and 1983-MW2 were repaired. These wells were damaged by traffic; however, the damage was only at the surface and the wells themselves were still functional. Both wells were changed from having a stick-up aboveground to flush mounts. This was done to prevent future damage. No sampling or analysis was performed during this maintenance activity.

3.5 Phase II RFI Soils Investigation

The Phase I RFI investigations were designed to screen the site and assess whether there were impacts from prior waste management activities. The initial sampling did confirm the presence of some contamination. Phase I did not provide for sampling related to the UST since it was being addressed by the NSRR UST program. Between the Phase I (1995) and 1997, the Navy and EPA agreed that the RCRA program should include the UST as part of the SWMU. The UST site characterization also indicated that contamination was present at the site. Based on the findings of the Phase I and the UST site characterization, further investigations were deemed necessary to establish the nature and extent of site impacts. No comments were received on the Phase I RFI regarding this SWMU until receipt of the November 14, 1997 EPA letter. In this letter, comments pertained to the apparent presence of PCBs and antimony at levels exceeding certain screening criteria. Additional site characterization investigations were requested for surface and subsurface soils. A workplan for additional investigations was provided to, and approved by, the USEPA on December 24, 1997 (Baker, 1997a).

The subsections that follow present a description of the procedures employed in collecting surface and subsurface soil samples during the Phase II RFI soils investigation of SWMU 30.

A Geoprobe system was utilized for this investigation. A one inch inside diameter (ID) casing with a removable drive point and an internal acetate liner was used to advanced the boring for the majority of the investigation. The Macro Core sampler (a two inch (ID) casing with an internal acetate liner) was also utilized during the investigation. Once the casing reached the desired depth, the drive point was removed through the interior of the casing and acetate liner. The casing and acetate liner were advanced until the desired length of sample was collected (maximum of two feet). The casing containing the acetate liner and soil sample was then extracted from the ground. Once at the surface, subcontractor personnel would remove the acetate liner from the casing and immediately place end caps on the liner containing the soil sample.

Borehole information pertaining to soil classifications, environmental sampling depths, and depth to groundwater measurements were recorded on the test boring records which are provided as Appendix B.

Subsurface soil samples were collected using direct push methodologies. After the one inch outside diameter (OD) by two foot long acetate liner was removed from the casing, depth intervals were marked on the exterior of the liner. The soil sample was then removed from the liner and immediately screened using a Photoionization Detector (PID) meter. The soil within the desired depth (with the exception of the volatile organic compounds which was collected and placed directly into the sample jars) was composited within a bowl constructed of disposable aluminum foil and immediately placed in sample jars provided by the laboratory. This process was repeated for all soil sample locations. Soils for BTEX analysis were not physically mixed, but were composited directly into sample jars. All samples were kept in coolers on ice and under strict chain- of -custody until delivered to the laboratory. Copies of the Chain-of-Custody forms are presented in Appendix C.

Five boring locations (30HP01 through 30HP05) were collected for "detailed" sampling and analysis to assist in the delineation of PCB and antimony contamination located in the vicinity of the former incinerator as shown on Figure 3-4 (see Table 3-1 for a sampling matrix). Soil samples in these borings were obtained from the following intervals:

- Below root zone- 0.5 to 1.5 feet below ground surface
- 5.0 to 7.0 feet below ground surface
- One foot interval above the groundwater surface which in this case was 8.0 to 9.0 feet below ground surface.

These five boring locations had a total of 15 samples collected (3 from each boring location). The 15 soil samples were analyzed for:

- TPH (Modified 8015)
- BTEX (8240)
- Semi-Volatiles (8270)
- PCB=s (8080)
- Antimony (SW-846)

With the exception of 30HP03, the other four "detailed" boring locations (30HP01, 30HP02, 30HP04, and 30HP05) all had PID levels exceeding 40 PPM at the 8.0 to 9.0 foot sampling depth.

Eleven boring locations 30HP06 through 30HP16 were collected to assist in the delineation of TPH in the soil as shown on Figure 3-4 (see Table 3-1 for a sampling matrix). Soil samples in these boring locations were obtained from the following intervals:

- 5.0 to 6.0 feet below ground surface
- One foot interval above the groundwater surface which in this case was 8.0 to 9.0 feet below ground surface.

The eleven boring locations had a total of nine samples collected. The eight soil samples were analyzed for TPH (Modified 8015).

Boring location 30HP06 was completed as required in the work plan for SWMU 30.

The soil boring 30HP07 encountered spoon refusal a 6.2 feet. The soil sample between 5.0 to 6.0 feet was collected, but the 8.0 to 9.0 foot sample was unable to be obtained. The boring was filled with concrete to complete the abandoning process.

The soil boring location 30HP08 had spoon refusal at four different times at four different locations at an approximate depth of 3 feet. The boring was abandoned after the fourth attempt and no samples were able to be collected. It should be noted that this sample location was found to be above the tunnel associated with Building 38.

The soil boring location 30HP09 had spoon refusal at eight different times at eight different locations at depths that ranged from 1.8 feet to 2 feet below ground surface. The boring was abandoned after the eighth attempt and no samples were able to be collected.

The soil boring location 30HP10 had spoon refusal at three different times at three different locations, all refusal depths were at 3.5 feet below ground surface. The boring was abandoned after the third attempt and no samples were able to be collected.

Location 30HP11 encountered spoon refusal at four different times at four different locations. Three of the four locations refusal was encountered at 2 feet. The soil sample between 5.0 to 6.0 feet was collected at the initial location, but the 8.0 to 9.0 foot sample was unable to be obtained.

Location 30HP12 encountered spoon refusal at three different times at three different locations at an approximate depth of six feet. The soil sample between 5.0 to 6.0 feet was collected at the initial location, but the 8.0 to 9.0 foot sample was unable to be obtained.

Boring location 30HP13 was completed as required in the work plan for SWMU 30.

Location 30HP14 encountered spoon refusal at 6.0 feet. The boring was advanced utilizing a jackhammer; the location north of the former incinerator was inaccessible by vehicle. The soil sample between 5.0 to 6.0 feet was collected at the initial location, but the 8.0 to 9.0 foot sample was unable to be obtained.

Location 30HP15 encountered spoon refusal at four different times at four different locations. Spoon refusal occurred at 6.1 feet below ground surface at all three locations. The soil sample between 5.0 to 6.0 feet was collected at the initial location, but the 8.0 to 9.0 foot sample was unable to be obtained.

The soil boring location 30HP16 had spoon refusal at four different times at four different locations. The first and third attempt encountered refusal at three feet, the second attempt refusal was

encountered at two feet, while the fourth reached a depth of five feet below ground surface before refusal occurred. The boring was abandoned after the fourth attempt and no samples were able to be collected.

3.6 Quality Assurance/Quality Control Sampling Procedures

Extensive field quality assurance/quality control (QA/QC) samples were collected during the RFI investigation (Table 3-5). These samples were obtained to: (1) ensure that decontamination procedures were properly implemented (i.e., equipment rinsate blanks); (2) evaluate field methodology (i.e., duplicate
samples); (3) establish field background conditions (i.e., field blanks); and, (4) evaluate whether cross-contamination occurred during sampling and/or shipping (i.e., trip blanks).

Several types of field QA/QC samples were collected and analyzed including duplicate samples, equipment rinsate samples, field blanks, and trip blanks. These QA/QC samples are defined below:

- Duplicate Sample (D): Two samples collected simultaneously into separate containers from the same source under identical conditions. One duplicate sample was collected for every 10 (10 percent) environmental samples collected for each media type.

- Equipment Rinsate Sample (ER/RB): Sample obtained by running laboratory supplied deionized water over/through sample collection equipment after it was decontaminated or prior to use of disposable sample collection equipment. These samples were used to determine if decontamination procedures were adequate.

- Field Blank (FB): Sample obtained from each water source utilized during the field program. The water sources used during the field program included: laboratory supplied deionized water utilized to collect rinsate blanks; store bought distilled water utilized for decontamination; and, potable water utilized for decontamination.

- Trip Blank (TB): Trip blanks were prepared at the laboratory and shipped with the sample containers. The trip blanks were packaged for shipment with the other Volatile Organic Compound (VOC) samples and sent for analysis. At no time after their preparation were the trip blank sample containers opened before they reached

the laboratory. At least one trip blank per shipping cooler containing VOC samples was sent to the laboratory for VOC analysis.

QA/QC sampling results are discussed in Section 5.4. The analytical data is provided in Appendix G.

3.7 Decontamination Procedures

Decontamination procedures performed in the field were conducted in accordance with USEPA Region II guidelines.

For routine sample collection equipment, the following steps were implemented:

- Clean with potable water and low-phosphate detergent
- Tap water rinse
- 10 percent nitric acid solution rinse
- Tap water rinse
- Methanol followed by a hexane or an acetone rinse
- Analyte-free deionized water rinse
- Air dry
- Wrap in aluminum foil, shiny side out, for storage or transport

This decontamination procedure was performed on stainless steel sampling spoons in accordance with Baker=s standard operating procedure (SOP) F502. The geoprobe equipment was decontaminated prior to the start of drilling and between each drilling location.

4.0 PHYSICAL CHARACTERISTICS OF STUDY AREA

The physical setting of NSRR was documented in the 1984 Initial Assessment Study (IAS) (NEESA, 1984). This information is summarized below.

4.1 Climatology

The climate of the Roosevelt Roads area is characterized as warm and humid, with frequent showers occurring throughout the year. A major factor affecting the weather is the pattern of trade winds associated with the Bermuda High, the center of which is in the vicinity of 30E North, 30E West. The prevailing wind direction reflects the easterly trade winds. The area receives a surface flow varying between the northeast to the southeast about 75 percent of the year, and as much as 95 percent of the time in July when the easterly winds are strongest. The differential heating of the land and sea during the day tends to give a more northerly component to the flow on the northern side of the island and a more southerly component on the southern side. During the night, a land breeze causes a prevailing southeasterly flow in the north and a prevailing northeasterly flow over the southern coast. The mean annual wind velocity is 5.5 knots, with a minimum in November and a maximum in August. Gales associated with westward moving disturbances in the trade winds or hurricanes passing either north or south of the area have the highest probability of occurrence from June through October.

Uniform temperatures prevail, with small diurnal ranges as a result of insular exposure and the relatively small land areas. The warmest months are August and September, while the coolest are January and February. Mean annual maximum temperatures range from 82.0E in January to 88.2EF in August. The mean annual minimum temperatures vary from 64.0E in January to 73.2E in June. The highest maximum temperature recorded was 95EF, while the lowest minimum was 59EF. Rain usually occurs at least nine days in every month, with an average of 60 inches per year although a dry winter season occurs from December through April. About 22 thunderstorm-days occur per year, with maximum frequencies of three days per month from May through October.

In late summer, the mean sky cover begins a steady decrease from a monthly maximum average of 6.5-tenths coverage in September to a minimum monthly average of 4.4-tenths coverage in February. From March through August, the monthly average cloud cover increases steadily from 4.5- to 6.0-tenths coverage. Over the open sea, a maximum of clouds (usually broken stratocumulus) occurs during early morning, with the skies clearing or becoming scattered with cumulus by afternoon.

Completely clear or overcast skies are rare during daylight hours, while clear skies frequently occur at night.

The hurricane season is from June 1st through November 30; maximum winds exceed 95 knots during severe hurricanes. An average of two tropical storms per year occur in the study area, one of which usually reaches hurricane intensity.

4.2 Topography

The regional area of Roosevelt Roads consists of an interrupted, narrow coastal plain with small valleys extending from the Sierra de Luquillo range, which has been severely eroded by streams into valleys several hundreds of feet deep. Slopes of up to 60E are common.

In the immediate area of the station, elevations range from sea level to approximately 295 feet. Immediately to the north of the NSRR boundary, the hills rise abruptly to heights of 800 to 1,050 feet above sea level, with the tallest peak located within two kilometers of the station boundary. There is a series of three hilly areas on the station, two of which separate the southern airfield area from the Port/Industrial, Housing and Personnel Support areas. The third set of hills is in the Bundy area. These ridge lines not only separate sections of the station, but dictate the degree of allowable development. The ridge line south of the airfield provides an excellent barrier which effectively decreases the aircraft-generated noise which reaches the Unaccompanied Enlisted Personnel Housing areas to an acceptable level. Relief is low along the shoreline. Lagoons and mangrove swamps are common.

4.3 Geology

The following subsections present a description of the general geology at NSRR as well as site-specific geologic information obtained at SWMU 30.

4.3.1 Soils

The soil associations found at the station are predominantly of two types typical of humid areas, namely the Swamps-Marshes Association and the Mabi-Rio-Arriba-Cayagua Association, as well as the Descalabrado-Guayama Association, which is typical of dry areas. In addition, isolated areas of the Caguabo-Mucara-Naranjito Association, the Coloso-Toa-Bajura Association, and the Jacana-Amelia-Fraternidad Association are found at the station.

The Swamps-Marshes and Mabi-Rio-Arriba-Cayagua associations cover over one half of the station's surface area and are equally distributed. The remaining area is covered primarily by the Descalabrado-Guayama and Caguabo-Mucara-Naranjito associations.

The Swamps-Marshes Association consists of deep, very poorly drained soils. This association is found in level or nearly level areas that are slightly above sea level but are wet, and when the tide is high, are covered or affected by saltwater or brackish water. The soils are sandy or clayey, and contain organic materials from decaying mangrove trees. They are underlain by coral, shells and marl at varying depths. The high concentration of salt inhibits the growth of all vegetation except mangrove trees, and in small scattered patches, other salt-tolerant plants.

The Mabi-Rio-Arriba-Cayagua Association consists generally of deep, somewhat poorly drained and moderately well-drained, nearly level to moderately steep soils found on foot and side slopes, terraces and alluvial fans. Soils of this association at the station are basically clayey.

The Descalabrado-Guayama Association generally consists of shallow, well-drained, strongly sloping to very steep soils on volcanic uplands. Soils of this association are found primarily in the hilly areas located directly inland and adjacent to the soils of the Swamps-Marshes Association.

The Caguabo-Mucara-Naranjito Association consists generally of shallow and moderately deep, well-drained, sloping to very steep soils on volcanic uplands. This association consists of soils which formed in residual material that weathered from volcanic rocks. This association is represented at the station by soils of the Sabana series, which are found on the side slopes and the hilly terrain west of Langley Drive in the Fort Bundy area. These soils are suited for pasture and woodland. Steep slopes, susceptibility to erosion and depth to bedrock are the main limitations for farming, and for recreation and urban areas.

The Coloso-Toa-Bajura Association consists of deep, moderately well drained to poorly drained, nearly level soils found on floodplains. This soil association extends along the western boundary of the station and around the airfield. The soils of this association formed in fine-textured and moderately fine-textured sediment of mixed origin on floodplains. The Coloso soils are deep and somewhat poorly drained; the Toa soils are deep and moderately well drained; and the Bajura soils and Maunabo soils are deep and poorly drained. The Reilly soils, also part of this association, are shallow sand and gravel and are excessively drained; they lie adjacent to streams. The minor soils are Talante, Vivi, Fortuna, Vega Alta and Vega Baja. The Talante, Vivi, Fortuna and Vega Baja soils are found on floodplains, while the Vega Alta soils occupy slightly higher positions on terraces.

The Jacana-Amelia-Fraternidad Association consists generally of moderately deep and deep, well-drained and moderately well-drained, nearly level to strongly sloping soils on terraces, alluvial fans and foot slopes. This association is represented at the station by soils of the Jacana series, which consist of moderately deep, well-drained soils found on the foot slopes and low rolling hills along Langley Drive and just east of the airfield. These soils formed in fine-textured sediment and residuum derived from basic volcanic rocks.

4.3.2 Regional Geology

The underlying geology of the station area is predominantly volcanic (composed of lava and tuff), as well as sedimentary (rocks derived from discontinuous beds of limestone). These rocks all range in age from early Cretaceous to middle Eocene. The volcanic rocks and interbedded limestones have been complexly faulted, folded, metamorphosed and variously intruded by dioritic rocks. This complex geological structuring occurred sometime after the deposition of the limestone during the middle Tertiary, when Puerto Rico was separated from the other major Antillean Islands by block faulting, and was arched, uplifted and tilted to the northeast. Culebra, Vieques, and the Virgin Islands are part of the Puerto Rican block; they are separated from the main island simply because of the drowning that resulted from the tilting.

In addition to the predominant volcanic and sedimentary rock, the northwestern and western sectors of the base are underlain by unconsolidated alluvial and older deposits from the Quaternary period.

The primary geologic formations on and near NSRR are various beach deposits, alluvium, quartz diorite and granodiorite, quartz keratophyre, the Daguao Formation, and the Figuera Lava. The station is traversed by the Peña Pobre fault zone.

4.3.3 Site Geology SWMU 30 - Former Incinerator

The geology at SWMU 30 is fairly straightforward. Immediately northwest of the incinerator is a very steep vegetated hill with rock outcroppings. This condition makes for shallow bedrock at SWMU 30. The overlying soils are comprised of variable bands of sand, clayey sand, and clays all with varying degrees of cementation and shell fragments. Although not evident from the boring logs, it is quite possible that some of the material may be fill. This possibility is evident when understanding that a four foot by four foot concrete tunnel is buried below parts of the site, the site is essentially on a road berm, an UST was removed from the site and the excavation backfilled, and an incinerator and related concrete pad was installed at the site, not once but twice. It is expected that the mix of fill and native soils is what explains the heterogeneous nature of the subsurface at SWMU 30.

4.4 Hydrology

The following subsections present a description of the hydrologic conditions that exist at NSRR. Both regional conditions and site specific conditions at SMWU 30 are discussed.

4.4.1 Regional Hydrology

The surface waters that flow across the northeastern plain of Puerto Rico, where the Station is located, originate on the eastern slopes of the Sierra de Luquillo mountains. Surface runoff is channeled into various rivers and streams which eventually flow into the Caribbean Sea. The Daguao River and Quebrada Seca Stream (a tributary to Rio Daguao) collect surface waters from the hills immediately north of the station, and in periods of heavy rain, on-station flooding occurs. The Daguao-Quebrada Seca watershed comprises an area of approximately 7.6 square miles (4,900 acres), and the river falls some 700 feet from its source to sea level. Increased development in the Town of Ceiba, especially in areas adjacent to the station=s northern boundary, has significantly increased the surface runoff

reaching the station, causing ponding and erosion in the Boxer Drive area. Boxer Drive, for a major portion of its length, is subject to surface water flooding, as are Hangar 200 and AIMD Hangar 379 and adjacent apron areas. This condition has been alleviated by the construction of the new highway (Route 3) immediately outside the fence and the realignment of Boxer Drive both with attendant stormwater management features.

In the low-lying shore areas, seawater flooding results from storms, wind and abnormally high tides. The tidal ranges in the Roosevelt Roads area are rather small, with a maximum spring range of less than three feet. The tides are semidiurnal and have a usual range of about one foot in the main harbor of the station.

Little information exists concerning the geohydrology of NSRR. The only known potential sources of groundwater lie in lenticular beds of clay, sand and gravel, and rock fragments which occur at a depth of less than 30 meters. No wells have been developed on-base from these layers. Some wells had been developed upgradient of the station in Ceiba, some three kilometers from base headquarters, but were abandoned due to high levels of salinity.

The quality of surface waters is variable, reflecting the drainage area through which the water flows. Generally, surface waters have high turbidities and bio-organics (naturally occurring organics, such as decay products of vegetable and animal matter) due to the periodic heavy rains which can easily erode soils from steep slopes, exposed areas, and disturbed stream beds.

Water from alluvial aquifers along the coast of the station is of a calcium bicarbonate type, and has high concentrations of iron and manganese. The source of these minerals is unknown, but they may be derived from buried swamp or lagoon deposits.

A seawater-freshwater interface is present in the aquifers throughout the coastal areas of Puerto Rico, usually within a short distance inland of the coastline.

The station water treatment plant receives its raw water from the Rio Blanco through a 27-inch reinforced concrete pipe that replaced the old, open channel. The intake is located at the foot of the El Yunque rain forest. This buried raw water line traverses a distance of 14 miles from the intake to the station boundary. A raw water reservoir is located at the water treatment plant and has a

45-million gallon capacity. Additionally, there are two fire protection storage reservoirs with a total capacity of 520,000 gallons.

The base has been served for over 30 years by the present treatment facility. The plant (Building 88) has a capacity of 4.0 million gallons per day (mgd). Water flows by gravity into a 45 million gallon raw water storage basin from which the plant draws its supply at a rate of 1.3 mgd on average. Treatment consists of pre-chlorination, coagulation, sedimentation, filtration and post-chlorination.

The single potable water supply system provides water to all industrial operations at the facility. The water supply is low in hardness, and, therefore, is an excellent source for industrial uses, particularly in boiler operation and maintenance.

Three hundred acres are used for pasture near Gate 1, and are irrigated as needed. Extensive sprinkling of lawns and green areas is evident throughout the base.

4.4.2 SWMU 30 - Hydrogeology

Groundwater at SWMU 30 occurs at depths ranging from 9 to 16 feet below ground surface during drilling. Two rounds of water level measurements were taken by BBL in June, 1994. Table 4-1 summarizes the measurements. Based on these measurements, groundwater flow was found to be to the north at an average gradient of 0.0088 (BBL, 1994). Figures 4-1 and 4-2 are groundwater elevation contour maps for the two rounds of measurements. Groundwater elevation data has not been updated beyond this investigation in accordance with EPA comments.

BBL performed slug tests in three wells (1983-MW2, 1983-MW3 and 1983-MW4) during the UST site characterization. Analysis of the slug testing shows that hydraulic conductivities ranged form 0.03 feet per day to 0.16 feet per day.

5.0 NATURE AND EXTENT OF CONTAMINATION

This section presents an overview of the chemical analytical results obtained during the various investigations at SWMU 30. The analytical results from the 1994 UST Investigation, the 1995 Phase I RFI, and the 1999 Phase II RFI Soils Investigation are presented and discussed in this section of the report. Details on the sampling and methodologies from the 1994 UST Investigation and the 1995 Phase I RFI can be found in their respective reports (BBL, 1994 and Baker, 1996) and were summarized in Section 4.0. The objective of this section is to characterize the nature and delineate the extent of potential site contamination. COPCs will be selected as part of the human health screening evaluation presented in Section 6.0. SWMU characterization data was obtained through sample collection and analysis of the surface and subsurface soil and groundwater.

SWMU-specific sample results presented in the following sections have been compared to several criteria. Organic compounds detected in soil samples were compared to their respective risk based concentrations (RBCs) for both residential and industrial conditions as determined by USEPA Region III (October 1, 1999) (USEPA, 1999a). Inorganic compounds were compared to the RBCs (USEPA, 1990a) as well as two times the average detected background levels in accordance with recent personnel correspondence with EPA Region II personnel (USEPA, 1999b). Compounds detected in the groundwater samples were compared to USEPA Region III tap water RBCs (USEPA, 1999a) as well as the federal maximum contaminant levels (MCLs) (USEPA, 1999c).

5.1 Results of the UST Site Characterization

Data was collected during the BBL UST site characterization for soils and groundwater. The investigation was performed in a stepwise manner with large amounts of screening level data being used to select locations for the obtaining of samples to be subjected to more rigorous analysis. It should be noted that the TPH data from this investigation is utilized as an indicator of extent of contamination and not for inclusion in the human health or ecological screening evaluations.

Soil Analytical Results

The laboratory analyses (provided in Appendix E) confirmed the results of the screening data. BTEX was only found at significant levels (98 micrograms per kilogram [Fg/kg]) in a single soil boring which was 1983SB-6 (4'-6'). This is the soil boring that was drilled nearest to the site of the removed UST. Concentrations of BTEX were non-detect in the other borings (with the exception of 1983SB-3 (8'-10') where 7.5 Fg/kg was seen in a single sample).

TPH was found to be present at significant levels in the area of the UST. Figure 5-1 (BBL, 1994) shows the pattern of BTEX and TPH occurrence and concentration. Table 5-1 (BBL, 1994) summarizes the results. The BBL report estimated that there were 918 cubic yards of TPH-contaminated soil at the site.

Additional analyses were performed on five selected samples. Aroclor-1260 was detected in three of the samples at concentrations of 38, 80 and 130 Fg/kg. One sample containing Aroclor-1260 was from SB-3 (6'-8'); the other two occurrences were seen in samples from SB-6 (4'-6' and 8'-10'). SB-6 also contained a number of semi-volatile organic compounds. Their presence was not confirmed in any of the other samples including the one analyzed from two feet lower in SB-6. Table 5-2 (BBL, 1994) summarizes the additional analysis results.

Groundwater Analytical Results

Groundwater laboratory analytical results indicated that the five wells sampled in 1994 contained no detectable concentrations of benzene, total BTEX, or TPH. According to Puerto Rico Environmental Quality Board (PREQB) guideline standards, the groundwater did not exhibit contamination (BBL, 1994).

5.2 Results of the 1995 Phase I RFI

The Phase I RFI was designed to assess whether operation of the incinerator had impacted soil or groundwater at the site. To accomplish this goal, a total of six surface soil and two groundwater samples were obtained.

Surface Soil

Table 5-3 shows the Phase I RFI detected concentrations of organics (and compares them to screening criteria) in the SWMU 30 surface soils. The complete analytical data are provided in Appendix F. Acetone was detected in sample 30SS04 (at an estimated level of 10 Fg/kg) and trace xylenes were detected in three of the six samples. Only samples 30SS03 and 30SS04 were analyzed for pesticides/PCBs. Aroclor-1260 was detected in each sample at 200 Fg/kg and 250 Fg/kg, respectively. All the organic compounds detected were at levels well below the EPA Region III industrial and residential RBCs.

Tables 5-4 and 5-5 shows the concentrations of detected inorganic constituents in the surface soil and how they compare to screening criteria. The complete analytical data are provided in Appendix F. arsenic, barium, chromium and lead were detected in each sample. Beryllium, cadmium, cobalt, copper, nickel, vanadium and zinc were analyzed and detected in samples 30SS03 and 30SS04 only. Mercury was detected in 30SS04 at a concentration of 0.46 milligrams per kilogram (mg/kg). Silver was found in only one sample (30SS01) at 1 mg/kg. All six samples contained arsenic above the residential but below the industrial RBC; however, all the results were well below the basewide background criteria. Figure 5-2 shows sample locations with screening criteria exceedences. Lead exceeded twice average background values in five of the six samples. Cadmium exceeded background in 30SS03 and 30SS04 since cadmium was not present in the background. Silver, also not present in the background samples, was detected in 30SS01 and shows as an exceedance.

Groundwater

No organic constituents were present in either of the groundwater samples.

Tables 5-6 and 5-7 show the concentrations of total and dissolved inorganics detected in groundwater and compares them to screening criteria. The complete analytical data are provided in Appendix F. Total antimony, barium, cobalt, copper, vanadium and zinc were found in each sample. Total arsenic, chromium, lead and nickel were detected in sample 1983MW-3 and total mercury was found in 1983DW-1. Dissolved constituents (Table 5-7) found in each sample include barium, cobalt, copper, vanadium, and zinc. In addition, dissolved antimony and mercury were present in 1983DW-1 and dissolved arsenic was found in 1983MW-3. Cyanide and sulfide were not detected in either groundwater sample.

Figure 5-3 shows the groundwater sample locations with screening criteria exceedences. Dissolved and total antimony in 1983DW-1 exceeded both the Federal MCL and the EPA Region III Tap Water RBC. Dissolved arsenic exceeded the Tap Water RBC in 1983MW-3. Total antimony exceeded both the MCL and tap water RBC in the sample from 1983MW-3. Total zinc exceeded the tap water RBC and two times the average detected background in 1983DW-1 and total arsenic did the same in 1983MW-3. Dissolved vanadium exceeded two times the average detected background in both samples.

5.3 Background Conditions

Background for NSRR was established by sampling at sites remote from any potential impact from waste management activities. The background samples were obtained from a series of four monitoring wells installed along Boxer Drive northwest of the Crash Crew area (see Figure 3-3). [Note: the full rationale for background locations was provided in the approved RFI report for SWMU 7/8 (Tow Way Fuel Farm) (Baker, 1997b)]. The background samples were analyzed for the full Appendix IX parameter list. Tables 5-8 through 5-13 present the positive detections of the analytical testing of background samples. The full data set is provided in Appendix D. The analytical results are discussed in the sections that follow.

5.3.1 Surface Soil

Table 5-8 presents those organic compounds detected in the background surface soil samples collected from the four background monitoring wells. There were no VOCs, pesticides/PCBs, dioxins, chlorinated herbicides, or op-pesticides detected in this sample set, however, three Semivolatile Organic Compounds (SVOCs) [butylbenzylphthalate, bis(2-ethylhexyl) phthalate, and fluoranthene] were detected in sample BGMW01-00. These concentrations did not exceed their respective RBCs (residential or industrial).

Of the inorganic compounds detected in the background surface soil samples, (Table 5-9) only the compound arsenic exceeded the residential RBC for soil (0.43 mg/kg). A review of Table 5-9 shows that exceedances occurred in samples BGMW01-00, BGMW03-00, and BGMW04-00. Arsenic concentrations in excess of the residential RBC ranged from 1.2 mg/kg at BGMW01-00 to 1.8 mg/kg at BGMW04-00. Further review shows that these concentrations are below the industrial RBCs for soil. No other compound in the sample set exceeded either the residential or industrial RBC for soil.

5.3.2 Subsurface Soil

Trace concentrations of organic compounds (VOCs, SVOCs, dioxins, and chlorinated herbicides) were detected in the background subsurface soil sample set as shown in Table 5-10. Detected compounds included xylene, di-n-butyl phthalate, total Hexachlorodibenzo-p-dioxin (HxCDD), and 2,4,5-T. Of these compounds, only total HxCDD exceeded the residential RBC for soil of 0.043 µg/kg in sample BGMW03-03 with a concentration of 0.31J µg/kg. This concentration was below

the industrial soil RBC. No other compound in the sample set exceeded either the residential or industrial RBC for soil.

A comparison of background subsurface soil inorganic concentrations to the residential RBCs show that arsenic is the only compound detected that exceeds the screening criteria (Table 5-11). Arsenic concentrations exceeded the screening criteria in all of the samples except BGMW01-06 (nondetect). Concentrations ranged from 0.71J mg/kg at BGMW02-05, to 2.4J mg/kg at BGMW03-03. All inorganic concentrations in this sample set were below their respective industrial RBCs for soil.

5.3.3 Groundwater

As presented in Table 5-12, the background groundwater quality shows there were no VOCs present above their respective method detection limits. Three SVOCs were above their method detection limits in this sample set, including acetophenone, bis(2-ethylhexyl)phthalate, and dimethylphthalate. Acetophone exceeded the tap water RBC in sample BGMW03, with a concentration of 1J micrograms per liter (Fg/l). The concentration of bis(2-ethylhexyl)phthalate in sample BGMW03 (7J Fg/l) exceeded both the Federal MCL and the EPA Region III Tap Water RBC. There were no pesticides/PCBs, dioxins, chlorinated herbicides, or op-pesticides detected in any of the groundwater samples in this set.

Table 5-13 presents those inorganic compounds detected in the background groundwater samples for total inorganics. A total of twelve inorganic constituents were detected in this sample set. Three of these twelve (arsenic, cadmium, and vanadium) exceeded at least one of the listed criteria. The concentrations of arsenic ranged from 1.7J Fg/l in sample BGMW03, to 3.6 Fg/l in sample BGMW04 which are above the Tap Water RBC of 0.04 Fg/l, but below the Federal MCL. Cadmium exceeded the Federal MCL of 5 Fg/l in sample BGMW01, with a concentration of 7.5 Fg/l. The concentration of vanadium (549 Fg/l) in sample BGMW04 was detected in excess of the tap water RBC. No other constituent in this sample set exceeded either of the listed criteria.

Table 5-13 presents concentrations of dissolved inorganics which were above their method detection limits. Seven inorganic constituents were detected in this sample set. However, none of the seven constituents exceeded any of the listed criteria.

5.4 Results of the 1999 Phase II RFI Soils Investigation

This section discusses the nature and extent of contamination at SWMU 30. Included in this section is a discussion of the 1999 Phase II RFI Soils Investigation analytical data.

5.4.1 Surface Soil

Seven SVOCs, the PCB isomer Aroclor-1260, diesel-range (DRO) TPH, and gasoline-range (GRO) TPH were the only organic compounds detected in the surface soil (0-2.5 feet below ground surface [ft bgs]) samples (Table 5-14). Benzo(a)pyrene was the only SVOC which exceeded the screening criteria (EPA Region III RBC of 87 Fg/kg) at 30-HP04-01D (Figure 5-4). Aroclor-1260 exceeded the screening criteria (EPA Region III RBC of 319 Fg/kg) at 30HP02 and 30HP05 (Figure 5-4). 30HP02 and 30HP05 are located north of the former incinerator building. DRO and GRO TPH was detected at low levels (near or below method detection limits) and well below the PREQB screening level of 100 mg/kg which is a number used for combined DRO/GRO.

Table 5-15 presents the analytical detections of antimony in surface soil. Antimony was detected in 30HP01 through 30HP05 at concentrations below method detection. Because of different laboratories and better equipment, the method detection limits (MDLs) of the Phase II Soils Investigation are lower than those used in the background soils. Additionally, the ability to detect compounds below MDLs has improved with time. For this reason, antimony was detected at low levels at SWMU 30. Antimony did not exceed EPA Region III RBCs, nor did it exceed human health risk criteria and ecological risk criteria thresholds (Sections 6.0 and 7.0, respectively); therefore, showing antimony concentrations on exceedence figures and concentration isopleths is not warranted.

5.4.2 Subsurface Soil

Several organic compounds were detected in the subsurface soil samples (Table 5-16). The volatile organics benzene and toluene were detected at 4.9 mg/kg (both the same concentration) in 30HP04-02. Several PAHs were detected in 30HP04-03 but only 2-methylnaphthalene was present at a quantifiable concentration (6,100 mg/kg); the remainder were present at levels that could only be estimated by the lab. Bis(2-ethylhexyl)phthalate was detected at estimated levels in 30HP03-03 and 30HP04-03. This

is a common plasticizer and is likely present as an artifact of laboratory plasticware. None of these compounds exceeded their respective industrial or residential RBCs.

Aroclor-1260 was detected in eight of the ten samples in which it was analyzed. In 30HP04-02 and 30HP05-03, the concentrations exceeded the residential RBC but were below the TSCA cleanup criteria. Figure 5-5 shows the locations of the RBC exceedances. It should be noted that the industrial RBC was not exceeded at any location.

Diesel and gasoline-range TPH was detected in 16 of the 19 samples. Gasoline-range TPH was detected less frequently than diesel-range TPH and at generally low levels with many concentrations only being estimated by the laboratory. The highest GRO concentration was 5.7 mg/kg in 30HP05-03. Diesel-range TPH was more prevalent and at higher concentrations than GRO. This is not unexpected since the reported contents of the UST that was removed from the site was diesel used to fuel the former incinerator. Only in sample 30HP04-03 did DRO exceed the PREQB guideline criteria of 100 mg/kg with a concentration of 1,800 mg/kg

Antimony was the only inorganic compound analyzed. Antimony was detected below method detection limits in subsurface soil samples from borings 30HP01 to 30HP05 (Table 5-17). For the same reasons discussed in Section 5.3.1 concentration isopleths and criteria exceedence figures were not produced.

5.4.3 Quality Assurance/Quality Control Sample Results

A portion of the QA/QC sampling efforts consisted of equipment rinsates, field blanks, and trip blanks. Table 5-18 presents the detected constituents in the QA/QC samples. The complete set of the analytical results from the QA/QC sampling is presented in Appendix G.

The volatile organics chloroform and bromodichloromethane were detected in one field blank. These compounds are likely the result of chlorination of the potable water source. The compounds were not detected in the SWMU samples.

Arsenic, barium, copper, lead, vanadium and zinc were all sporadically detected, at very low concentrations, in the QA/QC samples.

Based on the results of the QA/QC samples, sampling and analysis techniques did not impact site samples.

5.5 Summary

The three investigations performed at the site are difficult to compare since each was done for a different reason. While this is the case, some general conclusions can be drawn particularly for PCBs and fuel-related compounds.

The 1994 BBL UST Site Characterization and the Phase II RFI Soils Investigation both include analyses for BTEX. Both investigations indicated that, while sporadic detections of BTEX were present at low levels, there is no apparent pattern. In fact, benzene and toluene were only detected in a single subsurface soil sample (both at 4.7 mg/kg) during the Phase II work.

TPH analyses were also done during the UST Site Characterization and the Phase II RFI Soils Investigations. The results of the 1994 UST Site Characterization indicated that there was a significant area of TPH contamination present around the UST location at levels exceeding the PREQB guideline of 100 mg/kg (Figure 5-1). The Phase II RFI Soils Investigation found TPH in nine of the eleven samples. Only one sample contained TPH above the PREQB guideline (30HP04-03 at 1,800 mg/kg). The next highest detection was only 47 mg/kg. It appears that TPH levels have been reduced over time by natural biological degredation.

Benzo(a)pyrene was detected in a single surface soil sample at a level above the residential RBC. The same sample also contained six other SVOCs at concentrations below the RBCs. The sample in which the detections were found was a duplicate of a primary environmental sample. No benzo(a)pyrene or other SVOC was found in the primary sample. The soil sampling procedures included homogenization of the soil sample prior to being placed in the sample containers. It is, therefore, difficult to see how the two samples diverged so much in their SVOC results. Regardless, the failure to confirm the presence of the SVOCs in the duplicate sample would indicate that benzo(a)pyrene is not a site-wide problem.

The PCB isomer Aroclor-1260 was detected in all three investigations. The detections in the UST Site Characterization and the Phase I RFI were below the screening criteria, including current EPA Region III RBCs. Only in the recent Phase II RFI Soils investigation was Aroclor-1260 detected above EPA

Region III residential RBCs. These detections above RBCs were limited to the area immediately north of the former incinerator.

Antimony was found to be present at levels that concerned the EPA during their review of the Phase I RFI results. For this reason, analysis for antimony was included in the Phase II Soils Investigation. Antimony was found in all five of the surface and subsurface soil samples at levels below 1 mg/kg. All the detections were below the residential RBC (31 mg/kg).

More data overlap exists with the groundwater data. Wells 1983-MW1 and 1983-MW3 were sampled during the UST Site Characterization and the Phase I RFI. No organic compounds were detected in either investigation.

6.0 HUMAN HEALTH SCREENING EVALUATION

A Human Health Screening Evaluation (HHSE) was prepared for SWMU 30 located on NSRR, Puerto Rico. This site is currently inactive and accessed only by military personnel and site workers. The purpose of this HHSE is to assist in determining if this location on the NSRR could potentially pose a human health risk by comparing the soil and groundwater site investigation data (presented in Section 5.0) to naturally occurring background concentrations and health based screening criteria.

A screening approach was applied to SWMU 30, rather than a comprehensive human health risk assessment because of its relatively small size and the limited number of contaminants observed in environmental samples. Therefore this HHSE focuses on Aroclor-1260, benzo(a)pyrene and several inorganics (antimony, arsenic, and vanadium) in groundwater.

6.1 Data Evaluation

During the RFI seven surface soil samples, ten subsurface soil, and two groundwater samples were collected. Appendix F presents those chemicals detected in surface and subsurface soil. Fifteen inorganic chemicals, two volatile organic (VOCs) chemicals, nine semi-volatile chemicals (SVOCs) including benzo(a)pyrene and Aroclor-1260 were detected in surface soil. Antimony was detected in subsurface soil, as was benzene, toluene, seven SVOCs, and Aroclor-1260. Eleven total inorganic and eight dissolved inorganic chemicals were detected in groundwater samples (Appendix F). No organic chemicals were detected in groundwater.

6.2 Conceptual Exposure Assessment

SWMU 30 is an inactive incinerator. The area is heavily vegetated with limited opportunities for exposure to surface soil by on-site workers and military personnel. There are no current exposures to subsurface soil or groundwater. The future use of this site could potentially be residential or light industrial. Thus, potential exposures to surface soil, subsurface soil, and groundwater exist for future

residents and construction workers. The pathways and receptors considered for this HHSE are summarized in the following table:

		Future			Current
		Residential		Construction Worker	On-Site Worker
		Adult	Child	Adult	Adult
Surface Soil					
	incidental ingestion	X	X	X	X
	dermal contact	X	X	X	X
	inhalation of particulates	X	X	X	X
	inhalation of volatiles	X	X	X	X
Subsurface Soil					
	incidental ingestion			X	
	dermal contact			X	
	inhalation of particulates			X	
	inhalation of volatiles			X	
Groundwater					
	incidental ingestion	X	X	X	
	dermal contact	X	X	X	
	inhalation of volatiles	X	X		

6.3 Tiered Screening of Chemicals of Potential Concern

A tiered screening approach was used to identify chemicals of potential concern (COPCs). COPCs are those chemicals having the greatest potential to affect human health and the environment. COPCs were selected by first comparing the maximum inorganic chemical concentrations detected in the environmental samples to two times the average background concentrations (USEPA, 1999a). In accordance with USEPA Risk Assessment Guidelines comparison with background concentrations is only applicable to inorganic chemicals. It is assumed that while some organic chemicals may be ubiquitous in nature, it is unlikely that the majority of organic chemicals found on a site are naturally occurring (USEPA, 1989). On this basis, only inorganic chemicals were screened in Tier I of this HHSE. Any chemical exceeding two times the average background for its respective chemical was retained for further analysis in Tier II. All organic chemicals were retained for analysis in Tier II. The following chemicals that were identified as COPCs from the Tier I process are summarized in the table that follows and presented in Tables 6-1, 6-2, and 6-3.

Surface Soil	Subsurface Soil	Total Inorganics in Groundwater	Dissolved Inorganics in Groundwater
Antimony Cadmium Lead Mercury Silver	Antimony	Antimony Arsenic Mercury Zinc	Antimony Arsenic Mercury Vanadium

The Tier II screening process was conducted by comparing the chemicals in environmental samples to RBCs (USEPA 1999b). RBCs were derived using conservative USEPA promulgated default values and the most recent toxicological criteria available. RBCs for potentially carcinogenic and noncarcinogenic chemicals were individually derived based on a target incremental lifetime cancer risk (ICR) of $1x10^{-6}$ and a target hazard quotient (HQ) of 1.0, respectively. For potential carcinogens, the toxicity criteria applicable to the derivation of the RBCs are chronic oral and inhalation cancer slope factors; for noncarcinogens they are oral and inhalation reference doses. Noncarcinogenic RBCs were adjusted downward to correspond to a target HQ of 0.1 rather than 1 to ensure that chemicals with additive effects are not prematurely eliminated during screening (USEPA 1999b).

The maximum detected concentration of each organic chemical detected in surface soil and subsurface soil and those inorganic chemicals identified as COPCs in the Tier I process were compared to the Region III residential and industrial soil RBC values and tap water criteria. No organic chemicals were detected in groundwater; thus, they were not evaluated in this HHSE.

A summary of the COPCs identified in this Tier II process is presented below. No chemicals in the surface or subsurface soil exceeded the industrial RBC value (Table 6-4). Benzo(a)pyrene and Aroclor-1260 exceeded the residential RBC value in surface soil (Table 6-5), and Aroclor-1260 exceeded the residential RBC value in subsurface soil (Table 6-6). In groundwater total inorganics exceeded RBC tap water criteria for antimony, arsenic, and zinc (Table 6-7). Dissolved inorganic COPCs that were identified include antimony, arsenic, and vanadium (Table 6-8).

Surface Soil	Subsurface Soil	Total Inorganics in Groundwater	Dissolved Inorganics in Groundwater
Benzo(a)Pyrene PCB - 1260	PCB - 1260	Antimony Arsenic Zinc	Antimony Arsenic Vanadium

6.4 Risk Characterization

Soil

Aroclor-1260 was retained for quantitative evaluation at SWMU 30. The maximum detected surface soil concentration for Aroclor-1260 is 1.4 mg/kg detected at sample location 30HPO5-01. Aroclor-1260 was also detected in subsurface soil samples at concentrations slightly higher (2.0 mg/kg at location 30-HP05-03, 8 to 9 inches bgs) than those detected at the surface.

The site conceptual model for SWMU 30 indicates that the area is currently used for industrial purposes and access is available to military personnel and on-site workers. As a result, the potential for current exposure to Aroclor-1260 in soil is limited. *USEPA's Guidance on Remedial Action for Superfund Sites With PCB Contamination* (USEPA, 1990) indicates that PCBs in residential area soil at concentrations ranging from 1 mg/kg to 10 mg/kg produce potential human health risks which fall within USEPAs generally acceptable risk range ($1x10^{-6}$ to $1x10^{-4}$). This is also true for SWMU 30.

By applying a simple screening approach using the USEPA Region III residential RBC value presented in Table 6-5 a risk of $4 x10^{-6}$ can be calculated for surface soil, and $6 x 10^{-6}$ can be calculated for subsurface soil. This is done by dividing the maximum detected surface soil value by the residential RBC value (which is established for a $1x10^{-6}$ target risk) and multiplying by $1x10^{-6}$. The RBC value only considers exposure by ingestion, but doubling the estimated risk for the SWMU 30 maximum detected PCB-1260 soil concentration produces a risk of approximately $9x10^{-6}$ in surface soil, and $1x10^{-5}$ in subsurface soil. This semi-quantitative value accounts for potential risk associated with the dermal pathway, which is typically less than the risk associated with the ingestion pathway. This conservative estimate of risk falls within the acceptable risk range.

Table 6-9 presents the most recent risk-based criteria and remediation regulations for PCBs. In 1998, USEPA published the Disposal of PCBs-Final Rule, which amended the rules under the Toxic Substances Control Act (TSCA). Under this final rule, low occupancy area bulk materials (i.e., soil, sediments, sludges, etc.) can be remediated to less than 25 mg/Kg. Low occupancy areas are characterized by estimated exposure time not exceeding 6.7 hours per week times a 50-week exposure year. EPA allows a PCB cleanup level of 1.0 mg/Kg in bulk material at high occupancy areas.

It should, therefore, be noted that SWMU 30 contains PCB levels closer to those allowed to remain in high occupancy areas even if no corrective action is taken. Given the nature of SWMU 30 and the limited potential for exposure, risks associated with PCBs in surface soil or subsurface soil (maximum detected value = 2.0 mg/kg) will fall within USEPA's acceptable risk range for any current or future land use.

Using a similar approach to that taken for PCB-1260, a risk for benzo(a)pyrene was calculated. The single detection of 0.20 mg/kg was divided by its respective residential RBC value of 0.088 mg/kg. A carcinogenic risk of 2×10^{-6} was calculated for surface soil. The value falls within EPA acceptable carcinogenic risk of $1x10^{-4}$ to $1x10^{-6}$.

Groundwater

COPCs in groundwater samples include antimony, arsenic, vanadium, and zinc. The maximum concentration for each of these COPCs was divided by its respective tap water RBC value. The RBC values are either calculated based on carcinogenic or non-carcinogenic effects. For non-carcinogenic effects, hazard indices of 2.1, and 6.6, were calculated for antimony and zinc in non-filtered groundwater samples. For filtered groundwater samples, a hazard index of 1.5, and 0.7 was calculated for antimony and vanadium, respectively. For carcinogenic effects, arsenic may potentially contribute an increased cancer risk of $1x10^{-4}$ in non-filtered groundwater samples and 7.5×10^{-5} in filtered groundwater samples.

6.5 Data Gaps and Limited Use of Data

Benzo(a)pyrene was detected one time in surface soil sample 30-HP04-01 at 0.20 mg/kg of which exceeded the residential RBC value of 0.088 mg/kg (Table 6-5). This sample is a duplicate sample. Benzo(a)pyrene was not detected in the original sample, nor was it detected in subsurface soil. Regardless of the uncertainty in the precision and accuracy of this result, benzo(a) pyrene was retained for analysis in this HHSE.

Antimony, arsenic, zinc, and vanadium exceeded their respective Region III tap water criteria. However, there is some uncertainty in using this data for developing an understanding of potential human health risk. There is a limited amount of data; only one round of sampling was collected from two monitoring points in 1995. It would be expected that groundwater levels and conditions would

vary greatly at NSRR due to rainfall, and tropical storms. Regardless, these COPCs were retained for analysis in this HHSE.

6.6 Conclusions

The results of this HHSE indicate that a potential risk may exist in the residential/potable use scenario for groundwater based on a review of two samples collected in the first phase of the RFI. Based on a semi-quantitative evaluation, the noncarcinogenic risk for antimony in groundwater appears to be two times greater than the acceptable HI of 1, and almost seven times greater for zinc. Exposures to arsenic may contribute an increased cancer risk of $1x10^{-4}$. This value is not greater than the acceptable EPA risk range of $1x10^{-4}$ to $1x10^{-6}$. In addition exposures to benzo(a)pyrene and PCB-1260 were evaluated for increased cancer risk. Both fall within acceptable EPA limits.

7.0 ECOLOGICAL SCREENING EVALUATION

An ecological screening evaluation was conducted at SWMU 30 to determine if ecological COPCs are present in surface soil and groundwater. Subsurface soil was excluded from this ecological screening evaluation since ecological exposures are not expected to occur at the depth samples were collected from (6 to 7 feet bgs and 8 to 9 feet bgs).

The SWMU 30 surface soil and groundwater data for inorganics were initially compared to background data (see Section 6.3). Inorganics with maximum detected concentrations less than two times average background concentrations were eliminated as ecological COPCs (USEPA, 1999b). Potential exposure pathways for inorganics with maximum detected concentrations greater than two times average background concentrations, as well as potential exposure pathways for all detected organic compounds were evaluated to identify possible complete exposure pathways. Maximum detected concentrations for those inorganic and organic compounds with possible complete exposure pathways were compared to applicable criteria and toxicological benchmarks (e.g., screening thresholds). Inorganic and organic compounds with maximum detected concentrations exceeding screening thresholds were identified as ecological COPCs.

7.1 Comparison of SWMU 30 Surface Soil and Groundwater Data to Background Data

The comparison of SMUW 30 surface soil and groundwater data to background data was presented in Section 6.3 and summarized in Table 6-1, Table 6-2, and Table 6-3. The comparison identified several metals in surface soil and groundwater (total recoverable and dissolved) that had maximum detected concentrations greater than two times average background concentrations. These metals, identified below, have been retained as ecological COPCs for further evaluation (e.g., comparison to screening thresholds).

Surface Soil	Groundwater (Total Recoverable Fraction)	Groundwater (Dissolved Fraction)
Antimony	Antimony	Antimony
Cadmium	Arsenic	Arsenic
Lead	Mercury	Mercury
Mercury	Zinc	Vanadium
Silver		

Several organic compounds were also detected in the SWMU 30 surface soil samples and retained as ecological COPCs. The detected organic compounds were acetone, xylenes (total), benzo(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(a)pyrene, chrysene, fluoranthene, pyrene, and Aroclor-1260. Organic compounds were not detected in the SWMU 30 groundwater samples.

7.2 Evaluation of Potential Exposure Pathways

In order for an exposure to occur, a complete exposure pathway must exist with the following conditions:

- A source and mechanism of chemical release into the environment;
- An environmental transport medium;
- A point of potential contact with the medium; and
- A feasible exposure route at the contact point.

This ecological screening evaluation considered potential receptor exposures to the ecological COPCs in surface soil, groundwater, surface water (freshwater and saltwater), sediments, and air. A discussion of each potential exposure pathway is present in Sections 7.2.1 to Section 7.2.4. A summary of the exposure pathway evaluation is presented in Section 7.2.5.

7.2.1 Surface Soil Exposure Pathway

The release source for the surface soil exposure pathway is the incinerator that was formerly used to burn flammable waste and an associated underground storage tank. Potential ecological receptors (e.g., plants, soil invertebrates, terrestrial reptiles, birds, and mammals) may be exposed to chemicals in surface soil by direct uptake, dermal adsorption, incidental ingestion, and food chain transfer. It is noted that the underground storage tank has been removed along with the incinerator that originally operated. [Note: The incinerator presently on the site has never been used.]

As depicted in Figure 7-1, SWMU 30 occupies a thin strip of land between a steep, relatively unvegetated rock slope and the former landfill access road. Immediately across the road from SWMU 30 is the Forrestal Wastewater Treatment Plant and 100 yards down the road is the start of the Base Landfill. Other notable structures in the immediate vicinity of SWMU 30, as depicted on Figure 7-1,

include the Material Recovery Facility and Building 38 (Old Power Plant). The existing ground cover at SWMU 30 is approximately 70 percent vegetation, represented by a single vegetative unit, and 30 percent gravel (gravel parking lots). The approximate surface area of the vegetative unit is 7,500 square feet (0.07 hectares).

Given the location of SWMU 30 in relation to other structures (see Figure 7-1), access to the SWMU 30 vegetative unit by terrestrial mammals is restricted. In addition, the relatively small size of the vegetative unit most likely limits its utilization by other potential terrestrial receptors, notably terrestrial birds which typically have home ranges much greater than 0.07 hectares (USEPA, 1993). For these reasons, the surface soil exposure pathway for terrestrial birds and mammals most likely represents an insignificant exposure pathway and will not be evaluated further. It is noted that a habitat evaluation has not been conducted at SWMU 30; therefore, utilization of the vegetative unit by terrestrial receptors has not been documented.

The surface soil exposure pathway is considered a possible complete exposure pathway for plants, soil invertebrates (i.e., earthworms), and microorganisms. Direct uptake by plants, ingestion and dermal adsorption by earthworms, and direct contact by microorganisms was evaluated by comparing the surface soil analytical data to screening thresholds developed by Oak Ridge National Laboratory (ORNL) (see Section 7.3.1).

7.2.2 Groundwater Exposure Pathway

The potential release source for the groundwater exposure pathway is contaminated surface soil and subsurface soil, with leaching serving as the release mechanism. Although a potential source and mechanism of release exist, the groundwater exposure pathway does not represent a complete exposure pathway for the following reasons:

- There are no surface expressions of groundwater (e.g., seeps, springs, etc.); and
- Groundwater is not inhabited by ecological receptors

Ecological receptors may potentially be exposed to the ecological COPCs in groundwater only if the groundwater discharges to surface water (freshwater or marine). An evaluation of potential exposures resulting from the discharge of groundwater to surface water is addressed in the discussion of the surface water and sediment exposure pathway presented in the section that follows.

7.2.3 Surface Water and Sediment Exposure Pathway

The potential release sources for the surface water and sediment exposure pathway are surface soil and groundwater. Ecological COPCs detected in surface soil and groundwater may reach surface water and sediment via surface water run-off from unvegetated areas and groundwater seepage, respectively.

There are no permanent freshwater streams, ephemeral freshwater streams, or other freshwater bodies (i.e., lakes, ponds, etc.) within or adjacent to SWMU 30. Furthermore, there are no drainage features (i.e., drainage ditches, swales, etc.) that may serve as temporary freshwater habitat or migration pathways to freshwater habitat. Any overland flow would likely travel toward the former landfill access road where it could remain ponded until it evaporated or infiltrated into the soil. Therefore, the freshwater exposure pathway is not a complete exposure pathway at SWMU 30.

The site hydrology indicates that groundwater flow from SWMU 30 is toward northeast and eventually to the Caribbean Sea. As a result, marine aquatic life (phytoplankton, invertebrates, and fish) may potentially be exposed to ecological COPCs that have migrated to the offshore marine environment. If present, marine mammals and piscivorous birds utilizing biota in the offshore marine environment may also potentially be exposed to ecological COPCs that have migrated with the groundwater. Potential exposure routes are incidental ingestion of surface water and sediment, dermal contact with surface water and sediment, and food chain transfer.

Marine surface water and sediment samples have not been collected at potential groundwater discharge points to the Caribbean Sea; therefore, it is not known if chemicals detected in the SWMU 30 groundwater samples are migrating to the offshore marine environment. However, given the close proximity of SWMU 30 to the Caribbean Sea, migration to this offshore marine environment is possible. As a result, the marine surface water and sediment exposure pathway is considered a possible complete exposure pathway.

The evaluation of this possible complete exposure pathway was limited to a comparison of groundwater data directly to USEPA Saltwater National Ambient Water Quality Criteria (NAWQC) (USEPA, 1999d). This is considered an extremely conservative evaluation because attenuation and dilution are not considered. The pathway-specific exposure routes addressed by the comparison of groundwater data to USEPA NAWQC are those associated with marine aquatic life (e.g., incidental ingestion and dermal adsorption).

The lack of surface water and sediment analytical data prevents an evaluation of all potential pathway-specific exposure routes for surface water. It is noted that the marine exposure pathway for all potential ecological receptors, including marine aquatic life, is likely insignificant because COPCs in groundwater would be subject to dilution/attenuation during advective transport, as well as dilution upon discharge to the offshore marine environment

7.2.4 Air Exposure Pathway

The potential release source for the air exposure pathway is exposed surface soil. The release mechanism is suspension of soil particles into ambient air from exposed soil, with the exposure route being inhalation. Potential ecological receptors include terrestrial reptiles, birds, and mammals.

As discussed in Section 7.2.1, the existing ground cover at SWMU 30 is approximately 70 percent vegetation and 30 percent gravel (gravel parking lots). The vegetation and gravel cover at SWMU 30 most likely mitigates the suspension of soil particles from wind erosion. For this reason, the air exposure pathway would likely represent an insignificant exposure pathway and will not be evaluated further.

7.2.5 Summary of the Evaluation of Potential Exposure Pathways

A summary of the evaluation of potential exposure pathways presented in the preceding sections, including the identification of possible complete exposure pathways and pathway-specific exposure routes, is provided in Table 7-1. The surface soil exposure pathway for soil organisms is the most probable exposure pathway at SWMU 30.

7.3 Ecological Screening Thresholds

The screening thresholds used in this ecological screening evaluation were selected to address those ecological COPCs for which a possible complete exposure pathway exists. Direct uptake by plants and ingestion and dermal adsorption by soil invertebrates were evaluated by comparing surface soil analytical data to toxicological benchmarks established by the ORNL. Potential impacts to marine aquatic life resulting from the potential migration of ecological COPCs in groundwater were conservatively evaluated by comparing groundwater data directly to available saltwater NAWQC. For those chemicals without established NAWQC, analytical data were compared to literature toxicity

values. A description of the surface soil and surface water screening thresholds is provided in the sections that follow.

7.3.1 Surface Soil Screening Thresholds

ORNL has established surface soil screening thresholds for earthworms, microorganisms and microbial processes (Efroymson, et. al., 1997a) and plants (Efroymson, et. al., 1997b). The method used by ORNL to derive the surface soil screening thresholds was based on the National Oceanographic and Atmospheric Administration's (NOAA's) method for deriving Effects Range-Low (ER-L) sediment screening benchmarks (Long and Morgan, 1990). Initially, Lowest Observed Effect Concentration (LOEC) values reported in the literature for soil toxicity studies were compiled and rank-ordered. A 20 percent reduction in growth, reproduction, or activity (e.g., EC_{20}) was used as the threshold for significant effects. After rank-ordering the LOEC literature values, the tenth percentile of these data were approximated. If there were ten or fewer values for a chemical, the lowest LOEC was used. If there were more than ten values, the tenth percentile LOEC value was used. If the tenth percentile fell between LOEC values, a value was chosen by interpolation.

The ORNL surface soil screening thresholds are intended to be threshold values for significant effects on growth, reproduction, or activity. Therefore, when a benchmark is based on a median lethal concentration (LC_{50}), the concentration of chemical that causes a 50 percent reduction in survival, that value was divided by a factor of five to approximate the ratio LC_{50}/EC_{20}. The screening thresholds for earthworms, microorganisms and microbial processes, and plants are summarized in Table 7-2 for those chemicals retained as ecological COPCs following the comparison to background data. Included in Table 7-2 is the level of confidence (low, medium, or high) assigned to each benchmark by the authors of the ORNL documents. The criteria used by the authors to best reflect the confidence in each screening threshold were as follows:

- Low Confidence: screening thresholds based on fewer than 10 literature values
- Moderate Confidence: screening thresholds based on 10 to 20 literature values
- High Confidence: screening thresholds based on over 20 literature values

7.3.2 Surface Water Screening Thresholds

USEPA Saltwater NAWQC for aquatic life contain two expressions of allowable magnitude: a criterion maximum concentration (CMC) to protect against acute (short-term) effects and a criterion continuous concentration (CCC) to protect against chronic (long-term) effects. Available saltwater NAWQC for those metals retained as ecological COPCs following the comparison to background data are summarized in Table 7-3. The criteria are expressed as total recoverable and dissolved concentrations. The total recoverable metals criteria were derived by dividing the dissolved criteria by the appropriate USEPA Conversion Factor (CF) (USEPA, 1999d).

Saltwater criteria (CMC and CCC values) have not been established for antimony and vanadium. For these metals, detected concentrations were compared to available saltwater toxicity data compiled by the USEPA in the Aquatic Toxicity Information Retrieval (AQUIRE) database (Table 7-4). AQUIRE is a web-based application available through the USEPA ECOTOX search page (USEPA, 1999e). As evidenced by Table 7-4, the AQUIRE toxicity test data for antimony and vanadium are limited to total recoverable, acute toxicity test data reported as either 48-hour median effective concentration (EC_{50}), 96-hour EC_{50}, or 96-hour LC_{50} values.

7.4 Comparison of SWMU 30 Surface Soil and Groundwater Data to Screening Thresholds

A comparison of the surface soil analytical data (range of positive detections) to ORNL surface soil screening thresholds is provided in Table 7-5. In addition to the range of positive detections, frequencies of detection are also shown. A comparison of the dissolved and total recoverable metal groundwater data to available saltwater NAWQC (CMC and CCC values) is provided in Table 7-6 and Table 7-7, respectively.

7.4.1 Comparison of Surface Soil Data to ORNL Screening Thresholds

The maximum detected concentration of antimony, cadmium, lead, mercury, silver and Aroclor-1260 in the SWMU 30 surface soil samples was less than their respective surface soil screening thresholds; therefore, these metals and Aroclor-1260 are eliminated as ecological COPCs for surface soil.

The only metals with detected concentrations greater than ORNL screening thresholds are mercury and lead. The concentration of lead detected in samples 30SS01 (55.6J mg/kg), 30SS02 (53.4 mg/kg), and 30SS03 (101 mg/kg) is greater than the screening threshold for plants (50 mg/kg), while the concentration of mercury detected in sample 30SS05 (0.46 mg/kg) is greater than the screening threshold for plants and earthworms (0.3 mg/kg and 0.1 mg/kg, respectively). These metals are retained as ecological COPC for surface soil.

ORNL screening thresholds for acetone, xylenes (total) and the polyaromatic hydrocarbons (PAH) compounds detected in surface soil at SWMU 30 have not been established (see Table 7-2). Because these constituents cannot be compared to screening thresholds, they are retained as ecological COPCs for surface soil. It is noted that these organics were not detected in the background surface soil samples; therefore, their presence in the SWMU 30 samples cannot be attributed to anthropogenic background levels.

7.4.2 Comparison of Groundwater Data to NAWQC and AQUIRE Toxicity Data

Total recoverable and dissolved mercury were detected in sample 1983-DW1 at 0.23J µg/L and 0.18J µg/L, respectively. Total recoverable and dissolved arsenic were detected in sample 1983-MW3 at 4.4 µg/L and 3.0 µg/L, respectively. As evidenced by Table 7-5 and Table 7-6, the total recoverable and dissolved mercury and arsenic concentrations detected in the SWMU 30 groundwater samples are less than applicable CMC and CCC values. Therefore, these two metals (total recoverable and dissolved fractions) have been eliminated as ecological COPCs for groundwater.

The total recoverable concentration of zinc detected in sample 1983-DW1 (72,000 µg/L) is greater than the total recoverable CMC and CCC value for this metal (95 µg/L and 86 µg/L, respectively). However, the dissolved zinc concentration detected in this sample (27.6 µg/L) is less than the dissolved zinc CMC and CCC value (90 µg/L and 81 µg/L, respectively). It is noted that current USEPA policy is to express metals criteria as dissolved concentrations since dissolved metals more closely approximate the bioavailable fraction of metals in the water column (USEPA, 1995 and 1999d). One reason is that the primary mechanism for water column toxicity (adsorption at the gill surface) requires metals to be in the dissolved form. Therefore, it is likely that the total recoverable zinc detected in sample 1983-DW1 is not biologically available. Given that current USEPA policy to express metals criteria as dissolved concentrations, and the dissolved zinc concentration detected in sample 1983-DWI is less than the dissolved CMC and CCC, total recoverable zinc is not retained as an ecological COPC for groundwater.

As was previously discussed in Section 7.3.2, antimony and vanadium do not have established NAWQC. Detected concentrations were compared to available toxicity data from the USEPA AQUIRE database. As evidenced by Table 7-4, the available data for antimony are limited to a 96-hour EC_{50} for the diatom *Skeletonema costatum* (USEPA, 1978), a 96-hour LC_{50} for *Mysidopsia bahia* (opossum shrimp) (USEPA, 1978), two 96-hour LC_{50} values for *Fundulus heteroclitus* (mummichog) (Dorfman, 1977), and a 96-hour LC_{50} for *Cyprinodon variegatus* (sheepshead minnow) (Heitmuller, et., al. 1981). The lowest acute value reported in the literature was the 96-hour EC_{50} value for *Skeletonema costatum* and the 96-hour LC_{50} value for the opossum shrimp (>4,150 µg/L). This acute effect concentration, expressed as a total recoverable concentration, is well above the maximum, total recoverable and dissolved antimony concentration detected in the SWMU 30 groundwater samples (31.5 µg/Land 23.3 µg/L, respectively).

The available saltwater toxicity data for vanadium is limited to 48-hour EC_{50} values for the dinoflagellate *Gymnodinum splendens* and the diatom *Thalassiosira guillardii* (Wilson and Freeburg, 1980) and a 96-hour LC_{50} for *Therapon jarbua* (tiger fish) (Krishnakumaria et, al, 1983). The lowest acute value reported in the literature was the 96-hour LC_{50} for the tigerfish (620 µg/L). This acute effect concentration, expressed as a total recoverable concentration, is above the maximum, total recoverable and dissolved vanadium concentration detected in the SWMU 30 groundwater samples (208 µg/L and 177 µg/L, respectively).

Based on the comparison of SWMU 30 groundwater data to the acute effect concentrations available from the literature, total recoverable antimony and dissolved antimony and vanadium are eliminated as ecological COPCs. It is noted that the available acute toxicity test data for antimony and vanadium are limited; therefore, sensitive species may not have been tested. Furthermore, chronic toxicity test data for sensitive endpoints such as growth and reproduction, were not available from the literature; therefore, it is not known if the antimony and vanadium concentrations detected in the SWMU 30 groundwater samples are less than or greater than chronic effect concentrations.

7.5 Screening Risk Calculation

The ecological screening evaluation identified the following chemicals in surface soil as ecological COPCs: lead, mercury, acetone, xylenes (total), benzo(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(a)pyrene, chrysene, fluoranthene, and pyrene. Mercury and lead were retained as ecological COPC based on a comparison of SWMU 30 data to background data and ORNL

surface soil screening thresholds. The organic compounds were retained as ecological COPC based on the lack of ORNL screening thresholds. All groundwater parameters have been eliminated as ecological COPCs based on the comparison of SWMU 30 groundwater data to background data and screening thresholds.

As a measure of potential risk from exposures to lead and mercury in surface soil, Hazard Quotients (HQs) for earthworms, microorganisms, and plants were be derived by calculating the ratio of the maximum SWMU 30 surface soil concentration to the ORNL screening threshold:

HQ = Maximum Detected Concentration (µg/L)/Screening Threshold (µg/L)

A HQ value less than unity (e.g., less than one) would indicate that the chemical is unlikely to cause adverse ecological effects. Conversely, a HQ greater than one would indicate that the chemical has the potential to cause adverse ecological effects. The significance of the HQ has previously been judged as follows: (Menzie, et, al., 1993):

- HQ exceeds one but less than 10: some small potential for environmental effects
- HQ exceeds 10: significant potential that greater exposures could result in effects based on experimental evidence
- HQ exceeds 100: effects may be expected since this represents an exposure level at which effects have been observed in other species.

HQ values for earthworms, microorganisms, and plants are summarized in Table 7-8. As evidenced by Table 7-8, the microorganism HQ for lead and mercury are 0.11 and 0.02, respectively. The earthworm and plant HQ for lead is 2.02, while the earthworm and plant HQ for mercury is 4.60 and 1.53, respectively. The sum of their individual HQ values, termed a Hazard Index (HI), is 6.02 for earthworms, 3.55 for plants, and 0.13 for microorganisms. The HQ and HI values for earthworms and plants suggest that there is only some small potential for ecological effects.

7.6 Uncertainty Analysis

The procedures used in this ecological screening evaluation are subject to several uncertainties. These uncertainties are discussed in the paragraphs that follow.

7.6.1 Surface Soil Screening Thresholds

The surface soil screening thresholds used in this ecological screening evaluation are based on a limited number of studies (primarily laboratory studies) with earthworms, microorganisms, and plants. As a result, the confidence associated with many of these benchmarks is low (see Table 7-2). Furthermore, the studies used to derive the ORNL surface soil screening thresholds most often reported nominal concentrations of a soluble, highly bioavailable form of the chemical added to the soil. Site-specific soil characteristics, including pH and total organic carbon, will influence the bioavailability and, therefore, toxicity of metals and organic compounds detected in the SWMU 30 samples. Therefore, depending on site-specific soil characteristics, the surface soil screening threshold values utilized in this ecological screening evaluation may overestimate or underestimate site-specific threshold values.

The ORNL screening threshold for Aroclor-1260 (40 mg/kg) was derived from laboratory toxicity studies with plants. It is noted that the ORNL screening threshold does not address the ability of Aroclor-1260 to bioaccumulate and biomagnify.

ORNL surface soil screening thresholds have not been developed for acetone, xylenes (total), benzo(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(a)pyrene, chrysene, fluoranthene, and pyrene. As a result, the potential impact of these organic compounds on earthworms, microorganisms, and plants was not evaluated. Only plant screening thresholds have been developed for antimony and Aroclor-1260; therefore, potential impacts to earthworms and microorganisms was not evaluated.

7.6.2 Surface Water Screening Thresholds

Saltwater NAWQC have not been established for antimony and vanadium (total recoverable or dissolved). Therefore, potential impacts to aquatic life were evaluated by comparing SWMU 30 groundwater data directly to literature effect concentrations. The available literature values for

antimony consist of a 96-hour EC_{50} for a diatom species and 96-hour LC_{50} values for the opossum shrimp, mummichog, and sheepshead minnow. The available literature values for vanadium consist of a 48-hour EC_{50} for a diatom species, a 48-hour LC_{50} for a dinoflagellate species, and a 96-hour LC_{50} value for the tigerfish. Given the low number of toxicity values, sensitive species may not have been tested. Furthermore, chronic toxicity test data for sensitive endpoints (e.g., growth and reproduction) were not available from the literature; therefore, it is not known if the antimony and vanadium concentrations detected in the SWMU 30 groundwater samples are less than or greater than chronic effect concentrations.

Site-specific water quality characteristics, such as pH, suspended solids, and total organic carbon may influence metals toxicity to aquatic life. As a result, the NAWQC and literature toxicity values used in this ecological screening evaluation may overestimate or underestimate site-specific threshold values.

The SWMU 30 groundwater data were compared directly to USEPA NAWQC and literature toxicity values. The saltwater NAWQC have been established to be protective of aquatic life in marine surface waters. Given that the organisms for which these criteria have been established to be protective are not present within groundwater, it is unlikely that aquatic life would be exposed to the concentration of metals detected in the groundwater samples due to dilution/attenuation during advective transport. Furthermore, the toxicological data used to derive the saltwater NAWQC, as well as the literature toxicity values, may have been generated using test species that are not indigenous to Puerto Rico's offshore marine environment. Depending on the sensitivity of the tested species to regional species, the NAWQC and literature toxicity values used in this ecological screening evaluation may overestimate or underestimate site-specific threshold values.

7.6.3 Sampling and Analytical Program

Specific exposure routes for the marine surface water and sediment exposure pathway (e.g., incidental ingestion and dermal adsorption of surface water and sediment by marine mammals and birds and direct contact with sediment by marine aquatic life) could not be evaluated due to a lack of media-specific analytical data.

It is not known if metals detected in the SWMU 30 groundwater samples are migrating to the offshore marine environment. If migration is not occurring, the marine surface water and sediment exposure pathway would represent an incomplete exposure pathway.

The concentration of total recoverable zinc detected in groundwater sample1983-DWI (72,000 µg/L) is questionable. This concentration is over three orders of magnitude higher than the dissolved zinc concentration detected in sample 1983-DWI (27.6 µg/L) and the total recoverable zinc concentration detected in groundwater sample 1983-MW3 (20.4 µg/L).

7.7 Conclusions

SWMU 30 occupies a thin strip of land between a steep rock slope and the former landfill access road. Immediately across from SWMU 30 is the Forrestal Wastewater Treatment Plant. Other notable structures adjacent to SWMU 30 include the Base Landfill, Material Recovery Facility, and Building 38. The existing groundcover at SWMU 30 is approximately 70 percent vegetation and 30 percent gravel cover. The vegetation occupies an approximate surface area of 0.07 hectares.

An ecological screening evaluation was conducted to determine if ecological COPCs are present in surface soil and groundwater at SWMU 30. Ecological COPCs were identified by comparing site data to background data (inorganics only) and screening thresholds. The surface soil screening thresholds used in this evaluation were ORNL toxicological benchmarks for earthworms, microorganisms, and plants, while the groundwater screening thresholds were USEPA saltwater NAWQC and literature toxicity test data for saltwater organisms.

The comparison of site data to the background data indicated that most metals detected in surface soil and groundwater at SWMU 30 are naturally occurring. Metals retained as ecological COPCs for surface soil following a comparison to background data were antimony, cadmium, lead, mercury, and silver. Several organic compounds were detected in surface soils and, thus, retained as ecological COPCs. These organic compounds were acetone, xylenes (total), benzo(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(a)pyrene, chrysene, fluoranthene, pyrene, and Aroclor-1260. Metals retained as ecological COPCs for groundwater were total recoverable and dissolved antimony, arsenic, and mercury, total recoverable zinc, and dissolved vanadium.

The comparison of SWMU 30 groundwater data to USEPA NAWCQ and literature toxicity data eliminated all metals in groundwater as ecological COPCs. For surface soil, antimony, cadmium, and silver were eliminated as ecological COPCs. Only lead and mercury had maximum detected concentrations greater than surface soil screening thresholds. With the exception of Aroclor-1260, all organic compounds were retained as ecological COPCs since ORNL toxicological benchmarks for these compounds have not been developed. Aroclor-1260 was eliminated as an ecological COPC because its maximum detected concentration was less than the surface soil screening threshold value. HQ and HI values were derived for the surface soil exposure pathway to determine if potential exposures to lead and mercury are impacting earthworms, microorganisms, and plants. The risk screening evaluation was limited to lead and mercury since ORNL screening thresholds have not been developed for the organic compounds retained as ecological COPCs. The HQ and HI values for these potential ecological receptors, summarized in Table 7-8, suggest that there is only a small potential for adverse ecological effects to earthworms and plants. This consideration, the small size of the site, and its location relative to other structures makes the surface soil exposure pathway an insignificant pathway for terrestrial receptors.

8.0 SUMMARY AND RECOMMENDATIONS

8.1 Summary

The nature and extent section of the report identified a number of organic and inorganic compounds/constituents in the surface soil, the subsurface soil and the site groundwater. The findings of the investigations were then used to screen risks at the site. The findings of these screenings are:

8.1.1 Human Health

There appears to be some noncarcinogenic risk posed by antimony and zinc in the groundwater. This is based on the analysis of only two data points. No potentially unacceptable risk was found for any other environmental media.

8.1.2 Ecological

A small potential for adverse ecological effects to earthworms and plants was present when the site soils were screened against toxicological benchmarks.

8.2 Recommendations

No further actions are recommended at SWMU 30. The SWMU is isolated and very small in area. It is essentially incapable of being used for any significant purpose such as the siting of major buildings or residential areas. The site constraints preclude this type of development. Given the size of the area and the fact that it is surrounded with wastewater treatment plants and sanitary landfills, there is no likelihood that the groundwater in the area of SWMU 30 will ever be used as a potable source. This being the case, the groundwater pathway becomes insignificant and potential risks to human health are removed.

The site is partially overgrown with volunteer vegetation that has established itself since the area was abandoned as an incinerator site. The plants, occupying an area of approximately 0.07 hectares, appear to be thriving. The small size of the vegetative unit and its location relative to the Forrestal Wastewater Treatment plant, Base Landfill, Material Recovery Facility, Building 38, and the steep rock slope removes it as a significant portion of the range of any birds, reptiles or mammals. Based on these considerations and there only being a “small potential for adverse ecological effects to earthworms and plants” no further action at SWMU 30 is necessary to address ecological concerns.

9.0 REFERENCES

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TABLES

TABLE 3-1
SUMMARY OF SAMPLING AND ANALYTICAL PROGRAM
SWMU 30 - FORMER INCINERATOR AREA
NAVAL STATION ROOSEVELT ROADS, CEIBA, PUERTO RICO

Sample Media	Investigation	Sample ID	Sample Depth (ft bgs)	Sample Date	Analytical Parameters
Surface Soil	Phase I RFI	30SS01	0.00-0.00	10/25/95	VOCs, SVOCs, RCRA Metals
		30SS02	0.00-0.00	10/25/95	VOCs, SVOCs, RCRA Metals
		30SS03	0.00-0.00	10/25/95	VOCs, SVOCs, Pesticides/PCBs, OP-Pesticides, Herbicides, Dioxins, Appendix IX Metals
		30SS04	0.00-0.00	10/25/95	VOCs, SVOCs, Pesticides/PCBs, OP-Pesticides, Herbicides, Dioxins, Appendix IX Metals
		30SS05	0.00-0.00	10/25/95	VOCs, SVOCs, RCRA Metals
		30SS06	0.00-0.00	10/25/95	VOCs, SVOCs, RCRA Metals
	Phase II RFI	30-HP01-01	0.00-2.50	6/23/99	SVOCs, BTEX, PCBs, TPH (GRO and DRO), and Antimony
		30-HP02-01	0.00-2.50	6/23/99	SVOCs, BTEX, PCBs, TPH (GRO and DRO), and Antimony
		30-HP03-01	0.00-2.50	6/22/99	SVOCs, BTEX, PCBs, TPH (GRO and DRO), and Antimony
		30-HP03-01D	0.00-2.50	6/22/99	SVOCs, BTEX, PCBs, TPH (GRO and DRO), and Antimony
		30-HP04-01	0.00-2.50	6/23/99	SVOCs, BTEX, PCBs, TPH (GRO and DRO), and Antimony
		30-HP04-01D	0.00-2.50	6/23/99	SVOCs, BTEX, PCBs, TPH (GRO and DRO), and Antimony
		30-HP05-01	0.00-2.50	6/23/99	SVOCs, BTEX, PCBs, TPH (GRO and DRO), and Antimony
Subsurface Soil	BB&L	MW-4	4-6	5/11/94	BTEX and TPH
		MW-4	8-10	5/11/94	BTEX and TPH
		SB-1	2-4	5/10/94	BTEX and TPH
		SB-1	4-6	2/28/94	BTEX and TPH
		SB-2	4-6	3/1/94	BTEX and TPH
		SB-3	4-6	5/10/94	BTEX and TPH
		SB-3	6-8	5/10/94	VOCs (8240), SVOCs (8270), TCLP Metals, PCBs, BTEX and TPH
		SB-3	8-10	5/10/94	BTEX and TPH
		SB-4	4-6	3/1/94	BTEX and TPH
		SB-4	8-10	5/3/94	VOCs (8240), SVOCs (8270), TCLP Metals, PCBs, BTEX and TPH
		SB-5	6-8	3/2/94	BTEX and TPH
		SB-6	4-6	3/2/94	VOCs (8240), SVOCs (8270), TCLP Metals, PCBs, BTEX and TPH
		Duplicate	NA	3/9/94	VOCs (8240), SVOCs (8270), TCLP Metals, and PCBs
		SB-6	8-10	5/3/94	VOCs (8240), SVOCs (8270), TCLP Metals, PCBs, BTEX and TPH
		Duplicate	NA	5/3/94	BTEX and TPH
		SB-7	4-6	5/3/94	BTEX and TPH
		SB-7	10-12	5/3/94	VOCs (8240), SVOCs (8270), BTEX and TPH
		SB-8	4-6	5/4/94	BTEX and TPH
		SB-8	8-10	5/4/94	BTEX and TPH
		SB-9	4-6	5/10/94	BTEX and TPH
		SB-9	8-10	5/10/94	BTEX and TPH
Subsurface Soil	Phase II RFI	30-HP01-02	6.00-7.00	6/23/99	SVOCs, BTEX, PCBs, TPH (GRO and DRO), and Antimony

TABLE 3-1
SUMMARY OF SAMPLING AND ANALYTICAL PROGRAM
SWMU 30 - FORMER INCINERATOR AREA
NAVAL STATION ROOSEVELT ROADS, CEIBA, PUERTO RICO

Sample Media	Investigation	Sample ID	Sample Depth (ft bgs)	Sample Date	Analytical Parameters
(continued)		30-HP01-03	6.00-7.00	6/23/99	SVOCs, BTEX, PCBs, TPH (GRO and DRO), and Antimony
		30-HP02-02	6.00-7.00	6/23/99	SVOCs, BTEX, PCBs, TPH (GRO and DRO), and Antimony
		30-HP02-03	6.00-7.00	6/23/99	SVOCs, BTEX, PCBs, TPH (GRO and DRO), and Antimony
		30-HP03-02	6.00-7.00	6/22/99	SVOCs, BTEX, PCBs, TPH (GRO and DRO), and Antimony
		30-HP03-03	8.00-9.00	6/22/99	SVOCs, BTEX, PCBs, TPH (GRO and DRO), and Antimony
		30-HP04-02	6.00-7.00	6/23/99	SVOCs, BTEX, PCBs, TPH (GRO and DRO), and Antimony
		30-HP04-03	8.00-9.00	6/23/99	SVOCs, BTEX, PCBs, TPH (GRO and DRO), and Antimony
		30-HP05-02	6.00-7.00	6/23/99	SVOCs, BTEX, PCBs, TPH (GRO and DRO), and Antimony
		30-HP05-03	8.00-9.00	6/23/99	SVOCs, BTEX, PCBs, TPH (GRO and DRO), and Antimony
		30-HP06-01	5.00-6.00	6/22/99	TPH (GRO and DRO)
		30-HP06-02	8.00-10.00	6/22/99	TPH (GRO and DRO)
		30-HP07-01	5.00-6.00	6/22/99	TPH (GRO and DRO)
		30-HP11-01	5.00-6.00	6/24/99	TPH (GRO and DRO)
		30-HP12-01	5.00-6.00	6/23/99	TPH (GRO and DRO)
		30-HP13-01	5.00-7.00	6/22/99	TPH (GRO and DRO)
		30-HP13-02	8.00-12.00	6/22/99	TPH (GRO and DRO)
		30-HP14-01	5.00-6.00	6/27/99	TPH (GRO and DRO)
		30-HP15-01	5.00-6.00	6/24/99	TPH (GRO and DRO)
Groundwater	BB&L	MW-1	NA	5/14/94	TPH, Lead, BTEX (601), SVOCs (625), and TDS
		MW-2	NA	5/14/94	TPH, BTEX (601), and SVOCs (625)
		MW-3	NA	5/14/94	TPH, BTEX (601), and SVOCs (625)
		DW-1	NA	5/31/94	SVOCs (625) and PAHs (610)
		Duplicate	NA	5/31/94	SVOCs (625) and PAHs (610)
		MW-4	NA	6/10/94	TPH, Lead, SVOCs (625), PAHs (601/602/8020), PCBs (608), and TDS
	Phase I RFI	1983-DW1	NA	10/25/95	VOCs, SVOCs, Pesticides/PCBs, OP-Pesticides, Herbicides, Appendix IX Metals
		1983-DW1D	NA	10/25/95	Herbicides
		1983-MW3	NA	10/25/95	VOCs, SVOCs, Pesticides/PCBs, OP-Pesticides, Herbicides, Appendix IX Metals

Notes:
VOC = Volatile Organic Compounds
SVOC = Semivolatile Organic Compounds
TPH = Total Petroleum Hydrocarbons
PCB = Polychlorinated Biphenol
BTEX = Benzene, Toluene, Ethylbenzene, and Xylene
TCLP = Toxicity Characteristic Leachate Procedure
ft bgs = feet below ground surface
RCRA = Resource Conservation and Recovery Act
OP = Orthophosphate
GRO = Gasoline Range Organics
DRO = Diesel Range Organics
NA = Not Applicable

TABLE 3-2

METHOD PERFORMANCE LIMITS
APPENDIX IX COMPOUND LIST AND CONTRACT
REQUIRED QUANTITATION LIMITS (CRQL)

Volatiles	Quantitation Limits* Water (µg/L)	Low Soil (µg/kg)	Method Number
Acetone	100	100	8240
Acetonitrile	100	100	8240
Acrolein	5	5	8240
Acrylonitrile	5	5	8240
Methyl Chloride	100	100	8240
Benzene	5	5	8240
Bromodichloromethane	10	10	8240
Bromoform	5	5	8240
Bromomethane	10	10	8240
Carbon Disulfide	5	5	8240
Carbon Tetrachloride	5	5	8240
Chlorobenzene	5	5	8240
2-Chloro-1,3-butadiene	5	5	8240
Chloroethane	10	10	8240
Chlorodibromomethane	5	5	8240
Chloroform	5	5	8240
Chloromethane	10	10	8240
3-Chloropropene	5	5	8240
1,2-Dibromo-3-chloropropane	5	5	8240
Dibromomethane	5	5	8240
trans-1,4-Dichloro-2-butene	100	100	8240
Dichlorodifluoromethane	5	5	8240
Dibromomethane	5	5	8240
1,1-Dichloroethane	5	5	8240
1,2-Dichloroethane	5	5	8240
trans-1,2-Dichloroethylene	5	5	8240
1,1-Dichloroethylene	5	5	8240
Dichloromethane	5	5	8240
1,2-Dichloropropane	5	5	8240
cis-1,3-Dichloropropene	5	5	8240
trans-1,3-Dichloropropene	5	5	8240
1,4-Dioxane	150	150	8240
Ethyl benzene	5	5	8240
Ethyl cyanide	100	100	8240

Volatiles	Quantitation Limits* Water (µg/L)	Low Soil (µg/kg)	Method Number
Ethyl methacrylate	5	5	8240
2-Hexanone	50	50	8240
Iodomethane	5	5	8240
Isobutyl alcohol	50	50	8240
Methacrylonitrile	100	100	8240
Methyl ethyl ketone	100	100	8240
Methyl methacrylate	5	50	8240
4-Methyl-2-pentanone	50	50	8240
Pentachloroethane	10	10	8240
Stryene	5	5	8240
1,1,1,2-Tetrachloroethane	5	5	8240
1,1,2,2-Tetrachloroethane	5	5	8240
Tetrachloroethene	5	5	8240
Toluene	5	5	8240
1,1,1-Trichloroethane	5	5	8240
1,1,2-Trichloroethane	5	5	8240
Trichloroethene	5	5	8240
Trichlorofluoromethane	5	NA	8240
1,2,3-Trichloropropane	5	5	8240
Vinyl Acetate	50	50	8240
Vinyl Chloride	10	10	8240
Xylene	5	5	8240

* Quantitation limits listed for soil/sediment are based on wet weight. The quantitation limits calculated by the laboratory for soil/sediment, calculated on dry weight basis, will be higher.

TABLE 3-2 (Continued)

METHOD PERFORMANCE LIMITS
APPENDIX IX COMPOUND LIST AND CONTRACT
REQUIRED QUANTITATION LIMITS (CRQL)

Semivolatiles	Quantitation Limits* Water (µg/L)	Low Soil (µg/kg)	Method Number
Acenaphthene	10	660	8270
Acenaphthylene	10	660	8270
Acetophenone	10	NA	8270
2-Acetylaminofluorene	20	NA	8270
4-Aminobiphenyl	20	NA	8270
Aniline	10	NA	8270
Anthracene	10	660	8270
Aramite	20	NA	8270
Benzo(a)anthracene	10	660	8270
Benzo(b)fluoranthene	10	660	8270
Benzo(k)fluoranthene	10	660	8270
Benzo(g,h,i)perylene	10	660	8270
Benzo(a)pyrene	10	660	8270
Benzyl alcohol	20	1,300	8270
Bis(2-chloroethoxyl)methane	10	660	8270
Bis(2-chloroethyl)ether	10	660	8270
Bis(2-chloro-1-methyl ethyl)ether	10	660	8270
Bis(2-ethylhexyl)phthalate	10	660	8270
4-Bromophenyl phenyl ether	10	660	8270
Butyl benzyl phthalate	10	660	8270
p-Chloroaniline	20	1,300	8270
Chlorobenzilate	10	NA	8270
p-Chloro-m-cresol	20	1,300	8270
2-Chloronaphthalene	10	660	8270
2-Chlorophenol	10	660	8270
4-Chlorophenyl phenyl ether	10	660	8270
Chrysene	10	660	8270
o,m,p-Cresol	10	660	8270
Diallate	10	NA	8270
Dibenzofuran	10	660	8270
Di-n-butyl phthalate	10	660	8270
Dibenzo(a,h)anthracene	10	660	8270
o-Dichlorobenzene	10	660	8270
m-Dichlorobenzene	10	660	8270

TABLE 3-2 (Continued)

METHOD PERFORMANCE LIMITS
APPENDIX IX COMPOUND LIST AND CONTRACT
REQUIRED QUANTITATION LIMITS (CRQL)

Semivolatiles	Quantitation Limits* Water (µg/L)	Low Soil (µg/kg)	Method Number
p-Dichlorobenzene	10	660	8270
3,3'-Dichlorobenzidine	20	1,300	8270
2,4-Dichlorophenol	10	660	8270
2,6-Dichlorophenol	10	NA	8270
Diethylphthalate	10	660	8270
Dimethoate	20	NA	8270
p-(Dimethylamino)azobenzene	10	NA	8270
7,12-Dimethyl benz(a)anthracene	10	NA	8270
3,3-Dimethyl benzidine	10	NA	8270
Dimethylphenenthylamine	10	NA	8270
2,4-Dimethylphenol	10	660	8270
Dimethyl phthalate	10	660	8270
m-Dinitrobenzene	20	NA	8270
4,6-Dinitro-o-cresol	50	3,300	8270
2,4-Dinitrophenol	50	3,300	8270
2,4-Dinitrotoluene	10	660	8270
2,6-Dinitrotoluene	10	660	8270
Di-n-octylphthalate	10	660	8270
Diphenylamine	10	NA	8270
Di-n-propylnitrosamine	10	NA	8270
Ethylmethanesulfonate	20	NA	8270
Fluoranthene	10	660	8270
Fluorene	10	660	8270
Hexachlorobenzene	10	660	8270
Hexachlorobutadiene	10	660	8270
Hexachlorocyclopentadiene	10	660	8270
Hexachloroethane	10	660	8270
Hexachloropropene	10	NA	8270
Indeno(1,2,3-cd)pyrene	10	660	8270
Isodrin	20	NA	8270
Isophorone	10	660	8270
Isosafrole	10	NA	8270
Kepone	20	NA	8270
Methapyrilene	100	NA	8270

TABLE 3-2 (Continued)

METHOD PERFORMANCE LIMITS
APPENDIX IX COMPOUND LIST AND CONTRACT
REQUIRED QUANTITATION LIMITS (CRQL)

Semivolatiles	Quantitation Limits* Water (µg/L)	Low Soil (µg/kg)	Method Number
3-Methylcholanthrene	10	NA	8270
Methyl methanesulfonate	10	NA	8270
2-Methylnaphthalene	10	660	8270
Naphthalene	10	660	8270
1,4-Naphthoquinone	10	NA	8270
1-Naphthylamine	10	NA	8270
2-Naphthylamine	10	NA	8270
o-Nitroaniline	50	3,300	8270
m-Nitroaniline	50	3,300	8270
p-Nitroaniline	20	NA	8270
Nitrobenzene	10	660	8270
o-Nitrophenol	10	660	8270
p-Nitrophenol	50	3,300	8270
4-Nitroquinoline-1-oxide	40	NA	8270
n-Nitrosodi-n-butylamine	10	NA	8270
n-Nitrosodiethylamine	20	NA	8270
n-Nitrosodimethylamine	20	NA	8270
n-Nitrosodiphenylamine	10	660	8270
n-Nitrosomethylethylamine	20	NA	8270
n-Nitrosomorpholine	10	NA	8270
n-Nitrosopiperidine	20	NA	8270
n-Nitrosopyrrolidine	40	NA	8270
5-Nitro-o-toluidine	10	NA	8270
Pentachlorobenzene	10	NA	8270
Pentachloronitrobenzene	20	NA	8270
Pentachlorophenol	50	3,300	8270
Phenacetin	20	ND	8270
Phenanthrene	10	660	8270
Phenol	10	660	8270
Phorate	10	NA	8270
p-Phenylenediamine	10	NA	8270
2-PicolinPronamidee	10	NA	8270
Pyrene	10	660	8270
Pyridine	10	NA	8270

TABLE 3-2 (Continued)

METHOD PERFORMANCE LIMITS
APPENDIX IX COMPOUND LIST AND CONTRACT
REQUIRED QUANTITATION LIMITS (CRQL)

Semivolatiles	Quantitation Limits* Water (µg/L)	Low Soil (µg/kg)	Method Number
Safrole	10	NA	8270
1,2,4,5-Tetrachlorobenzene	10	NA	8270
2,3,4,6-Tetrachlorophenol	10	NA	8270
o-Toluidine	10	NA	8270
1,2,4-Trichlorobenzene	10	660	8270
2,4,5-Trichlorophenol	10	660	8270
2,4,6-Trichlorophenol	10	660	8270
O,O,O-Triethyl-Phosphorotrioate	10	NA	8270
sym-Trinitrobenzene	10	660	8270

* Quantitation limits listed for soil/sediment are based on wet weight. The quantitation limits calculated by the laboratory for soil/sediment, calculated on dry weight basis, will be higher.

TABLE 3-2 (Continued)

METHOD PERFORMANCE LIMITS
APPENDIX IX COMPOUND LIST AND CONTRACT
REQUIRED QUANTITATION LIMITS (CRQL)

Pesticides/PCBs	Quantitation Limits[1] Water (µg/L)	Low Soil (µg/kg)	Method Number
Aldrin	0.04	2.7	8080
Alpha-BHC	0.03	2	8080
beta-BHC	0.06	4	8080
delta-BHC	0.09	6	8080
Lindane	0.05	1.7	8080
Chlordane	0.14	9.4	8080
4,4'-DDT	0.12	8	8080
4,4'-DDE	0.04	2.7	8080
4,4'-DDD	0.11	7.4	8080
Dieldrin	0.02	1.3	8080
Endosulfan I	0.14	9.4	8080
Endosulfan II	0.04	2.7	8080
Endosulfan sulfate	0.66	44	8080
Endrin	0.06	4	8080
Toxaphene	2.4	160	8080
Endrin Aldehyde	0.1	3.3	8080
Heptachlor	0.03	2	8080
Heptachlor epoxide	0.83	56	8080
Methyoxychlor	1.8	120	8080
Aroclor-1016	NA	NA	8080
Aroclor-1221	NA	NA	8080
Aroclor-1232	NA	NA	8080
Aroclor-1242	0.65	44	8080
Aroclor-1248	NA	NA	8080
Aroclor-1254	NA	NA	8080
Aroclor-1260	NA	NA	8080

(1) Practical Quantitation Limits taken from ATest Methods for Evaluating Solid Wastes,@ USEPA, SW-846, November 1986.

NA = Not Available

TABLE 3-2 (Continued)

METHOD PERFORMANCE LIMITS
APPENDIX IX COMPOUND LIST AND CONTRACT
REQUIRED QUANTITATION LIMITS (CRQL)

Dioxins (SW-846 Method 8280)	Quantitation Limits Water (µg/L)	Low Soil (µg/kg)	Method Number
PCDDs	0.01	NA	8280
PCDFs	0.01	NA	8280
2,3,7,8-TCDD	0.005	0.17	8280

TABLE 3-2 (Continued)

METHOD PERFORMANCE LIMITS
APPENDIX IX COMPOUND LIST AND CONTRACT
REQUIRED QUANTITATION LIMITS (CRQL)

Inorganics	Method Number	MDL (µg/L)	Method Description
Antimony	6010	32	Inductively Cupled Plasma
Arsenic	7060	1	AA Graphite Furnace
Barium	6010	2	Inductively Coupled Plasma
Beryllium	6010	0.3	Inductively Coupled Plasma
Cadmium	6010	4	Inductively Coupled Plasma
Chromium	6010	7	Inductively Coupled Plasma
Cobalt	6010	7	Inductively Coupled Plasma
Copper	6010	6	Inductively Coupled Plasma
Lead	7421	1	AA Graphite Furnace
Mercury	7470	0.2	Cold Vapor AA
Nickel	6010	40	Inductively Coupled Plasma
Selenium	7741	2	AA Graphite Furnace
Silver	6010	7	Inductively Coupled Plasma
Thallium	7841	1	AA Graphite Furnace
Tin	6010	1,000	Inductively Coupled Plasma
Vanadium	6010	8	Inductively Coupled Plasma
Cyanide	9010	5	Colorimetric
Sulfide	9030	1,000	Titrimetric, Iodine

TABLE 3-2 (Continued)

METHOD PERFORMANCE LIMITS
APPENDIX IX COMPOUND LIST AND CONTRACT
REQUIRED QUANTITATION LIMITS (CRQL)

Chlorinated Herbicides	Practical Quantitation Limits Water (µg/L)	Soil/Sediment (µg/kg)	Method Number
2,4-Dichlorophenoxyacetic acid	12	804	8150
Dinoseb	0.7	46.9	8150
2,4,5-T	2	134	8150
Silvex	1.7	11.4	8150

TABLE 3-3

METHOD PERFORMANCE LIMITS
RCRA METALS COMPOUND LIST AND CONTRACT
REQUIRED QUANTITATION LIMITS (CRQL

Inorganics	Method Number	MDL (µg/L)	Method Description
Arsenic	7060	1	AA Graphite Furnace
Barium	6010	2	Inductively Coupled Plasma
Cadmium	6010	4	Inductively Coupled Plasma
Chromium	6010	7	Inductively Coupled Plasma
Lead	7421	1	AA Graphite Furnace
Mercury	7470	0.2	Cold Vapor AA
Selenium	7741	2	AA Graphite Furnace
Silver	6010	7	Inductively Coupled Plasma

TABLE 3-4
SUMMARY OF BACKGROUND SAMPLING AND ANALYTICAL PROGRAM - 1996
SWMU 30 - FORMER INCINERATOR AREA
NAVAL STATION ROOSEVELT ROADS, CEIBA, PUERTO RICO

Sample Media	Sample ID	Sample Depth (ft bgs)	Sample Date	Analytical Parameters
Surface Soil	BGMW01-00	0.00-1.00	4/4/96	VOCs, SVOCs, Pesticides/PCBs, OP-Pesticides, Herbicides, Dioxins, Appendix IX Metals
	BGMW02-00	0.00-1.00	4/4/96	VOCs, SVOCs, Pesticides/PCBs, OP-Pesticides, Herbicides, Dioxins, Appendix IX Metals
	BGMW03-00	0.00-1.00	4/4/96	VOCs, SVOCs, Pesticides/PCBs, OP-Pesticides, Herbicides, Dioxins, Appendix IX Metals
	BGMW04-00	0.00-1.00	4/4/96	VOCs, SVOCs, Pesticides/PCBs, OP-Pesticides, Herbicides, Dioxins, Appendix IX Metals
Subsurface Soil	BGMW01-04	8-10	4/23/96	VOCs, SVOCs, Pesticides/PCBs, OP-Pesticides, Herbicides, Dioxins, Appendix IX Metals
	BGMW01-06	12-14	4/23/96	VOCs, SVOCs, Pesticides/PCBs, OP-Pesticides, Herbicides, Dioxins, Appendix IX Metals
	BGMW02-05	10-12	4/22/96	VOCs, SVOCs, Pesticides/PCBs, OP-Pesticides, Herbicides, Dioxins, Appendix IX Metals
	BGMW02-08	16-18	4/22/96	VOCs, SVOCs, Pesticides/PCBs, OP-Pesticides, Herbicides, Dioxins, Appendix IX Metals
	BGMW03-03	6-8	4/12/96	VOCs, SVOCs, Pesticides/PCBs, OP-Pesticides, Herbicides, Dioxins, Appendix IX Metals
	BGMW03-04	8-10	4/12/96	VOCs, SVOCs, Pesticides/PCBs, OP-Pesticides, Herbicides, Dioxins, Appendix IX Metals
	BGMW04-02	4-6	4/24/96	VOCs, SVOCs, Pesticides/PCBs, OP-Pesticides, Herbicides, Dioxins, Appendix IX Metals
	BGMW04-04	8-10	4/24/96	VOCs, SVOCs, Pesticides/PCBs, OP-Pesticides, Herbicides, Dioxins, Appendix IX Metals
Groundwater	BGMW01	NA	4/27/96	VOCs, SVOCs, Pesticides/PCBs, OP-Pesticides, Herbicides, Dioxins, Appendix IX Metals
	BGMW02	NA	4/27/96	VOCs, SVOCs, Pesticides/PCBs, OP-Pesticides, Herbicides, Dioxins, Appendix IX Metals
	BGMW03	NA	4/16/96	VOCs, SVOCs, Pesticides/PCBs, OP-Pesticides, Herbicides, Dioxins, Appendix IX Metals
	BGMW04	NA	4/27/96	VOCs, SVOCs, Pesticides/PCBs, OP-Pesticides, Herbicides, Dioxins, Appendix IX Metals

Notes:

VOC = Volatile Organic Compounds
SVOC = Semivolatile Organic Compounds
PCB = Polychlorinated Biphenol
OP = Orthophosphate

TABLE 3-5
SUMMARY OF QA/QC SAMPLING AND ANALYTICAL PROGRAM - 1999
SWMU 30 - FORMER INCINERATOR AREA
NAVAL STATION ROOSEVELT ROADS, CEIBA, PUERTO RICO

Sample ID	Sample Date	Analytical Parameters
99ER01	6/30/99	VOCs, SVOCs, PCBs, TPH (GRO and DRO), Dioxins, Appendix IX Metals, Cyanide, and Sulfide
99ER02	6/30/99	VOCs, SVOCs, TPH (GRO and DRO), Dioxins, Appendix IX Metals, Cyanide, and Sulfide
99FB01	6/30/99	VOCs, SVOCs, PCBs, TPH (GRO and DRO), Dioxins, BTEX, Appendix IX Metals
99FB02	6/30/99	VOCs, SVOCs, PCBs, TPH (GRO and DRO), Dioxins, BTEX, Appendix IX Metals
30-TB01	6/24/99	VOCs and GRO
30-TB04	6/28/99	GRO

Notes:

VOC = Volatile Organic Compounds
SVOC = Semivolatile Organic Compounds
TPH = Total Petroleum Hydrocarbons
PCB = Polychlorinated Biphenol
BTEX = Benzene, Toluene, Ethylbenzene, and Xylene
GRO = Gasoline Range Organics
DRO = Diesel Range Organics

TABLE 4-1

WATER LEVEL DATA

Site 1983
Roosevelt Roads, U. S. Naval Station
Ceiba, Puerto Rico

Well Designation	Elevation of Top of Casing (ft, msl)	June 9, 1994		June 16, 1994	
		Depth to Water (ft)	Water Level Elevation (ft, msl)	Depth to Water (ft)	Water Level Elevation (ft, msl)
1983-MW1	11.65	9.81	1.84	10.03	1.62
1983-MW2	11.30	8.89	2.41	9.17	2.13
1983-MW3	13.97	13.09	0.88	13.15	0.82
1983-MW4	13.91	12.64	1.27	12.76	1.15
1983-DW1	14.30	13.05	1.25	13.17	1.13

NOTE: Top-of-casing elevations referenced to MSL.
Msl = mean sea level

Source: Blasland, Bouck & Lee, Inc., 1994

TABLE 5-1

**SUMMARY OF SOIL ANALYTICAL RESULTS
FOR BTEX AND TPH
SWMU 30 – UST SITE CHARACTERIZATION
ROOSEVELT ROADS, U.S. NAVAL STATION
CEIBA, PUERTO RICO**

Soil Boring	ECG Laboratories (field screening)		Savannah Laboratories	
	Modified EPA Method 418.1 Field TPH (mg/Kg)	Modified EPA Method 602 Total BTEX (µg/Kg)	EPA Method 418.1 Laboratory TPH (mg/Kg)	EPA Method 8010 Laboratory Total BTEX (µg/Kg)
1983-SB1 (2'-4')	NA	NA	<5.0	<5.0
1983-SB1 (4'-6')	844	<5.0	840	<5.0
1983-SB2 (4'-8')	1,164	10	28	<5.0
1983-SB3 (4'-6')	NA	NA	110	<5.0
1983-SB3 (6'-8')	NA	NA	2,400	<5.0
1983-SB3 (8'-10')	NA	NA	260	7.5
1983-SB4 (4'-6')	124	<5.0	13	<5.0
1983-SB4 (8'-10')	<10	NA	<5.0	<5.0
1983-SB5 (6'-8')	512	<5.0	220	<5.0
1983-SB6 (4'-6')	1,410	<5.0	9,800	98
1983-SB6 (8'-10')	NA	NA	2,200	<5.0
1983-SB7 (4'-6')	<10	NA	<5.0	<5.0
1983-SB7 (10'-12')	<10	NA	<5.0	<5.0
1983-SB8 (4'-6')	<10	NA	<5.0	<5.0
1983-SB8 (8'-10')	<10	NA	<5.0	<5.0
1983-SB9 abandoned (4'-6')	NA	NA	<5.0	<5.0
1983-SB9 (4'-6')	NA	NA	<5.0	<5.0
1983-SB9 (8'-10')	NA	NA	320	<5.0
Puerto Rico EQB[1] UST Target Levels	100	50	100	50

NOTES:

EQB[1]	=	Environmental Quality Board
TPH	=	total petroleum hydrocarbons
Total BTEX	=	Sum of benzene, toluene, ethylbenzene, and xylenes
µg/Kg	=	micrograms per kilogram
mg/Kg	=	milligrams per kilogram
NA	=	not analyzed
UST	=	underground storage tank

Source: Blasland, Bouck & Lee, Inc.; Savannah Laboratories; and ECG Laboratories, 1994.

TABLE 5-2

SUMMARY OF ADDITIONAL SOIL LABORATORY ANALYTICAL RESULTS FOR VOCs, SEMIVOLATILES, PCBs, AND TCLP METALS

SWMU 30 – UST SITE CHARACTERIZATION
ROOSEVELT ROADS, U.S. NAVAL STATION
CEIBA, PUERTO RICO

Soil Boring	EPA Method	Constituents Detected	Concentration/Result	Units
1983-SB3 (6-8)	6010 and 7470	Silver	0.010	mg/Kg
	8080	Aroclor 1260 (PCB)	38	µg/Kg
	8240	ND	--	--
	8270	ND	--	--
1983-SB4 (8-10)	6010 and 7470	ND	--	--
	8080	ND	--	--
	8240	ND	--	--
	8270	ND	--	--
1983-SB6 (4-6)	6010 and 7470	Barium	1.2	mg/Kg
	8080	Aroclor 1260 (PCB)	80	µg/Kg
	8240	Napthalene	26,000	µg/Kg
	8270	Acenaphthene	3,400	µg/Kg
	--	N-Nitrosediphenylamine/	3,600	µg/Kg
	--	diphenylamine		
	--	Phenanthrene	6,900	µg/Kg
	--	2-Methylnaphthalene	64,000	µg/Kg
1983-SB6 (8-10)	6010 and 7470	Barium	1.2	mg/Kg
	8080	Aroclor 1260 (PCB)	130	µg/Kg
	8240	ND	--	--
	8270	ND	--	--
1983-SB7 (10-12)	8240	ND	--	--
	8270	ND	--	--
1983-Soil Cuttings	6010 and 7470	Barium	1.1	mg/Kg
	8080	Aroclor-1260 (PCB)	8.3	--
	--	(corrosivity) pH	<1.0	mg/Kg
	--	(reactivity) Cyanide	No Flash	--
	--	(ignitability), Flash Point	<10	mg/Kg
	--	(reactivity) Sulfide	120	µg/Kg

Notes:

VOC = volatile organic compounds
µg/Kg = micrograms per kilogram
mg/Kg = milligrams per kilogram
ND = None Detected

Source: Blasland, Bouck & Lee, Inc.; Savannah Laboratories; and ECG Laboratories, 1994.

TABLE 5-3 (continued)

SUMMARY OF ORGANIC DETECTIONS IN SURFACE SOIL - PHASE I RFI
SWMU 30 - FORMER INCINERATOR AREA
NAVAL STATION ROOSEVELT ROADS, CEIBA, PUERTO RICO

Sample ID	EPA Region III	**EPA Region II**	30SS01	30SS02	30SS03	30SS04	30SS05	30SS06
Sample Date	Industrial	**Residential**	10/25/95	10/25/95	10/25/95	10/25/95	10/25/95	10/25/95
Depth Range	RBC	**RBC**	0.00-0.00	0.00-0.00	0.00-0.00	0.00-0.00	0.00-0.00	0.00-0.00
	(ug/kg)	(ug/kg)						
Volatiles (ug/kg)								
Acetone	204,400,000	7,821,429	12 U	11 U	12 U	10 J	11 U	16 U
Xylene (total)	4,088,000,000	156,428,571	3 J	3 J	6 U	6 U	1 J	6 UJ
Semivolatiles (ug/kg)								
Pesticides/PCBs (ug/kg)								
Aroclor-1260	2,862	319	NA	NA	200	250	NA	NA
Ortho Pesticides (ug/kg)								
Herbicides (ug/kg)								
Dioxins (ug/kg)								

Data Qualifiers:

J = Analyte present. Reported value may not be accurate or precise.
U = Not detected. The associated number indicates approximate sample concentration necessary to be detected.
UJ = Not detected. Quantitation limit may be inaccurate or imprecise.
NA = Not analyzed.

ug/kg = micrograms per kilogram.

TABLE 5-3 (continued)

SUMMARY OF ORGANIC DETECTIONS IN SURFACE SOIL - PHASE I RFI
SWMU 30 - FORMER INCINERATOR AREA
NAVAL STATION ROOSEVELT ROADS, CEIBA, PUERTO RICO

Sample ID Sample Date Depth Range	EPA Region III Industrial RBC (ug/kg)	**EPA Region III Residential RBC** (ug/kg)	Number Exceeding EPA Region III Industrial RBC	Range Exceeding EPA Region III Industrial RBC	**Number Exceeding EPA Region III Residential RBC**	**Range Exceeding EPA Region III Residential RBC**	Location Maximum Detect
Volatiles (ug/kg)							
Acetone	204,400,000	7,821,429	0/6		0/6		30SS04
Xylene (total)	4,088,000,000	156,428,571	0/6		0/6		30SS01, 30SS02
Semivolatiles (ug/kg)							
Pesticides/PCBs (ug/kg)							
Aroclor-1260	2,862	319	0/2		0/2		30SS04
Ortho Pesticides (ug/kg)							
Herbicides (ug/kg)							
Dioxins (ug/kg)							

Data Qualifiers:

J = Analyte present. Reported value may not be accurate or precise
U = Not detected. The associated number indicates approximate sample concentration necessary to be detected.
UJ = Not detected. Quantitation limit may be inaccurate or imprecise
NA = Not analyzed.

ug/kg = micrograms per kilogram.

TABLE 5-4

SUMMARY OF RCRA METAL DETECTIONS IN SURFACE SOIL - PHASE I RFI
SWMU 30 - FORMER INCINERATOR AREA
NAVAL STATION ROOSEVELT ROADS, CEIBA, PUERTO RICO

Sample ID	2 X Average	**EPA Region III**	EPA Region III	30SS01	30SS02	30SS05	30SS06
Sample Date	Detected	**Industrial**	Residential	10/25/95	10/25/95	10/25/95	10/25/95
Depth Range	Background	**RBC**	RBC	0.00-0.00	0.00-0.00	0.00-0.00	0.00-0.00
	(mg/kg)	(mg/kg)	(mg/kg)				
RCRA Metals (mg/kg)							
Arsenic	2.43	3.82	0.43	0.58 J	1.5 J	0.45 J	1.6 J
Barium	181	143,080	5,475	103	36.5	93.7	24.3
Chromium	59	NE	NE	11.2 J	6.8 J	6.9 J	4.7 J
Lead	15	NE	NE	55.6 J	53.5	6.9 J	19.4
Selenium	1.46	10,220	391	0.33 J	0.2 J	0.15 UJ	0.95 J
Silver	ND	10,220	391	1	0.49 U	0.49 U	0.52 U

Data Qualifiers:

J = Analyte present. Reported value may not be accurate or precise.
U = Not detected. The associated number indicates approximate sample concentration necessary to be detected.
UJ = Not detected. Quantitation limit may be inaccurate or imprecise.

ND = Not Detected.
NE = Not established.

mg/kg = milligrams per kilogram.

TABLE 5-4

SUMMARY OF RCRA METAL DETECTIONS IN SURFACE SOIL - PHASE I RFI
SWMU 30 - FORMER INCINERATOR AREA
NAVAL STATION ROOSEVELT ROADS, CEIBA, PUERTO RICO

Sample ID Sample Date Depth Range	2 X Average Detected Background (mg/kg)	**EPA Region III Industrial RBC** (mg/kg)	EPA Region III Residential RBC (mg/kg)	Number Exceeding 2 X Average Detected Background	Range Exceeding 2 X Average Detected Background	**Number Exceeding EPA Region III Industrial RBC**	**Range Exceeding EPA Region III Industrial RBC**	Number Exceeding EPA Region III Residential RBC	Range Exceeding EPA Region III Residential RBC
RCRA Metals (mg/kg)									
Arsenic	2.43	3.82	0.43	0/4		0/4		4/4	0.45J-1.6J
Barium	181	143,080	5,475	0/4		0/4		0/4	
Chromium	59	NE	NE	0/4		NE		NE	
Lead	15	NE	NE	3/4	19.4-101	NE		NE	
Selenium	1.46	10,220	391	0/4		0/4		0/4	
Silver	ND	10,220	391	1/4	1	0/4		0/4	

Data Qualifiers:

J = Analyte present. Reported value may not be accurate or precise.
U = Not detected. The associated number indicates approximate sample concentration necessary to be detected.
UJ = Not detected. Quantitation limit may be inaccurate or imprecise.

ND = Not Detected.
NE = Not established.

mg/kg = milligrams per kilogram.

TABLE 5-4

SUMMARY OF RCRA METAL DETECTIONS IN SURFACE SOIL - PHASE I RFI
SWMU 30 - FORMER INCINERATOR AREA
NAVAL STATION ROOSEVELT ROADS, CEIBA, PUERTO RICO

Sample ID Sample Date Depth Range	2 X Average Detected Background (mg/kg)	**EPA Region III Industrial RBC** (mg/kg)	EPA Region III Residential RBC (mg/kg)	Location Maximum Detect
RCRA Metals (mg/kg)				
Arsenic	2.43	3.82	0.43	30SS06
Barium	181	143,080	5,475	30SS01
Chromium	59	NE	NE	30SS04
Lead	15	NE	NE	30SS03
Selenium	1.46	10,220	391	30SS06
Silver	ND	10,220	391	30SS01

Data Qualifiers:

J = Analyte present. Reported value may not be accurate or precise.
U = Not detected. The associated number indicates approximate sample concentration necessary to be detected.
UJ = Not detected. Quantitation limit may be inaccurate or imprecise.

ND = Not Detected.
NE = Not established.

mg/kg = milligrams per kilogram.

TABLE 5-5

SUMMARY OF APPENDIX IX INORGANIC DETECTIONS IN SURFACE SOIL - PHASE I RFI
SWMU 30 - FORMER INCINERATOR AREA
NAVAL STATION ROOSEVELT ROADS, CEIBA, PUERTO RICO

Sample ID	2 X Average	**EPA Region III**	EPA Region III	30SS03	30SS04
Sample Date	Detected	**Industrial**	Residential	10/25/95	10/25/95
Depth Range	Background	**RBC**	RBC	0.00-0.00	0.00-0.00
	(mg/kg)	(mg/kg)	(mg/kg)		
Inorganics (mg/kg)					
Arsenic	2.43	3.82	0.43	1.5	0.79 J
Barium	181	143,080	5,475	34.2	59.7
Beryllium	0.45	4,100	160	0.14	0.15
Cadmium	ND	2,044	78	1 J	0.24 J
Chromium	59	NE	NE	9.3 J	16.6 J
Cobalt	44	122,640	4,693	6.2	9
Copper	234.2	81,760	3,129	53	68.3
Lead	15	NE	NE	101	20.9
Mercury	0.11	NE	NE	0.06 U	0.46
Nickel	17	40,880	1,564	6.1	7.5
Vanadium	355	14,308	548	43.1 J	65.8 J
Zinc	125	613,200	23,464	79.6 J	46.5 J

Data Qualifiers:

J = Analyte present. Reported value may not be accurate or precise.
U = Not detected. The associated number indicates approximate sample concentration necessary to be detected.
ND = Not Detected.
NE = Not established.

mg/kg = milligrams per kilogram.

TABLE 5-5

SUMMARY OF APPENDIX IX INORGANIC DETECTIONS IN SURFACE SOIL - PHASE I RFI
SWMU 30 - FORMER INCINERATOR AREA
NAVAL STATION ROOSEVELT ROADS, CEIBA, PUERTO RICO

Sample ID Sample Date Depth Range	2 X Average Detected Background (mg/kg)	**EPA Region III Industrial RBC** (mg/kg)	EPA Region III Residential RBC (mg/kg)	Number Exceeding 2 X Average Detected Background	Range Exceeding 2 X Average Detected Background	**Number Exceeding EPA Region III Industrial RBC**	**Range Exceeding EPA Region III Industrial RBC**	Number Exceeding EPA Region III Residential RBC	Range Exceeding EPA Region III Residential RBC
Inorganics (mg/kg)									
Arsenic	2.43	3.82	0.43	0/2		0/2		2/2	0.45J-1.6J
Barium	181	143,080	5,475	0/2		0/2		0/2	
Beryllium	0.45	4,100	160	0/2		0/2		0/2	
Cadmium	ND	2,044	78	2/2	0.24J-1J	0/2		0/2	
Chromium	59	NE	NE	0/2		NE		NE	
Cobalt	44	122,640	4,693	0/2		0/2		0/2	
Copper	234.2	81,760	3,129	0/2		0/2		0/2	
Lead	15	NE	NE	2/2	20.9-101	NE		NE	
Mercury	0.11	NE	NE	1/2	0.46	NE		NE	
Nickel	17	40,880	1,564	0/2		0/2		0/2	
Vanadium	355	14,308	548	0/2		0/2		0/2	
Zinc	125	613,200	23,464	0/2		0/2		0/2	

Data Qualifiers:

J = Analyte present. Reported value may not be accurate or precise.
U = Not detected. The associated number indicates approximate sample concentration necessary to be detected.
ND = Not Detected.
NE = Not established.

mg/kg = milligrams per kilogram.

TABLE 5-5

SUMMARY OF APPENDIX IX INORGANIC DETECTIONS IN SURFACE SOIL - PHASE I RFI
SWMU 30 - FORMER INCINERATOR AREA
NAVAL STATION ROOSEVELT ROADS, CEIBA, PUERTO RICO

Sample ID Sample Date Depth Range	2 X Average Detected Background (mg/kg)	**EPA Region III Industrial RBC** (mg/kg)	EPA Region III Residential RBC (mg/kg)	Location Maximum Detect
Inorganics (mg/kg)				
Arsenic	2.43	3.82	0.43	30SS06
Barium	181	143,080	5,475	30SS01
Beryllium	0.45	4,100	160	30SS04
Cadmium	ND	2,044	78	30SS03
Chromium	59	NE	NE	30SS04
Cobalt	44	122,640	4,693	30SS04
Copper	234.2	81,760	3,129	30SS04
Lead	15	NE	NE	30SS03
Mercury	0.11	NE	NE	30SS04
Nickel	17	40,880	1,564	30SS04
Vanadium	355	14,308	548	30SS04
Zinc	125	613,200	23,464	30SS03

Data Qualifiers:

J = Analyte present. Reported value may not be accurate or precise.
U = Not detected. The associated number indicates approximate sample concentration necessary to be detected.
ND = Not Detected.
NE = Not established.

mg/kg = milligrams per kilogram.

TABLE 5-6

SUMMARY OF (TOTAL) INORGANIC DETECTIONS IN GROUNDWATER - PHASE I RFI
SWMU 30 - FORMER INCINERATOR AREA
NAVAL STATION ROOSEVELT ROADS, CEIBA, PUERTO RICO

Sample ID Sample Date	2 X Average Detected Background (ug/l)	**Federal MCL** (ug/l)	EPA Region III Tap Water RBC (ug/l)	1983-DW1 10/25/95	1983-MW3 10/25/95
Total Inorganics (ug/l)					
Antimony	ND	6.0	14.6	**16.2**	**31.5**
Arsenic	3.6	50.0	0.045	1.6 U	4.4
Barium	706	2,000	2,555	51.2	173
Chromium	117	100	180	4.6 U	6.6
Cobalt	142	NE	2,190	2.5	5.9
Copper	299	1,300	1,460	10	28.2
Lead	7.1	15.0	NE	0.8 UJ	1.5 J
Mercury	ND	2.0	NE	0.23 J	0.1 U
Nickel	89.8	100	730	3.7 U	4.2
Vanadium	419	NE	255.5	17.8	208
Zinc	722	NE	10,950	72,000	20.4

Data Qualifiers:

J = Analyte present. Reported value may not be accurate or precise.
U = Not detected. The associated number indicates approximate sample concentration necessary to be detected.
UJ = Not detected. Quantitation limit may be inaccurate or imprecise.
ND = Not Detected.
NE = Not Established.

ug/l = micrograms per liter.

TABLE 5-6

SUMMARY OF (TOTAL) INORGANIC DETECTIONS IN GROUNDWATER - PHASE I RFI
SWMU 30 - FORMER INCINERATOR AREA
NAVAL STATION ROOSEVELT ROADS, CEIBA, PUERTO RICO

Sample ID Sample Date	2 X Average Detected Background (ug/l)	**Federal MCL** (ug/l)	EPA Region III Tap Water RBC (ug/l)	Number Exceeding 2 X Average Detected Background	Range Exceeding 2 X Average Detected Background	**Number Exceeding Federal MCL**	**Range Exceeding Federal MCL**	Number Exceeding EPA Region III Tap Water RBC	Range Exceeding EPA Region III Tap Water RBC	Location Maximum Detect
Total Inorganics (ug/l)										
Antimony	ND	6.0	14.6	NE		2/2	16.2-31.5	2/2	16.2-31.5	1983-MW3
Arsenic	3.6	50.0	0.045	1/2	4.4	0/2		1/2	4.4	1983-MW3
Barium	706	2,000	2,555	0/2		0/2		0/2		1983-MW3
Chromium	117	100	180	0/2		0/2		0/2		1983-MW3
Cobalt	142	NE	2,190	0/2		NE		0/2		1983-MW3
Copper	299	1,300	1,460	0/2		0/2		0/2		1983-MW3
Lead	7.1	15.0	NE	0/2		0/2		NE		1983-MW3
Mercury	ND	2.0	NE	NE		0/2		NE		1983-DW1
Nickel	89.8	100	730	0/2		0/2		0/2		1983-MW3
Vanadium	419	NE	255.5	0/2		NE		0/2		1983-MW3
Zinc	722	NE	10,950	1/2	72,000	NE		1/2	72,000	1983-DW1

Data Qualifiers:

J = Analyte present. Reported value may not be accurate or precise.
U = Not detected. The associated number indicates approximate sample concentration necessary to be detected.
UJ = Not detected. Quantitation limit may be inaccurate or imprecise.
ND = Not Detected.
NE = Not Established.

ug/l = micrograms per liter.

TABLE 5-7 (continued)

SUMMARY OF (DISSOLVED) INORGANIC DETECTIONS IN GROUNDWATER - PHASE I RFI
SWMU 30 - FORMER INCINERATOR AREA
NAVAL STATION ROOSEVELT ROADS, CEIBA, PUERTO RICO

Sample ID Sample Date	2 X Average Detected Background (ug/l)	**Federal MCL** (ug/l)	EPA Region III Tap Water RBC (ug/l)	1983-DW1 10/25/95	1983-MW3 10/25/95
Dissolved Inorganics (ug/l)					
Antimony	ND	6.00	14.60	**23.3**	12.3 U
Arsenic	ND	50	0.04	1.6 U	3
Barium	239	2,000	2,555	47.3	108
Cobalt	58.6	NE	2,190	3.4	4.2
Copper	17.7	1,300	1,460	3.1	2.1
Mercury	ND	2.00	NE	0.18 J	0.1 U
Vanadium	6	NE	256	16.9	177
Zinc	75.7	NE	10,950	27.6	4.4

Data Qualifiers:

J = Analyte present. Reported value may not be accurate or precise.
U = Not detected. The associated number indicates approximate sample concentration necessary to be detected.
ND = Not Detected.
NE = Not Established.

ug/l = micrograms per liter.

TABLE 5-7 (continued)

SUMMARY OF (DISSOLVED) INORGANIC DETECTIONS IN GROUNDWATER - PHASE I RFI
SWMU 30 - FORMER INCINERATOR AREA
NAVAL STATION ROOSEVELT ROADS, CEIBA, PUERTO RICO

Sample ID Sample Date	2 X Average Detected Background (ug/l)	**Federal MCL** (ug/l)	EPA Region III Tap Water RBC (ug/l)	Number Exceeding 2 X Average Detected Background	Range Exceeding 2 X Average Detected Background	**Number Exceeding Federal MCL**	**Range Exceeding Federal MCL**	Number Exceeding EPA Region III Tap Water RBC	Range Exceeding EPA Region III Tap Water RBC	Location Maximum Detect
Dissolved Inorganics (ug/l)										
Antimony	ND	6.00	14.60	NE		1/2	23.3	1/2	23.3	1983-DW1
Arsenic	ND	50	0.04	NE		0/2		1/2	3	1983-MW3
Barium	239	2,000	2,555	0/2		0/2		0/2		1983-MW3
Cobalt	58.6	NE	2,190	0/2		NE		0/2		1983-MW3
Copper	17.7	1,300	1,460	0/2		0/2		0/2		1983-DW1
Mercury	ND	2.00	NE	NE		0/2		NE		1983-DW1
Vanadium	6	NE	256	2/2	16.9-177	NE		0/2		1983-MW3
Zinc	75.7	NE	10,950	0/2		NE		0/2		1983-DW1

Data Qualifiers:

J = Analyte present. Reported value may not be accurate or precise.
U = Not detected. The associated number indicates approximate sample concentration necessary to be detected.
ND = Not Detected.
NE = Not Established.

ug/l = micrograms per liter.

TABLE 5-8

SUMMARY OF ADDITIONAL SOIL LABORATORY ANALYTICAL RESULTS FOR VOCs, SEMIVOLATILES, PCBs, AND TCLP METALS

SWMU 30 – UST SITE CHARACTERIZATION
ROOSEVELT ROADS, U.S. NAVAL STATION
CEIBA, PUERTO RICO

Soil Boring	EPA Method	Constituents Detected	Concentration/Result	Units
1983-SB3 (6-8)	6010 and 7470	Silver	0.010	mg/Kg
	8080	Aroclor 1260 (PCB)	38	µg/Kg
	8240	ND	--	--
	8270	ND	--	--
1983-SB4 (8-10)	6010 and 7470	ND	--	--
	8080	ND	--	--
	8240	ND	--	--
	8270	ND	--	--
1983-SB6 (4-6)	6010 and 7470	Barium	1.2	mg/Kg
	8080	Aroclor 1260 (PCB)	80	µg/Kg
	8240	Napthalene	26,000	µg/Kg
	8270	Acenaphthene	3,400	µg/Kg
	--	N-Nitrosediphenylamine/	3,600	µg/Kg
	--	diphenylamine		
	--	Phenanthrene	6,900	µg/Kg
	--	2-Methylnaphthalene	64,000	µg/Kg
1983-SB6 (8-10)	6010 and 7470	Barium	1.2	mg/Kg
	8080	Aroclor 1260 (PCB)	130	µg/Kg
	8240	ND	--	--
	8270	ND	--	--
1983-SB7 (10-12)	8240	ND	--	--
	8270	ND	--	--
1983-Soil Cuttings	6010 and 7470	Barium	1.1	mg/Kg
	8080	Aroclor-1260 (PCB)	8.3	--
	--	(corrosivity) pH	<1.0	mg/Kg
	--	(reactivity) Cyanide	No Flash	--
	--	(ignitability), Flash Point	<10	mg/Kg
	--	(reactivity) Sulfide	120	µg/Kg

Notes:

VOC = volatile organic compounds
µg/Kg = micrograms per kilogram
mg/Kg = milligrams per kilogram
ND = None Detected

Source: Blasland, Bouck & Lee, Inc.; Savannah Laboratories; and ECG Laboratories, 1994.

TABLE 5-9

SUMMARY OF INORGANIC DETECTIONS IN BACKGROUND SURFACE SOIL
SWMU 30 - FORMER INCINERATOR AREA
NAVAL STATION ROOSEVELT ROADS, PUERTO RICO

Sample ID	EPA Region III	**EPA Region III**	BGMW01-00	BGMW02-00	BGMW03-00	BGMW04-00
Sample Date	Industrial	**Residential**	04/04/96	04/04/96	04/04/96	04/04/96
Depth Range (ft.)	RBC	**RBC**	0.00-1.00	0.00-1.00	0.00-1.00	0.00-1.00
	(mg/kg)	(mg/kg)				
Inorganics (mg/kg)						
Arsenic	3.8	0.43	**1.2**	0.35 J	**1.5**	**1.8**
Barium	143,080	5,475	169	94.1	35.6	63.7
Beryllium	4,100	160	0.36	0.1 U	0.28	0.21
Chromium	6,132	235	44.1 J	11 J	33.6 J	29.9 J
Cobalt	122,640	4,693	30.2	27	9.5	21.2
Copper	81,760	3,129	98.5	250	57	62.9
Lead	NE	NE	9.6	2.4	6.6	11.9
Mercury	NE	NE	0.06	0.04 U	0.07	0.07
Nickel	40,880	1,564	10.9	7.8	5.8	8.6
Selenium	10,220	391	0.56 J	0.13 UJ	1.2 J	1.1 J
Thallium	143	5.5	0.1 J	0.08 U	0.09 UJ	0.09 UJ
Tin	1,226,400	46,929	1.3 U	1.2 U	1.4	2.2
Vanadium	14,308	548	227	123	189	170
Zinc	613,200	23,464	106 J	66.2 J	34.2 J	43.9 J

Data Qualifiers:

U = Not Detected. The associated number indicates the approximate sample concentration necessary to be detected.
UJ = Not detected, quantitation limit may be inaccurate or imprecise.
J = Analyte present. Reported value may not be accurate or precise.

NE = Not Established.
mg/kg = milligrams per kilogram.

TABLE 5-9

SUMMARY OF INORGANIC DETECTIONS IN BACKGROUND SURFACE SOIL
SWMU 30 - FORMER INCINERATOR AREA
NAVAL STATION ROOSEVELT ROADS, PUERTO RICO

Sample ID Sample Date Depth Range (ft.)	EPA Region III Industrial RBC (mg/kg)	**EPA Region III Residential RBC** (mg/kg)	Number Exceeding EPA Region III Industrial RBC	Range Exceeding EPA Region III Industrial RBC	**Number Exceeding EPA Region III Residential RBC**	**Range Exceeding EPA Region III Residential RBC**	Location Maximum Detect
Inorganics (mg/kg)							
Arsenic	3.8	0.43	0/4		3/4	1.2-1.8	BGMW04-00
Barium	143,080	5,475	0/4		0/4		BGMW01-00
Beryllium	4,100	160	0/4		0/4		BGMW01-00
Chromium	6,132	235	0/4		0/4		BGMW01-00
Cobalt	122,640	4,693	0/4		0/4		BGMW01-00
Copper	81,760	3,129	0/4		0/4		BGMW02-00
Lead	NE	NE	NE		NE		BGMW04-00
Mercury	NE	NE	NE		NE		BGMW03-00, BGMW04-00
Nickel	40,880	1,564	0/4		0/4		BGMW01-00
Selenium	10,220	391	0/4		0/4		BGMW03-00
Thallium	143	5.5	0/4		0/4		BGMW01-00
Tin	1,226,400	46,929	0/4		0/4		BGMW04-00
Vanadium	14,308	548	0/4		0/4		BGMW01-00
Zinc	613,200	23,464	0/4		0/4		BGMW01-00

Data Qualifiers:

U = Not Detected. The associated number indicates the approximate sample concentration necessary to be detected.
UJ = Not detected, quantitation limit may be inaccurate or imprecise.
J = Analyte present. Reported value may not be accurate or precise.

NE = Not Established.
mg/kg = milligrams per kilogram.

TABLE 5-10

SUMMARY OF ORGANIC DETECTIONS IN BACKGROUND SUBSURFACE SOIL
SWMU 30 - FORMER INCINERATOR AREA
NAVAL STATION ROOSEVELT ROADS, PUERTO RICO

Sample ID	EPA Region III	**EPA Region III**	BGMW01-04	BGMW01-06	BGMW02-05	BGMW02-08	BGMW03-03	BGMW03-04	BGMW04-02	BGMW04-
Sample Date	Industrial	**Residential**	04/23/96	04/23/96	04/22/96	04/22/96	04/12/96	04/12/96	04/24/96	04/24/96
Depth Range (ft.)	RBC	**RBC**	8.00-10.00	12.00-14.00	10.00-12.00	16.00-18.00	6.00-8.00	8.00-10.00	4.00-6.00	8.00-10.0(
	(ug/kg)	(ug/kg)								
Volatiles (ug/kg)										
Xylene (total)	4,088,000,000	156,428,571	2 J	3 J	8 U	7 U	7 U	2 J	6 U	7
Semivolatiles (ug/kg)										
Di-n-butylphthalate	204,400,000	7,821,429	440 U	490 U	320 J	470 U	460 U	440 U	420 U	420
Pesticides/PCBs (ug/kg)										
Dioxins (ug/kg)										
Total HxCDD	0.38	0.043	0.14 U	0.23 U	0.3 U	0.13 U	**0.31** J	0.26 U	0.35 U	0.42
Chlorinated Herbicides (ug/kg)										
2,4,5-T	20,440,000	782,143	44 U	27 J	53 U	47 U	46 U	45 U	42 U	45
OP-Pesticides (ug/kg)										

Data Qualifiers:

U = Not Detected. The associated number indicates the aproximate sample concentration necessary to be detected.
J = Analyte present. Reported value may not be accurate or precise.

ug/kg = micrograms per kilogram.

TABLE 5-10

SUMMARY OF ORGANIC DETECTIONS IN BACKGROUND SUBSURFACE SOIL
SWMU 30 - FORMER INCINERATOR AREA
NAVAL STATION ROOSEVELT ROADS, PUERTO RICO

Sample ID Sample Date Depth Range (ft.)	EPA Region III Industrial RBC (ug/kg)	**EPA Region III Residential RBC** (ug/kg)	04)
Volatiles (ug/kg)			
Xylene (total)	4,088,000,000	156,428,571	U
Semivolatiles (ug/kg)			
Di-n-butylphthalate	204,400,000	7,821,429	U
Pesticides/PCBs (ug/kg)			
Dioxins (ug/kg)			
Total HxCDD	0.38	0.043	U
Chlorinated Herbicides (ug/kg)			
2,4,5-T	20,440,000	782,143	U
OP-Pesticides (ug/kg)			

Data Qualifiers:

U = Not Detected. The associated number indicates the aproximate sample concentration necessary to be detected.
J = Analyte present. Reported value may not be accurate or precise.

ug/kg = micrograms per kilogram.

TABLE 5-10

SUMMARY OF ORGANIC DETECTIONS IN BACKGROUND SUBSURFACE SOIL
SWMU 30 - FORMER INCINERATOR AREA
NAVAL STATION ROOSEVELT ROADS, PUERTO RICO

Sample ID Sample Date Depth Range (ft.)	EPA Region III Industrial RBC (ug/kg)	**EPA Region III Residential RBC** (ug/kg)	Number Exceeding EPA Region III Industrial RBC	Range Exceeding EPA Region III Industrial RBC	**Number Exceeding EPA Region III Residential RBC**	**Range Exceeding EPA Region III Residential RBC**	Location Maximum Detect
Volatiles (ug/kg)							
Xylene (total)	4,088,000,000	156,428,571	0/8		0/8		BGMW01-06
Semivolatiles (ug/kg)							
Di-n-butylphthalate	204,400,000	7,821,429	0/8		0/8		BGMW02-05
Pesticides/PCBs (ug/kg)							
Dioxins (ug/kg)							
Total HxCDD	0.38	0.043	0/8		1/8	0.31J	BGMW03-03
Chlorinated Herbicides (ug/kg)							
2,4,5-T	20,440,000	782,143	0/8		0/8		BGMW01-06
OP-Pesticides (ug/kg)							

Data Qualifiers:

U = Not Detected. The associated number indicates the aproximate sample concentration necessary to be detected.
J = Analyte present. Reported value may not be accurate or precise.

ug/kg = micrograms per kilogram.

TABLE 5-11 (continued)

SUMMARY OF INORGANIC DETECTIONS IN BACKGROUND SUBSURFACE SOIL
SWMU 30 - FORMER INCINERATOR AREA
NAVAL STATION ROOSEVELT ROADS, PUERTO RICO

Sample ID	EPA Region III Industrial RBC (mg/kg)	**EPA Region III Residential RBC** (mg/kg)	BGMW01-04	BGMW01-06	BGMW02-05	BGMW02-08	BGMW03-03	BGMW03-04	BGMW04-02	BGMW04-
Sample Date			04/23/96	04/23/96	04/22/96	04/22/96	04/12/96	04/12/96	04/24/96	04/24/96
Depth Range (ft.)			8.00-10.00	12.00-14.00	10.00-12.00	16.00-18.00	6.00-8.00	8.00-10.00	4.00-6.00	8.00-10.0
Inorganics (mg/kg)										
Arsenic	3.82	0.43	**1.7**	0.22 UJ	**0.71** J	**1**	**2.4** J	**0.76** J	**0.72**	**0.79**
Barium	143,080	5,475	13 J	243 J	178 J	178 J	9.7	3.5	246 J	17.3
Beryllium	4,100	160	0.29	0.7	0.37	0.74	0.15	0.25	0.33	0.13
Cadmium	2,044	78.21	0.46	0.44	0.4 U	0.62	0.33 UJ	0.33 UJ	0.48	0.43
Chromium	6,132	235	101 J	84.1 J	148 J	29.1 J	58.9 R	63.6 R	34.7 J	10.9
Cobalt	122,640	4,693	3.7	14	15.7	42.4	2	4.3	33.8	4.1
Copper	81,760	3,129	65.3	120	144	131	72.9 R	94.5 R	107	37.6
Lead	NE	NE	4.8	4.9	3.3	2.6	4.1 J	3.4 J	5	6.6
Mercury	NE	NE	0.05 U	0.06 U	0.06 U	0.05 U	0.06 UJ	0.17 J	0.06 U	0.06
Nickel	40,880	1,564	7.2	39.9	35.6	23	3.7	5.8	10.2	2.2
Selenium	10,220	391	0.22 J	0.17 UJ	0.19 UJ	0.16 UJ	1.2 J	0.3 UJ	0.37 J	0.16
Tin	1,226,400	46,929	1.4 UJ	3.1 J	1.9 UJ	3.4 J	1.5 UJ	1.5 UJ	1.4 UJ	1.5
Vanadium	14,308	548	206	256	373	232	204	260	234	83.9
Zinc	613,200	23,464	24.1 J	64.6 J	55.7 J	98.5 J	14 J	23 J	56.2 J	18.4

Data Qualifiers:

U = Not Detected. The associated number indicates the approximate sample concentration necessary to be detected.
R = Unreliable result. Analyte may or may not be present in the sample. Supporting data necessary to confirm result.
UJ = Not detected, quantitation limit may be inaccurate or imprecise.
J = Analyte present. Reported value may not be accurate or precise.

NE = Not Established.
mg/kg = milligrams per kilogram.

TABLE 5-12 (continued)

SUMMARY OF ORGANIC DETECTIONS IN BACKGROUND GROUNDWATER
SWMU 30 - FORMER INCINERATOR AREA
NAVAL STATION ROOSEVELT ROADS, PUERTO RICO

Sample ID		**EPA Region III**				
	Federal	**Tap Water**	BGMW01	BGMW02	BGMW03	BGMW04
Sample Date	MCL	**RBC**	04/27/96	04/27/96	04/16/96	04/27/96
	(ug/l)	(ug/l)				
Volatiles (ug/l)						
Semivolatiles (ug/l)						
Acetophenone	NE	0.04	11 U	10 U	**1** J	10 U
Dimethylphthalate	NE	365,000	11 U	1 J	3 J	10 U
Bis(2-ethylhexyl)phthalate	6	4.78	11 U	10 U	**7** J	10 U
Pesticides/PCBs (ug/l)						
Dioxins (ug/l)						
Chlorinated Herbicides (ug/l)						
OP-Pesticides (ug/l)						

Data Qualifiers:

U = Not Detected. The associated number indicates the approximate sample concentration necessary to be detected.
J = Analyte present. Reported value may not be accurate or precise.

NE = Not Established.
ug/l = micrograms per liter.

TABLE 5-12 (continued)

SUMMARY OF ORGANIC DETECTIONS IN BACKGROUND GROUNDWATER
SWMU 30 - FORMER INCINERATOR AREA
NAVAL STATION ROOSEVELT ROADS, PUERTO RICO

Sample ID Sample Date	Federal MCL (ug/l)	EPA Region III **Tap Water RBC** (ug/l)	Number Exceeding Federal MCL	Range Exceeding Federal MCL	**Number Exceeding EPA Region III Tap Water RBC**	**Range Exceeding EPA Region III Tap Water RBC**	Location Maximum Detect
Volatiles (ug/l)							
Semivolatiles (ug/l)							
Acetophenone	NE	0.04	NE		1/4	1J	BGMW03
Dimethylphthalate	NE	365,000	NE		0/4		BGMW03
Bis(2-ethylhexyl)phthalate	6	4.78	1/4	7J	1/4	7J	BGMW03
Pesticides/PCBs (ug/l)							
Dioxins (ug/l)							
Chlorinated Herbicides (ug/l)							
OP-Pesticides (ug/l)							

Data Qualifiers:

U = Not Detected. The associated number indicates the approximate sample concentration necessary to be detected.
J = Analyte present. Reported value may not be accurate or precise.

NE = Not Established.
ug/l = micrograms per liter.

TABLE 5-13 (continued)

SUMMARY OF TOTAL AND DISSOLVED INORGANIC DETECTIONS IN BACKGROUND GROUNDWATER
SWMU 30 - FORMER INCINERATOR AREA
NAVAL STATION ROOSEVELT ROADS, PUERTO RICO

Sample ID Sample Date	Federal MCL (ug/l)	EPA Region III **Tap Water RBC** (ug/l)	BGMW01 04/27/96	BGMW02 04/27/96	BGMW03 04/16/96	BGMW04 04/27/96
Inorganics, Total (ug/l)						
Arsenic	50	0.04	1.8 U	1.8 U	**1.7** J	**3.6**
Barium	2,000	2,555	275	212	313	612
Beryllium	4	73	2	1.1 U	1.1 U	2.3
Cadmium	5	18.25	7.5	2.9 U	2.9 U	2.9 U
Chromium	100	109.5	54.1	3.1 R	29.4	92
Cobalt	NE	2,190	91.8	54.3	55.4	83.4
Copper	1,300	1,460	120	24	102	352
Lead	15	NE	4.3 J	0.9 UJ	2.5 J	7 J
Nickel	100	730	73.7	40	26.4	39.4
Selenium	50	182.5	2.8 UJ	1.4 UJ	1.4 UJ	3.1 J
Vanadium	NE	255.5	159	26.8	103	**549**
Zinc	NE	11,000	178	95.7	128	320
Inorganics, Dissolved (ug/l)						
Barium	2,000	2,555	82	148	121	126
Chromium	100	109.5	2.6 U	2.6 U	3.7	2.6 U
Cobalt	NE	2,190	59.4	44.4	11.5	3.9 U
Copper	1,300	1,460	32	2.2 U	2.2 U	2.2 U
Nickel	100	730	34.1	35.6	11.1 U	11.1 U
Vanadium	NE	255.5	2.6 U	2.6 U	2.6 U	8.1
Zinc	NE	11,000	82.6	60.6	4.4 J	3.8

Data Qualifiers:

U = Not Detected. The associated number indicates the approximate sample concentration necessary to be detected.
R = Unreliable result. Analyte may or may not be present in the sample. Supporting data necessary to confirm result.
UJ = Not detected, quantitation limit may be inaccurate or imprecise.
J = Analyte present. Reported value may not be accurate or precise.

NE = Not Established.
ug/l = micrograms per liter.

TABLE 5-13 (continued)

SUMMARY OF TOTAL AND DISSOLVED INORGANIC DETECTIONS IN BACKGROUND GROUNDWATER
SWMU 30 - FORMER INCINERATOR AREA
NAVAL STATION ROOSEVELT ROADS, PUERTO RICO

Sample ID Sample Date	Federal MCL (ug/l)	EPA Region III **Tap Water RBC** (ug/l)	Number Exceeding Federal MCL	Range Exceeding Federal MCL	**Number Exceeding EPA Region III Tap Water RBC**	**Range Exceeding EPA Region III Tap Water RBC**	Location Maximum Detect
Inorganics, Total (ug/l)							
Arsenic	50	0.04	0/4		2/4	1.7J-3.6	BGMW04
Barium	2,000	2,555	0/4		0/4		BGMW04
Beryllium	4	73	0/4		0/4		BGMW04
Cadmium	5	18.25	1/4	7.5	0/4		BGMW01
Chromium	100	109.5	0/3		0/3		BGMW04
Cobalt	NE	2,190	NE		0/4		BGMW01
Copper	1,300	1,460	0/4		0/4		BGMW04
Lead	15	NE	0/4		NE		BGMW04
Nickel	100	730	0/4		0/4		BGMW01
Selenium	50	182.5	0/4		0/4		BGMW04
Vanadium	NE	255.5	NE		1/4	549	BGMW04
Zinc	NE	11,000	NE		0/4		BGMW04
Inorganics, Dissolved (ug/l)							
Barium	2,000	2,555	0/4		0/4		BGMW02
Chromium	100	109.5	0/4		0/4		BGMW03
Cobalt	NE	2,190	NE		0/4		BGMW01
Copper	1,300	1,460	0/4		0/4		BGMW01
Nickel	100	730	0/4		0/4		BGMW02
Vanadium	NE	255.5	NE		0/4		BGMW04
Zinc	NE	11,000	NE		0/4		BGMW01

Data Qualifiers:

U = Not Detected. The associated number indicates the approximate sample concentration necessary to be detected.
R = Unreliable result. Analyte may or may not be present in the sample. Supporting data necessary to confirm result.
UJ = Not detected, quantitation limit may be inaccurate or imprecise.
J = Analyte present. Reported value may not be accurate or precise.

NE = Not Established.
ug/l = micrograms per liter.

TABLE 5-14

SUMMARY OF ORGANIC DETECTIONS IN SURFACE SOIL - PHASE II RFI
SWMU 30 - FORMER INCINERATOR AREA
NAVAL STATION ROOSEVELT ROADS, CEIBA, PUERTO RICO

Sample ID	EPA Region III	**EPA Region III**	30-HP01-01	30-HP02-01	30-HP03-01	30-HP03-01D	30-HP04-01	30-HP04-01D	30-HP05-01
Sample Date	Industrial	**Residential**	06/23/99	06/23/99	06/22/99	06/22/99	06/23/99	06/23/99	06/23/99
Depth Range	RBC	**RBC**	0.00-2.50	0.00-2.50	0.00-2.50	0.00-2.50	0.00-2.50	0.00-2.50	0.00-2.50
	(ug/kg)	(ug/kg)							
Semivolatiles (ug/kg)									
Benzo(a)anthracene	7,800	870	380 U	350 U	350 U	360 U	350 U	230 J	350 U
Benzo(a)pyrene	780	87	380 U	350 U	350 U	360 U	350 U	**200** J	350 U
Benzo(b)fluoranthene	7,800	870	380 U	350 U	350 U	360 U	350 U	280 J	350 U
Benzo(k)fluoranthene	78,000	8,700	380 U	350 U	350 U	360 U	350 U	240 J	350 U
Chrysene	780,000	87,000	380 U	350 U	350 U	360 U	350 U	390	350 U
Fluoranthene	82,000,000	3,100,000	380 U	350 U	350 U	360 U	350 U	260 J	350 U
Pyrene	61,000,000	2,300,000	380 U	350 U	350 U	360 U	350 U	240 J	350 U
BTEX (ug/kg)									
Hydrocarbons (mg/kg)									
Hydrocarbons as GRO	NE	NE	0.28 U	0.26 U	0.27 U	0.27 U	0.27 U	0.26 U	0.16 J
Hydrocarbons as DRO	NE	NE	3.7 U	7.9	0.91 J	0.98 J	1.3 J	3 J	3.7
Pesticides/PCBs (ug/kg)									
Aroclor-1260	2,862	319	72	**1,200**	35 U	36 U	25 J	64	**1,400**

Data Qualifiers:

J = Analyte present. Reported value may not be accurate or precise.
U = Not detected. The associated number indicates approximate sample concentration necessary to be detected.
NA = Not analyzed.
NE = Not established.

mg/kg = milligrams per kilogram.
ug/kg = micrograms per kilogram.

TABLE 5-14

SUMMARY OF ORGANIC DETECTIONS IN SURFACE SOIL - PHASE II RFI
SWMU 30 - FORMER INCINERATOR AREA
NAVAL STATION ROOSEVELT ROADS, CEIBA, PUERTO RICO

Sample ID Sample Date Depth Range	EPA Region III Industrial RBC (ug/kg)	**EPA Region III Residential RBC** (ug/kg)	Number Exceeding EPA Region III Industrial RBC	Range Exceeding EPA Region III Industrial RBC	**Number Exceeding EPA Region III Residential RBC**	**Range Exceeding EPA Region III Residential RBC**	Location Maximum Detect
Semivolatiles (ug/kg)							
Benzo(a)anthracene	7,800	870	0/7		0/7		30-HP04-01D
Benzo(a)pyrene	780	87	0/7		1/7	200 J	30-HP04-01D
Benzo(b)fluoranthene	7,800	870	0/7		0/7		30-HP04-01D
Benzo(k)fluoranthene	78,000	8,700	0/7		0/7		30-HP04-01D
Chrysene	780,000	87,000	0/7		0/7		30-HP04-01D
Fluoranthene	82,000,000	3,100,000	0/7		0/7		30-HP04-01D
Pyrene	61,000,000	2,300,000	0/7		0/7		30-HP04-01D
BTEX (ug/kg)							
Hydrocarbons (mg/kg)							
Hydrocarbons as GRO	NE	NE	NE		NE		30-HP05-01
Hydrocarbons as DRO	NE	NE	NE		NE		30-HP02-01
Pesticides/PCBs (ug/kg)							
Aroclor-1260	2,862	319	0/8		2/8	1,200-1,400	30-HP05-01

Data Qualifiers:

J = Analyte present. Reported value may not be accurate or precise.
U = Not detected. The associated number indicates approximate sample concentration necessary to be detected.
NA = Not analyzed.
NE = Not established.

mg/kg = milligrams per kilogram.
ug/kg = micrograms per kilogram.

TABLE 5-15 (Continued)

SUMMARY OF ORGANIC DETECTIONS IN SUBSURFACE SOIL
(SWMU 30)
NAVAL STATION ROOSEVELT ROADS, PUERTO RICO

SAMPLE ID	2 X Average	EPA Region III	**EPA Region III**	30-HP01-02	30-HP01-03	30-HP02-02	30-HP02-03	30-HP03-02	30-HP03-03
SAMPLE DATE	Detected	Industrial	**Residential**	06/23/99	06/23/99	06/23/99	06/23/99	06/22/99	06/22/99
DEPTH RANGE	Background	RBC	RBC	6.00-7.00	8.00-9.00	6.00-7.00	8.00-9.00	5.00-6.00	8.00-9.00
	(mg/kg)	(mg/kg)	(mg/kg)						
Inorganics (mg/kg)									
Antimony	5.733	818	31	0.29 J	0.29 J	0.28 J	0.51 J	0.71 J	0.34 J

TABLE 5-15 (Continued)

SUMMARY OF ORGANIC DETECTIONS IN SUBSURFACE SOIL
(SWMU 30)
NAVAL STATION ROOSEVELT ROADS, PUERTO RICO

SAMPLE ID	2 X Average	EPA Region III	**EPA Region III**	30-HP04-02	30-HP04-03	30-HP05-01	30-HP05-02	30-HP05-03	30-HP06-01
SAMPLE DATE	Detected	Industrial	**Residential**	06/23/99	06/23/99	06/23/99	06/23/99	06/23/99	06/22/99
DEPTH RANGE	Background	RBC	RBC	6.00-7.00	8.00-9.00	0.00-2.50	6.00-7.00	8.00-9.00	5.00-6.00
	(mg/kg)	(mg/kg)	(mg/kg)						
Inorganics (mg/kg)									
Antimony	5.733	818	31	0.28 J	0.29 J	0.29 J	0.3 J	0.33 J	NA

TABLE 5-15 (Continued)

SUMMARY OF ORGANIC DETECTIONS IN SUBSURFACE SOIL
(SWMU 30)
NAVAL STATION ROOSEVELT ROADS, PUERTO RICO

SAMPLE ID	2 X Average	EPA Region III	**EPA Region III**	30-HP06-02	30-HP07-01	30-HP12-01	30-HP13-01	30-HP13-02	30-HP14-0
SAMPLE DATE	Detected	Industrial	**Residential**	06/22/99	06/22/99	06/23/99	06/22/99	06/22/99	06/27/99
DEPTH RANGE	Background	RBC	RBC	8.00-10.00	5.00-6.00	5.00-6.00	5.00-7.00	8.00-12.00	0.00-2.50
	(mg/kg)	(mg/kg)	(mg/kg)						
Inorganics (mg/kg)									
Antimony	5.733	818	31	NA	NA	NA	NA	NA	NA

TABLE 5-15 (Continued)

SUMMARY OF ORGANIC DETECTIONS IN SUBSURFACE SOIL
(SWMU 30)
NAVAL STATION ROOSEVELT ROADS, PUERTO RICO

SAMPLE ID SAMPLE DATE DEPTH RANGE	2 X Average Detected Background (mg/kg)	EPA Region III Industrial RBC (mg/kg)	**EPA Region III**1 **Residential** RBC (mg/kg)
Inorganics (mg/kg)			
Antimony	5.733	818	31

TABLE 5-15 (Continued)

SUMMARY OF ORGANIC DETECTIONS IN SUBSURFACE SOIL
(SWMU 30)
NAVAL STATION ROOSEVELT ROADS, PUERTO RICO

SAMPLE ID SAMPLE DATE DEPTH RANGE	2 X Average Detected Background (mg/kg)	EPA Region III Industrial RBC (mg/kg)	**EPA Region III Residential** RBC (mg/kg)	Number Exceeding EPA Region III Industrial RBC	Range Exceeding EPA Region III Industrial RBC	Number Exceeding EPA Region III Residential RBC	Range Exceeding EPA Region III Residential RBC
Inorganics (mg/kg)							
Antimony	5.733	818	31	0/17		0/17	

TABLE 5-15 (Continued)

SUMMARY OF ORGANIC DETECTIONS IN SUBSURFACE SOIL
(SWMU 30)
NAVAL STATION ROOSEVELT ROADS, PUERTO RICO

SAMPLE ID SAMPLE DATE DEPTH RANGE	2 X Average Detected Background (mg/kg)	EPA Region III Industrial RBC (mg/kg)	**EPA Region III Residential** RBC (mg/kg)	LOCATION MAXIMUM DETECT
Inorganics (mg/kg)				
Antimony	5.733	818	31	30-HP03-02

TABLE 5-16 (continued)

SUMMARY OF ORGANIC DETECTIONS IN SUBSURFACE SOIL - PHASE II RFI
SWMU 30 - FORMER INCINERATOR AREA
NAVAL STATION ROOSEVELT ROADS, CEIBA, PUERTO RICO

Sample ID	EPA Region III	**EPA Region III**	30-HP01-02	30-HP01-03	30-HP02-02	30-HP02-03	30-HP03-02	30-HP03-03
Sample Date	Industrial	**Residential**	06/23/99	06/23/99	06/23/99	06/23/99	06/22/99	06/22/99
Depth Range	RBC	**RBC**	6.00-7.00	8.00-9.00	6.00-7.00	8.00-9.00	5.00-6.00	8.00-9.00
	(ug/kg)	(ug/kg)						
Semivolatiles (ug/kg)								
Naphthalene	40,880,000	1,564,290	350 U	350 U	350 U	370 U	350 U	410 U
2-Methylnaphthalene	40,880,000	1,564,290	350 U	350 U	350 U	370 U	350 U	410 U
Dibenzofuran	8,176,000	312,857	350 U	350 U	350 U	370 U	350 U	410 U
Phenanthrene	610,000,000	23,000,000	350 U	350 U	350 U	370 U	350 U	410 U
Pyrene	61,320,000	2,346,429	350 U	350 U	350 U	370 U	350 U	410 U
Bis(2-ethylhexyl)phthalate	408,800	45,623	350 U	350 U	350 U	370 U	350 U	220 J
Diphenylamine	51,100,000	1,955,357	350 U	350 U	350 U	370 U	350 U	410 U
BTEX (ug/kg)								
Benzene	197,352	22,025	6 U	5.4 U	5.3 U	5.6 U	5.3 U	6 U
Toluene	408,800,000	15,642,857	6 U	5.4 U	5.3 U	5.6 U	5.3 U	6 U
Hydrocarbons (mg/kg)								
Hydrocarbons as GRO	NE	NE	0.12 J	0.89 J	0.72 J	2.4	0.26 U	0.31 U
Hydrocarbons as DRO	NE	NE	3.5 U	97	4.6	21	3.5 U	4.1 U
PCBs (ug/kg)								
Aroclor-1260	2,862	319	160	190	96	160	35 U	41 U

Data Qualifiers:

U = Not detected. The associated number indicates approximate sample concentration necessary to be detected.
J = Analyte present. Reported value may not be accurate or precise.
NA = Not Analyzed.
NE - Not Established.
ug/kg = micrograms per kilogram.
mg/kg = milligrams per kilogram.

TABLE 5-16 (continued)

SUMMARY OF ORGANIC DETECTIONS IN SUBSURFACE SOIL - PHASE II RFI
SWMU 30 - FORMER INCINERATOR AREA
NAVAL STATION ROOSEVELT ROADS, CEIBA, PUERTO RICO

Sample ID	EPA Region III	**EPA Region III**	30-HP04-02	30-HP04-03	30-HP05-02	30-HP05-03	30-HP06-01	30-HP06-02
Sample Date	Industrial	**Residential**	06/23/99	06/23/99	06/23/99	06/23/99	06/22/99	06/22/99
Depth Range	RBC	**RBC**	6.00-7.00	8.00-9.00	6.00-7.00	8.00-9.00	5.00-6.00	8.00-10.00
	(ug/kg)	(ug/kg)						
Semivolatiles (ug/kg)								
Naphthalene	40,880,000	1,564,290	340 U	1,300 J	370 U	350 U	NA	NA
2-Methylnaphthalene	40,880,000	1,564,290	340 U	6,100	370 U	350 U	NA	NA
Dibenzofuran	8,176,000	312,857	340 U	240 J	370 U	350 U	NA	NA
Phenanthrene	610,000,000	23,000,000	340 U	820 J	370 U	350 U	NA	NA
Pyrene	61,320,000	2,346,429	340 U	190 J	370 U	350 U	NA	NA
Bis(2-ethylhexyl)phthalate	408,800	45,623	340 U	320 J	370 U	350 U	NA	NA
Diphenylamine	51,100,000	1,955,357	340 U	1,400 J	370 U	350 U	NA	NA
BTEX (ug/kg)								
Benzene	197,352	22,025	4.9	5.1 U	5.6 U	5.4 U	NA	NA
Toluene	408,800,000	15,642,857	4.9	5.1 U	5.6 U	5.4 U	NA	NA
Hydrocarbons (mg/kg)								
Hydrocarbons as GRO	NE	NE	0.26 U	0.24 J	0.28 U	5.7	0.28 U	0.28 U
Hydrocarbons as DRO	NE	NE	47	1,800	3.7 U	3.6	2 J	11
PCBs (ug/kg)								
Aroclor-1260	2,862	319	**1,600**	26 J	56	**2,000**	NA	NA

Data Qualifiers:

U = Not detected. The associated number indicates approximate sample concentration necessary to be detected.
J = Analyte present. Reported value may not be accurate or precise.
NA = Not Analyzed.
NE - Not Established.
ug/kg = micrograms per kilogram.
mg/kg = milligrams per kilogram.

TABLE 5-16 (continued)

SUMMARY OF ORGANIC DETECTIONS IN SUBSURFACE SOIL - PHASE II RFI
SWMU 30 - FORMER INCINERATOR AREA
NAVAL STATION ROOSEVELT ROADS, CEIBA, PUERTO RICO

Sample ID	EPA Region III	**EPA Region III**	30-HP07-01	30-HP11-01	30-HP12-01	30-HP13-01	30-HP13-02	30-HP14-01	30-HP15-01
Sample Date	Industrial	**Residential**	06/22/99	6/24/99	06/23/99	06/22/99	06/22/99	06/27/99	6/24/99
Depth Range	RBC	**RBC**	5.00-6.00	5.00-6.00	5.00-6.00	5.00-7.00	8.00-12.00	5.00-6.00	5.00-6.00
	(ug/kg)	(ug/kg)							
Semivolatiles (ug/kg)									
Naphthalene	40,880,000	1,564,290	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	40,880,000	1,564,290	NA	NA	NA	NA	NA	NA	NA
Dibenzofuran	8,176,000	312,857	NA	NA	NA	NA	NA	NA	NA
Phenanthrene	610,000,000	23,000,000	NA	NA	NA	NA	NA	NA	NA
Pyrene	61,320,000	2,346,429	NA	NA	NA	NA	NA	NA	NA
Bis(2-ethylhexyl)phthalate	408,800	45,623	NA	NA	NA	NA	NA	NA	NA
Diphenylamine	51,100,000	1,955,357	NA	NA	NA	NA	NA	NA	NA
BTEX (ug/kg)									
Benzene	197,352	22,025	NA	NA	NA	NA	NA	NA	NA
Toluene	408,800,000	15,642,857	NA	NA	NA	NA	NA	NA	NA
Hydrocarbons (mg/kg)									
Hydrocarbons as GRO	NE	NE	0.27 U	0.27 U	0.27 U	0.3 U	0.31 U	0.27 U	0.29 U
Hydrocarbons as DRO	NE	NE	18	1.1 J	3 J	14	1.8 J	4	0.97 J
PCBs (ug/kg)									
Aroclor-1260	2,862	319	NA	NA	NA	NA	NA	NA	NA

Data Qualifiers:

U = Not detected. The associated number indicates approximate sample concentration necessary to be detected.
J = Analyte present. Reported value may not be accurate or precise.
NA = Not Analyzed.
NE - Not Established.
ug/kg = micrograms per kilogram.
mg/kg = milligrams per kilogram.

TABLE 5-16 (continued)

SUMMARY OF ORGANIC DETECTIONS IN SUBSURFACE SOIL - PHASE II RFI
SWMU 30 - FORMER INCINERATOR AREA
NAVAL STATION ROOSEVELT ROADS, CEIBA, PUERTO RICO

Sample ID Sample Date Depth Range	EPA Region III Industrial RBC (ug/kg)	**EPA Region III Residential RBC** (ug/kg)	Number Exceeding EPA Region III Industrial RBC	Range Exceeding EPA Region III Industrial RBC	**Number Exceeding EPA Region III Residential RBC**	**Range Exceeding EPA Region III Residential RBC**	Location Maximum Detect
Semivolatiles (ug/kg)							
Naphthalene	40,880,000	1,564,290	0/10		0/10		30-HP04-03
2-Methylnaphthalene	40,880,000	1,564,290	0/10		0/10		30-HP04-03
Dibenzofuran	8,176,000	312,857	0/10		0/10		30-HP04-03
Phenanthrene	610,000,000	23,000,000	0/10		0/10		30-HP04-03
Pyrene	61,320,000	2,346,429	0/10		0/10		30-HP04-03
Bis(2-ethylhexyl)phthalate	408,800	45,623	0/10		0/10		30-HP04-03
Diphenylamine	51,100,000	1,955,357	0/10		0/10		30-HP04-03
BTEX (ug/kg)							
Benzene	197,352	22,025	0/10		0/10		30-HP04-02
Toluene	408,800,000	15,642,857	0/10		0/10		30-HP04-02
Hydrocarbons (mg/kg)							
Hydrocarbons as GRO	NE	NE	NE		NE		30-HP05-03
Hydrocarbons as DRO	NE	NE	NE		NE		30-HP04-03
PCBs (ug/kg)							
Aroclor-1260	2,862	319	0/10		2/10	1,600-2,000	30-HP05-03

Data Qualifiers:

U = Not detected. The associated number indicates approximate sample concentration necessary to be detected.
J = Analyte present. Reported value may not be accurate or precise.
NA = Not Analyzed.
NE - Not Established.
ug/kg = micrograms per kilogram.
mg/kg = milligrams per kilogram.

TABLE 5-17 (continued)

SUMMARY OF INORGANIC DETECTIONS IN SUBSURFACE SOIL - PHASE II RFI
SWMU 30 - FORMER INCINERATOR AREA
NAVAL STATION ROOSEVELT ROADS, CEIBA, PUERTO RICO

Sample ID	2 X Average	**EPA Region III**	EPA Region III	30-HP01-02	30-HP01-03	30-HP02-02	30-HP02-03	30-HP03-02
Sample Date	Detected	**Industrial**	Residential	06/23/99	06/23/99	06/23/99	06/23/99	06/22/99
Depth Range	Background	**RBC**	RBC	6.00-7.00	8.00-9.00	6.00-7.00	8.00-9.00	5.00-6.00
	(mg/kg)	(mg/kg)	(mg/kg)					
Inorganics (mg/kg)								
Antimony	NE	818	31	0.29 J	0.29 J	0.28 J	0.51 J	0.71 J

Data Qualifiers:

J = Analyte present. Reported value may not be accurate or precise.
NE = Not Established.

mg/kg = milligrams per kilogram.

TABLE 5-17 (continued)

SUMMARY OF INORGANIC DETECTIONS IN SUBSURFACE SOIL - PHASE II RFI
SWMU 30 - FORMER INCINERATOR AREA
NAVAL STATION ROOSEVELT ROADS, CEIBA, PUERTO RICO

Sample ID	2 X Average	**EPA Region III**	EPA Region III	30-HP03-03	30-HP04-02	30-HP04-03	30-HP05-02	30-HP05-03
Sample Date	Detected	**Industrial**	Residential	06/22/99	06/23/99	06/23/99	06/23/99	06/23/99
Depth Range	Background	**RBC**	RBC	8.00-9.00	6.00-7.00	8.00-9.00	6.00-7.00	8.00-9.00
	(mg/kg)	(mg/kg)	(mg/kg)					
Inorganics (mg/kg)								
Antimony	NE	818	31	0.34 J	0.28 J	0.29 J	0.3 J	0.33 J

Data Qualifiers:

J = Analyte present. Reported value may not be accurate or precise.
NE = Not Established.

mg/kg = milligrams per kilogram.

TABLE 5-17 (continued)

SUMMARY OF INORGANIC DETECTIONS IN SUBSURFACE SOIL - PHASE II RFI
SWMU 30 - FORMER INCINERATOR AREA
NAVAL STATION ROOSEVELT ROADS, CEIBA, PUERTO RICO

Sample ID Sample Date Depth Range	2 X Average Detected Background (mg/kg)	**EPA Region III Industrial RBC** (mg/kg)	EPA Region III Residential RBC (mg/kg)	Number Exceeding 2 X Average Detected Background	Range Exceeding 2 X Average Detected Background	**Number Exceeding EPA Region III Industrial RBC**	**Range Exceeding EPA Region III Industrial RBC**	Number Exceeding EPA Region III Residential RBC	Range Exceeding EPA Region III Residential RBC
Inorganics (mg/kg)									
Antimony	NE	818	31	NE		0/10		0/10	

Data Qualifiers:

J = Analyte present. Reported value may not be accurate or precise.
NE = Not Established.

mg/kg = milligrams per kilogram.

TABLE 5-17 (continued)

SUMMARY OF INORGANIC DETECTIONS IN SUBSURFACE SOIL - PHASE II RFI
SWMU 30 - FORMER INCINERATOR AREA
NAVAL STATION ROOSEVELT ROADS, CEIBA, PUERTO RICO

Sample ID Sample Date Depth Range	2 X Average Detected Background (mg/kg)	**EPA Region III Industrial RBC** (mg/kg)	EPA Region III Residential RBC (mg/kg)	Location Maximum Detect
Inorganics (mg/kg)				
Antimony	NE	818	31	30-HP03-02

Data Qualifiers:

J = Analyte present. Reported value may not be accurate or precise.
NE = Not Established.

mg/kg = milligrams per kilogram.

TABLE 5-18

POSITIVE DETECTION SUMMARY
QA/QC SAMPLES
SWMU 30 - FORMER INCINERATOR AREA
NAVAL STATION ROOSEVELT ROADS, CEIBA, PUERTO RICO

Sample ID	99FB01	99FB02	30-TB01	30-TB04	99-ER01	99-ER02
Sample Date	6/30/99	6/30/99	6/24/99	6/28/99	6/30/99	6/30/99
Volatiles (ug/l)						
Chloroform	5 U	84	5 U	NA	5 U	5 U
Bromodichloromethane	5 U	14	5 U	NA	5 U	5 U
Semivolatiles (ug/l)	No detects	No detects	NA	NA	No detects	No detects
PCBs (ug/l)	No detects	No detects	NA	NA	No detects	No detects
Total Metals (ug/l)						
Arsenic	1.3 U	1.4 J	NA	NA	1.3 U	1.3 U
Barium	0.4 U	8.9 J	NA	NA	0.4 U	0.4 U
Copper	0.81 J	10.6 J	NA	NA	0.92 J	0.8 U
Lead	0.9 U	0.9 U	NA	NA	0.9 U	1.2 J
Vanadium	0.6 U	0.74 J	NA	NA	0.6 U	0.6 U
Zinc	2.4 J	63.3	NA	NA	0.8 U	0.8 U
Dioxin (ug/kg)	No detects	No detects	NA	NA	No detects	No detects
Hydrocarbons (mg/l)	No detects	No detects	NA	No detects	No detects	No detects

Data Qualifiers:

U = Not detected. The associated number indicates approximate sample concentration necessary to be detected.
J = Analyte present. Reported value may not be accurate or precise.
NA = Not Analyzed.
ug/l = micrograms per liter.
mg/l = milligrams per liter.
ug/kg = micrograms per kilogram.

TABLE 6-1

COMPARING OF INORGANIC COMPOUNDS DETECTED IN SWMU 30
SOIL TO BACKGROUND CONCENTRATIONS
SWMU 30 - FORMER INCINERATOR AREA
NAVAL STATION ROOSEVELT ROADS, CEIBA PUERTO RICO

	Maximum Concentration	2 X Average Detected Background	Does the Maximum Exceed Background?	Location of Maximum Concentration	Frequency of Detection
Surface Soils (mg/kg)					
Antimony	**0.56 J**	**ND**	**YES**	**30-HP03-01**	**5/7**
Arsenic	1.6 J	2.4	no	30SS06	6/6
Barium	103	181	no	30SS01	6/6
Beryllium	0.15	0.45	no	30SS04	2/2
Cadmium	**1 J**	**ND**	**YES**	**30SS03**	**2/6**
Chromium	16.6 J	59.3	no	30SS04	6/6
Cobalt	9	44.0	no	30SS04	2/2
Copper	68.3	234	no	30SS04	2/2
Lead	**101**	**15.5**	**YES**	**30SS03**	**6/6**
Mercury	**0.46**	**0.11**	**YES**	**30SS04**	**1/2**
Nickel	7.5	16.6	no	30SS04	2/2
Selenium	0.95 J	1.5	no	30SS06	3/6
Silver	**1**	**ND**	**YES**	**30SS01**	**1/6**
Vanadium	65.8 J	355	no	30SS04	2/2
Zinc	79.6 J	125	no	30SS03	2/2
Subsurface Soils (mg/kg)					
Antimony	**0.71 J**	**ND**	**YES**	**30-HP03-02**	**10/10**

Notes:
J Estimated Value
ND Not Detected
Bold indicates that the chemical exceeded 2x the average background value.

TABLE 6-2

COMPARISON OF TOTAL INORGANIC COMPOUNDS DETECTED IN SWMU 30 GROUNDWATER TO BACKGROUND CONCENTRATIONS
SWMU 30 - FORMER INCINERATOR AREA
NAVAL STATION ROOSEVELT ROADS, CIEBA PUERTO RICO

	Maximum Concentration	2 X Average Detected Background	Does it Exceed?	Location of Maximum Concentration	Frequency of Detection
Total Inorganics (µg/L)					
Antimony	**31.5**	**ND**	**YES**	**1983-MW3**	**2/2**
Arsenic	**4.4**	**3.6**	**YES**	**1983-MW3**	**1/2**
Barium	173	706	no	1983-MW3	2/2
Chromium	6.6	117	no	1983-MW3	1/2
Cobalt	5.9	142	no	1983-MW3	2/2
Copper	28.2	299	no	1983-MW3	2/2
Lead	1.5 J	7.1	no	1983-MW3	1/2
Mercury	**0.23 J**	**ND**	**YES**	**1983-DW1**	**1/2**
Nickel	4.2	89.8	no	1983-MW3	1/2
Vanadium	208	419	no	1983-MW3	2/2
Zinc	**72000**	**722**	**YES**	**1983-DW1**	**2/2**

Notes:
J Estimated Value
ND Not Detected
Bold indicates that the chemical exceeded 2x the average background value.

TABLE 6-3

COMPARISON OF OF DISSOLVED INORGANIC COMPOUNDS DETECTED IN SWMU 30 GROUNDWATER TO BACKGROUND CONCENTRATIONS
SWMU 30 - FORMER INCINERATOR AREA
NAVAL STATION ROOSEVELT ROADS, CIEBA PUERTO RICO

	Maximum Concentration	2 X Average Detected Background	Does it Exceed?	Location of Maximum Concentration	Frequency of Detection
Dissolved Inorganic (µg/L)					
Antimony	**23.3**	**ND**	**YES**	**1983-MW3**	**2/2**
Arsenic	**3**	**ND**	**YES**	**1983-MW3**	**1/2**
Barium	108	239	no	1983-MW3	2/2
Cobalt	4.2	58.6	no	1983-MW3	2/2
Copper	3.1	17.7	no	1983-MW3	2/2
Mercury	0.18 J	**ND**	**YES**	**1983-DW1**	**1/2**
Vanadium	**177**	**6**	**YES**	**1983-MW3**	**2/2**
Zinc	27.6	75.7	no	1983-DW1	2/2

Notes:
J Estimated Value
ND Not Detected
Bold indicates that the chemical exceeded 2x the average background value.

TABLE 6-4

COMPARISON OF INORGANIC COMPOUNDS DETECTED
IN SWMU 30 SOIL TO REGION III RISK-BASED SOIL CONCENTRATIONS
SWMU 30 - FORMER INCINERATOR AREA
NAVAL STATION ROOSEVELT ROADS, CIEBA PUERTO RICO

	Maximum Concentration	Industrial RBC[(1)]	Does it Exceed?	Residential RBC[(1)]	Does it Exceed?	Location of Maximum Concentration	Frequency of Detection
Surface Soils (mg/kg)							
Antimony	0.56 J	82	no	3	no	30-HP03-01	5/7
Cadmium	1 J	204	no	8	no	30SS03	2/6
Lead [(2)]	101	400	no	400	no	30SS03	6/6
Mercury [(3)]	0.46	20.4	no	0.78	no	30SS04	1/2
Silver	1	1,022	no	39	no	30SS01	1/6
Subsurface Soils (mg/kg)							
Antimony	0.71 J	82	no	3	no	30-HP03-02	10/10

Notes:

(1) The Region III Risk Based Concentrations (RBC) were adjusted downward by a factor of 10 to account for potential noncarcniogenic additive effects. All RBC values on this table are based on non-carcinogenic effects. USEPA October 1999

(2) Currently there is not an established RfD for Lead therefore as recommended in 1996 EPA Soil Screening Guidance document, and EPA 1994. Revised Interim Soil Lead Guidance for CERCLA Sites and RCRA Corrective Action Facilities a screening level of 400 mg/kg was used for both the industrial and residential scenario.

(3) An RBC for Inorganic Mercury has not been established, therefore it was conservatively assumed that all mercury was organic and was screened using the methyl mercury RBC.

TABLE 6-5

COMPARISON OF ORGANIC COMPOUNDS IN SWMU 30
SURFACE SOIL TO REGION III RISK-BASED SOIL CONCENTRATIONS
SWMU 30 - FORMER INCINERATOR AREA
NAVAL STATION ROOSEVELT ROADS, CIEBA PUERTO RICO

	Maximum Concentration	Industrial RBC[(1)]	Does it Exceed?	Residential RBC[(1)]	Does it Exceed?	Location of Maximum Concentration	Frequency of Detection
Volatiles (ug/kg)							
Acetone	10 J	20,440,000 N	no	782,143 N	no	30SS04	1/6
Xylene (total)	3 J	408,800,000 N	no	15,642,857 N	no	30SS01,30SS02	3/6
Semivolatiles (ug/kg)							
Fluoranthene	260 J	8,176,000 N	no	312,857 N	no	30-HP04-01[(2)]	1/11
Pyrene	240 J	6,132,000 N	no	234,643 N	no	30-HP04-01[(2)]	1/11
Benzo(a)anthracene	230 J	7,840 C	no	875 C	no	30-HP04-01[(2)]	1/11
Chrysene	390	784,000 C	no	87,497 C	no	30-HP04-01[(2)]	1/11
Benzo(b)fluoranthene	280 J	7,840 C	no	875 C	no	30-HP04-01[(2)]	1/11
Benzo(k)fluoranthene	240 J	78,400 C	no	8,750 C	no	30-HP04-01[(2)]	1/11
Benzo(a)pyrene	**200 J**	**784 C**	**no**	**88 C**	**YES**	**30-HP04-01[(2)]**	**1/11**
Pesticides/PCBs (ug/kg)							
PCB-1260	**1400**	**2862 C**	**no**	**319 C**	**YES**	**30-HP05-01**	**6/7**

Notes:

(1) The Noncancer Region III Risk Based Concentrations (RBC) were adjusted downward by a factor of 10 to account for potential noncarcniogenic additive effects.USEPA October 1999.

(2) It should be noted ths sample is a duplicate; SVOCs were not detected in the original sample.

Bold indicates that the chemical exceeded the RBC value.

J Estimated Value

N Noncarcinogen

C Carcinogen

TABLE 6-6

COMPARISON OF ORGANIC COMPONENTS IN SWMU 30
SUBSURFACE SOIL TO REGION III RISK BASED SOIL CONCENTRATIONS
NAVAL STATION ROOSEVELT ROADS, CIEBA PUERTO RICO

	Maximum Concentration	Industrial RBC[(1)]	Does it Exceed?	Residential RBC[(1)]	Does it Exceed?	Location of Maximum Concentration	Frequency of Detection
BTEX (ug/kg)							
Benzene	4.9	197,352 C	no	22,025 C	no	30-HP04-02	1/10
Toluene	4.9	40,880,000 N	no	1,564,286 N	no	30-HP04-02	1/10
Semivolatiles (ug/kg)							
Naphthalene	1300 J	408,800 N	no	156,429 N	no	30-HP04-03	1/10
2-Methylnaphthalene	6100	408,800 N	no	156,429 N	no	30-HP04-03	1/10
Dibenzofuran	240 J	817,600 N	no	31,286 N	no	30-HP04-03	1/10
Phenanthrene[(2)]	820 J	61,320,000 N	no	2,346,429 N	no	30-HP04-03	1/10
Pyrene	190 J	6,132,000 N	no	234,643 N	no	30-HP04-03	1/10
Bis(2-ethylhexyl)phthalate	320 J	408,800 C	no	45,623 C	no	30-HP04-03	2/10
Diphenylamine	1400 J	5,110,000 N	no	195,536 N	no	30-HP04-03	1/10
PCBs (ug/kg)							
PCB-1260	**2000**	**286 C**	**YES**	**319 C**	**YES**	**30-HP05-03**	**8/10**

Notes:

(1) The Noncancer Region III Risk Based Concentrations (RBC) were adjusted downward by a factor of 10 to account for potential noncarcniogenic additive effects.USEPA October 1999.

(2) Anthracene was used as a surogate value for phenanthrene.

Bold indicates that the chemical exceeded the RBC value.

J Estimated Value

N Noncarcinogen

C Carcinogen

TABLE 6-7

COMPARISON OF TOTAL INORGANIC COMPOUNDS IN SWMU 30
GROUNDWATER TO REGION III RISK-BASED TAP WATER CONCENTRATIONS

	Maximum Concentration	Tap Water RBC[(1)]	Does it Exceed?	Location of Maximum Concentration	Frequency of Detection
Total Inorganics (ug/l)					
Antimony	**31.5**	**1.5 N**	**YES**	**1983-MW3**	**2/2**
Arsenic	**4.4**	**0.045 C**	**YES**	**1983-MW3**	**1/2**
Mercury[(2)]	0.23 J	0.4 N	no	1983-DW1	1/2
Zinc	**72000**	**1,095 N**	**YES**	**1983-DW1**	**2/2**

Notes:
(1) The Noncancer Region III Risk Based Concentrations (RBC) were adjusted downward by a factor of 10 to account for potential noncarcniogenic additive effects. USEPA October 1999.
(2) An RBC for Inorganic Mercury has not been established, therefore it was conservatively assumed that all mercury was organic and was screened using the methyl mercury RBC.
Bold indicates that the chemical exceeded the RBC value.
J Estimated Value
N Noncarcinogen
C Carcinogen

TABLE 6-8

COMPARISON OF DISSOLVED INORGANIC COMPOUNDS IN SWMU 30
GROUNDWATER TO REGION III RISK-BASED TAP WATER CONCENTRATIONS

	Maximum Concentration	Tap Water RBC[(1)]	Does it Exceed?	Location of Maximum Concentration	Frequency of Detection
Dissolved Inorganics (ug/l)					
Antimony	**23.3**	**1.5 N**	**YES**	**1983-DW1**	**1/2**
Arsenic	**3**	**0.04 C**	**YES**	**1983-MW3**	**1/2**
Mercury[(2)]	0.18 J	0.40 N	no	1983-DW1	1/2
Vanadium	**177**	**26 N**	**YES**	**1983-MW3**	**2/2**

Notes:

(1) The Noncancer Region III Risk Based Concentrations (RBC) were adjusted downward by a factor of 10 to account for potential noncarcniogenic additive effects.USEPA October 1999.

(2) An RBC for Inorganic Mercury has not been established, therefore it was conservatively assumed that all mercury was organic and was screened using the methyl mercury RBC.

Bold indicates that the chemical exceeded the RBC value.

J Estimated Value

N Noncarcinogen

C Carcinogen

TABLE 6-9

**MAXIMUM DETECTED SURFACE SOIL PCB CONCENTRATION,
RISK-BASED CRITERIA AND PCB REMEDIATION REGULATIONS
SWMU 30 - FORMER INCINERATOR AREA
NAVAL STATION ROOSEVELT ROADS, CIEBA PUERTO RICO**

Maximum Detected Site Surface Soil Concentration	USEPA Region III Residential RBC[(1)]	USEPA Region III Industrial RBC[(1)]	Low Occupancy Area Cleanup goal[(2)]	High Occupancy Area Cleanup goal[(2)]
1.4	0.32	2.9	<25	<1.0

Notes:
All values are mg/kg
(1) USEPA Region III Risk Based Concentration 10/99.
(2) Code of Federal Regulations 40 CFR Part 761.61(a)(4) PCB remediation waste. June 29, 1998.

TABLE 7-1

SUMMARY OF EXPOSURE PATHWAY EVALUATION
SWMU 30 - FORMER INCINERATOR AREA
NAVAL STATION ROOSEVELT ROADS, CEIBA, PUERTO RICO

Potential Exposure Pathway	Possible Complete Exposure Pathway (Yes/No)	Potential Exposure Routes	Potential Ecological Receptors	Exposure Route Evaluated (Yes/No)
Soil Exposure Pathway	Yes	Direct uptake	Plants	Yes
		Dermal adsorption	Soil invertebrates	Yes
			Terrestrial birds and mammals	No (1)
		Ingestion	Soil invertebrates	Yes
			Terrestrial birds and mammals	No (1)
		Food chain transfer	Terrestrial birds and mammals	No (1)
Groundwater Exposure Pathway	No	NA	NA	NA
Surface and Sediment Exposure Pathway (Freshwater)	No	NA	NA	NA
Surface Water Exposure Pathway (Saltwater)	Yes	Dermal adsorption	Aquatic life	Yes
			Marine mammals and birds	No (1)
		Ingestion	Aquatic life	Yes
			Marine mammals and birds	No (1)
		Food chain transfer	Aquatic life	No (1)
			Marine mammals and birds	No (1)
Sediment Exposure Pathway (Saltwater)	Yes	Dermal adsorption	Aquatic life	No (1)
			Marine mammals and birds	No (1)
		Ingestion	Aquatic life	No (1)
			Marine mammals and birds	No (1)
		Food chain transfer	Aquatic life	No (1)
			Marine mammals and birds	No (1)
Air Exposure Pathway	Yes	Inhalation	Terrestrial birds and mammals	No (1)

Notes:

NA = Not applicable, incomplete exposure pathway

(1) The pathway-specific exposure route for this potential ecological receptor is insignificant based on SWMU 30 land usage and/or likelyhood of potential exposure.

TABLE 7-2

OAK RIDGE NATIONAL LABORATORY SCREENING THRESHOLDS FOR ECOLOGICAL COPCS IN SURFACE SOIL
SWMU 30 - FORMER INCINERATOR AREA
NAVAL STATION ROOSEVELT ROADS, CEIBA, PUERTO RICO

Analyte	Surface Soil Screening Thresholds (mg/kg)					
	Earthworms [1]		Microorganisms and Microbial Processes [1]		Plants [2]	
	Screening Threshold	Level of Confidence	Screening Threshold	Level of Confidence	Screening Threshold	Level of Confidence
Inorganics:						
Antimony	NE	NE	NE	NE	5	Low
Cadmium	20	Moderate	20	High	4	High
Lead	500	Low	900	High	50	Moderate
Mercury	0.1	Low	30	High	0.3	Low
Silver	NE	NE	50	Moderate	2	Low
Volatiles:						
Acetone	NE	NE	NE	NE	NE	NE
Xylenes (total)	NE	NE	NE	NE	NE	NE
Semi-Volatiles:						
Benzo(a)anthracene	NE	NE	NE	NE	NE	NE
Benzo(b)fluoranthene	NE	NE	NE	NE	NE	NE
Benzo(k)fluoranthene	NE	NE	NE	NE	NE	NE
Benzo(a)pyrene	NE	NE	NE	NE	NE	NE
Chrysene	NE	NE	NE	NE	NE	NE
Fluoranthene	NE	NE	NE	NE	NE	NE
Pyrene	NE	NE	NE	NE	NE	NE
PCBs:						
Aroclor-1260	NE	NE	NE	NE	40	Low

NE = Not Established

[1] Soil screening level from Efroymson et al., 1997a.
[2] Soil screening level from Efroymson et al., 1997b.

TABLE 7-3

USEPA TOTAL RECOVERABLE AND DISSOLVED SALTWATER NATIONAL AMBIENT WATER QUALITY CRITERIA FOR ECOLOGICAL COPCS IN GROUNDWATER
SWMU 30 - FORMER INCINERATOR AREA
NAVAL STATION ROOSEVELT ROADS, CEIBA, PUERTO RICO

Analyte	USEPA Saltwater NAWQC (ug/L)				USEPA Saltwater Conversion Factors
	Dissolved Criteria (mg/L)		Total Recoverable Criteria (mg/L) [1]		
	Acute (CMC)	Chronic (CCC)	Acute (CMC)	Chronic (CCC)	
Antimony	NE	NE	NE	NE	NE
Arsenic	69 [2]	36 [2]	69 [2]	36 [2]	1.000
Mercury	1.8 [3]	0.94 [3]	2.1 [3]	1.1 [3]	0.85
Vanadium	NE	NE	NE	NE	NE
Zinc	90	81	95	86	0.946

Notes:

USEPA = United States Environmental Protection Agency
NAWQC = National Ambient Water Quality Criteria
CMC = Criteria Maximum Concentration
CCC = Criteria Continuous Concentration
NE = Not Established

[1] Total recoverable criteria were calculated by dividing the dissolved metal criteria by the appropriate USEPA Conversion Factor (USEPA, 1999d).
[2] The criterion shown was derived from data for trivalent arsenic, and applied to total arsenic (USEPA, 1999d).
[4] The criterion was derived from data for inorganic mercury (II) and applied to total mercury (USEPA, 1999d).

TABLE 7-4

AQUIRE DATABASE SALTWATER TOXICITY TEST DATA FOR ANTIMONY AND VANADIUM
SWMU 30 - FORMER INCINERATOR AREA
NAVAL STATION ROOSEVELT ROADS, CEIBA, PUERTO RICO

Analyte	Test Species	Test Endpoint	Effect Measured	Effect Concentration [1] (ug/L)	Reference
Antimony	*Skeletonema costatum* (Diatom)	96-hour EC_{50}	Photosynthesis	>4,150	USEPA, 1978
	Mysidopsia bahia (Opossum Shrimp)	96-hour LC_{50}	Mortality	>4,150	USEPA, 1978
	Fundulus heteroclitus (Mummichog)	96-hour LC_{50}	Mortality	>1,000,000	Dorfman, 1977
				>1,000,000	Dorfman, 1977
	Cyprinodon variegatus (Sheepshead Minnow)	96-hour LC_{50}	Mortality	>6,200	Heitmuller et. al., 1981
Vanadium	*Gymnodinium splendens* (Dinoflagellate)	48-hour EC_{50}	Growth	1,800 - 42,000 [2]	Wilson and Freeburg, 1980
	Thalassiosira guillardii (Diatom)	48-hour EC_{50}	Growth	12,000 - 37,000 [3]	Wilson and Freeburg, 1980
	Therapon jarbua (Tigerfish)	96-hour LC_{50}	Mortality	620	Krishnakumari et. al., 1983

Notes:

AQUIRE = Aquatic Toxicity Information Retrieval
EC_{50} = Median Effective Concentration Value
LC_{50} = Median Lethal Concentration Value

[1] Effect concentrations expressed in terms of the total recoverable metal in the water column.
[2] The value shown represents the range of effect concentrations reported for eight tests.
[3] The value shown represents the range of effect concentrations reported for ten tests.

TABLE 7-5

COMPARISON OF CONCENTRATIONS FOR ECOLOGICAL COPCS IN SURFACE SOIL TO OAK RIDGE NATIONAL LABORATORY SCREENING THRESHOLDS SWMU 30 - FORMER INCINERATOR AREA NAVAL STATION ROOSEVELT ROADS, CEIBA, PUERTO RICO

Analyte	ORNL Surface Soil Screening Threshold (mg/kg)	Frequency and Range of Detection		No. of Positive Detections Above Screening Threshold
		No. of Positive Detects/No. of Samples	Range of Positive Detections (mg/kg)	
Inorganics:				
Antimony	5 [1]	7/9	0.29J - 0.56J	0
Cadmium	4 [1]	2/6	0.24J - 1.0J	0
Lead	50 [1]	6/6	6.9J - 101	3
Mercury	0.1 [2]	1/2	0.46	1
Silver	2 [1]	1/6	1.0	0
Volatiles:				
Acetone	NE	1/10	0.01J	NA
Xylenes (total)	NE	3/10	0.001J - 0.003J	NA
Semi-Volatiles:				
Benzo(a)anthracene	NE	1/10	0.23J	NA
Benzo(b)fluoranthene	NE	1/10	0.28J	NA
Benzo(k)fluoranthene	NE	1/10	0.24J	NA
Benzo(a)pyrene	NE	1/10	0.20J	NA
Chrysene	NE	1/10	0.39J	NA
Fluoranthene	NE	1/10	0.26J	NA
Pyrene	NE	1/10	0.24J	NA
PCBs:				
Aroclor-1260	40 [1]	6/10	0.02J - 1.2	0

Notes:

NE = Not Established
NA = Not Applicable
J = Estimated Value

[1] Toxicological Benchmark from Efroymson et al., 1997b. The screening level given here is based on toxicity studies with plants.

[2] Toxicological Benchmark from Efroymson et al., 1997a. The screening level given here is based on toxicity studies with earthworms.

TABLE 7-6
COMPARISON OF TOTAL RECOVERABLE METAL CONCENTRATIONS FOR ECOLOGICAL COPCS IN GROUNDWATER TO USEPA TOTAL RECOVERABLE SALTWATER NAWQC
SWMU 30 - FORMER INCINERATOR AREA
NAVAL STATION ROOSEVELT ROADS, CEIBA, PUERTO RICO

Analyte	USEPA Total Recoverable Saltwater NAWQC (mg/L)		Frequency/Range of Positive Detections		No. of Positive Detects Above USEPA Total Recoverable Saltwater NAWQC	
	Acute (CMC)	Chronic (CCC)	No. of Positive Detects/No. of Samples	Range of Positive Detections (mg/L)	Acute (CMC)	Chronic (CCC)
Arsenic	69 [1]	36 [1]	1/2	4.4	0	0
Mercury	2.1 [2]	1.1 [2]	1/2	0.23J	0	0
Zinc	95	86	2/2	20.4 - 72,000	1	1

Notes:

NAWQC = National Ambient Water Quality Criteria
CMC = Criteria Maximum Concentration
CCC = Criteria Continuous Concentration
J = Estimated Value

[1] The criterion shown was derived from data for trivalent arsenic, and applied to total arsenic (USEPA, 1999d).
[2] The criterion was derived from data for inorganic mercury (II) and applied to total mercury (USEPA, 1999d).

TABLE 7-7
COMPARISON OF DISSOLVED METAL CONCENTRATIONS FOR ECOLOGICAL COPCS
IN GROUNDWATER TO USEPA DISSOLVED SALTWATER NAWQC
SWMU 30 - FORMER INCINERATOR AREA
NAVAL STATION ROOSEVELT ROADS, CEIBA, PUERTO RICO

Analyte	USEPA Dissolved Saltwater NAWQC (mg/L)		Frequency/Range of Positive Detections		No. of Positive Detects Above USEPA Dissolved Saltwater NAWQC	
	Acute (CMC)	Chronic (CCC)	No. of Positive Detects/No. of Samples	Range of Positive Detections (mg/L)	Acute (CMC)	Chronic (CCC)
Arsenic	69 [1]	36 [1]	1/2	0.0044	0	0
Mercury	1.8 [2]	0.94 [2]	1/2	0.00023J	0	0

Notes:

NAWQC = National Ambient Water Quality Criteria
CMC = Criteria Maximum Concentration
CCC = Criteria Continuous Concentration
J = Estimated Value

[1] The criterion shown was derived from data for trivalent arsenic, and applied to total arsenic (USEPA, 1999d).
[2] The criterion was derived from data for inorganic mercury (II) and applied to total mercury (USEPA, 1999d).

TABLE 7-8

HAZARD QUOTIENT and HAZARD INDEX VALUES FOR SOIL ORGANISMS
SWMU 30 - FORMER INCINERATOR AREA
NAVAL STATION ROOSEVELT ROADS, CEIBA, PUERTO RICO

Surface Soil Ecological COPCs	Maximum Concentration (mg/kg)	Hazard Quotient (unitless)		
		Earthworms	Microorganisms	Plants
Lead	101	2.02	0.11	2.02
Mercury	0.46	4.60	0.02	1.53

FIGURES

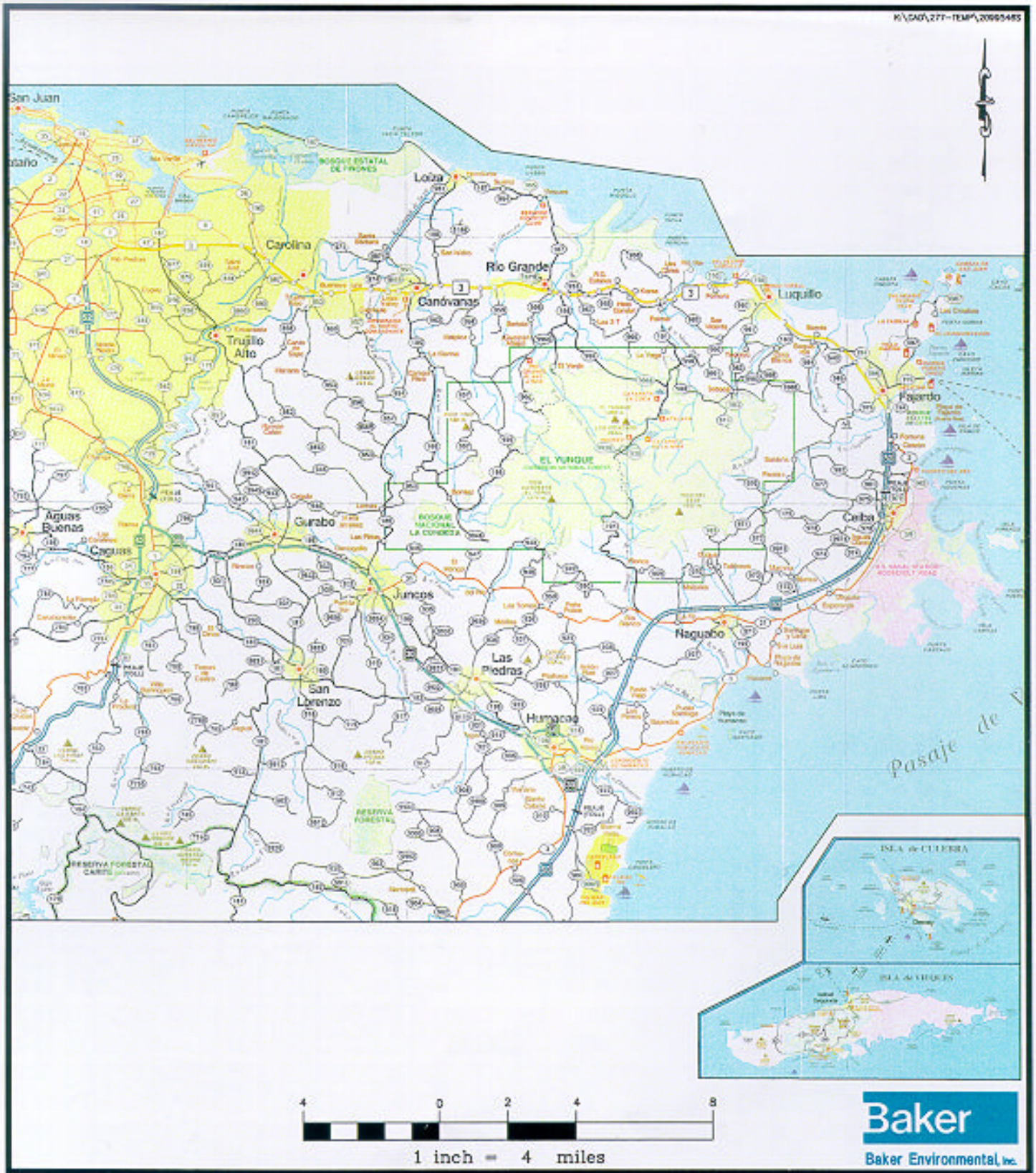


FIGURE 2-1
REGIONAL LOCATION MAP

NAVAL STATION ROOSEVELT ROADS
PUERTO RICO

SOURCE: METRODATA, INC., 1999.

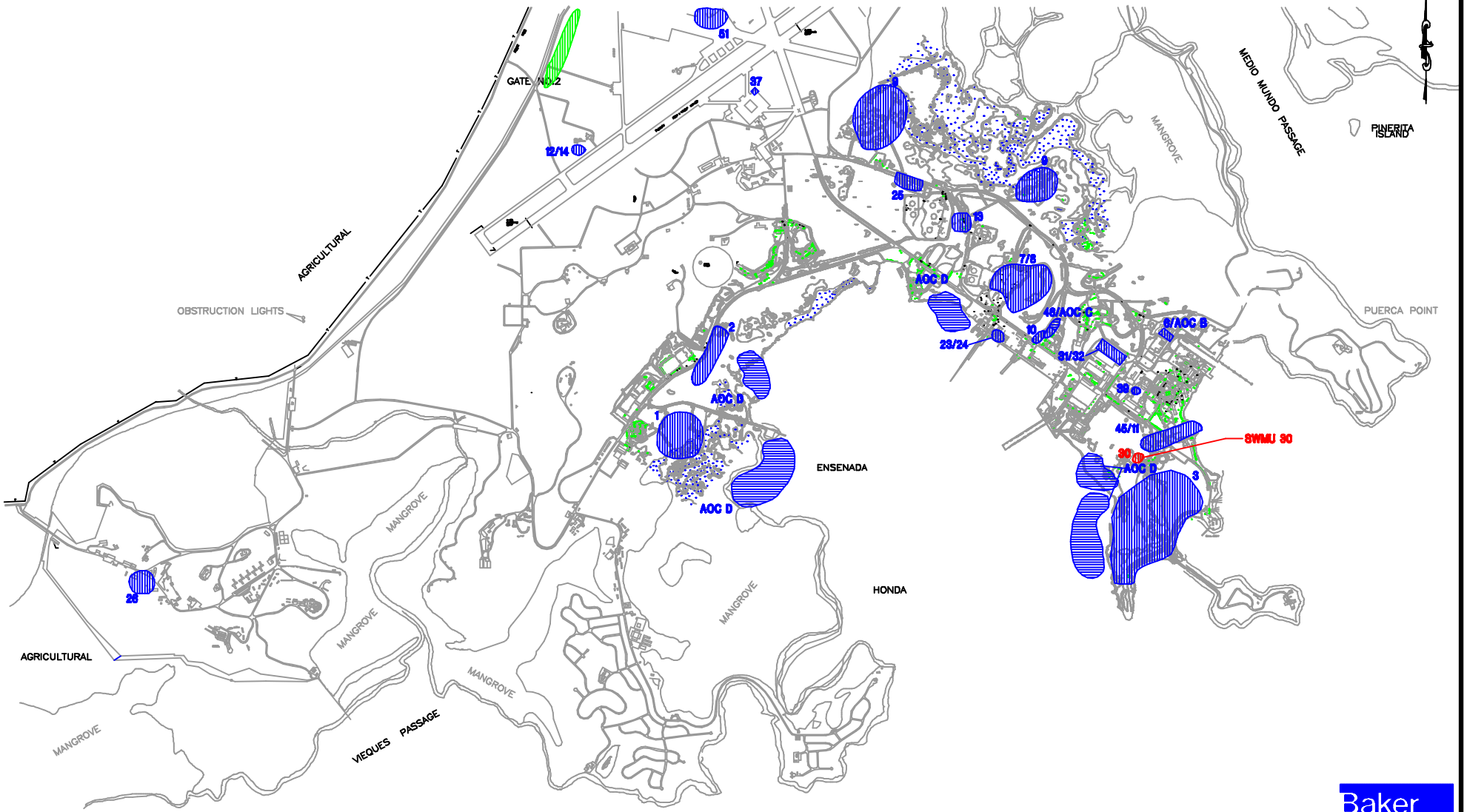
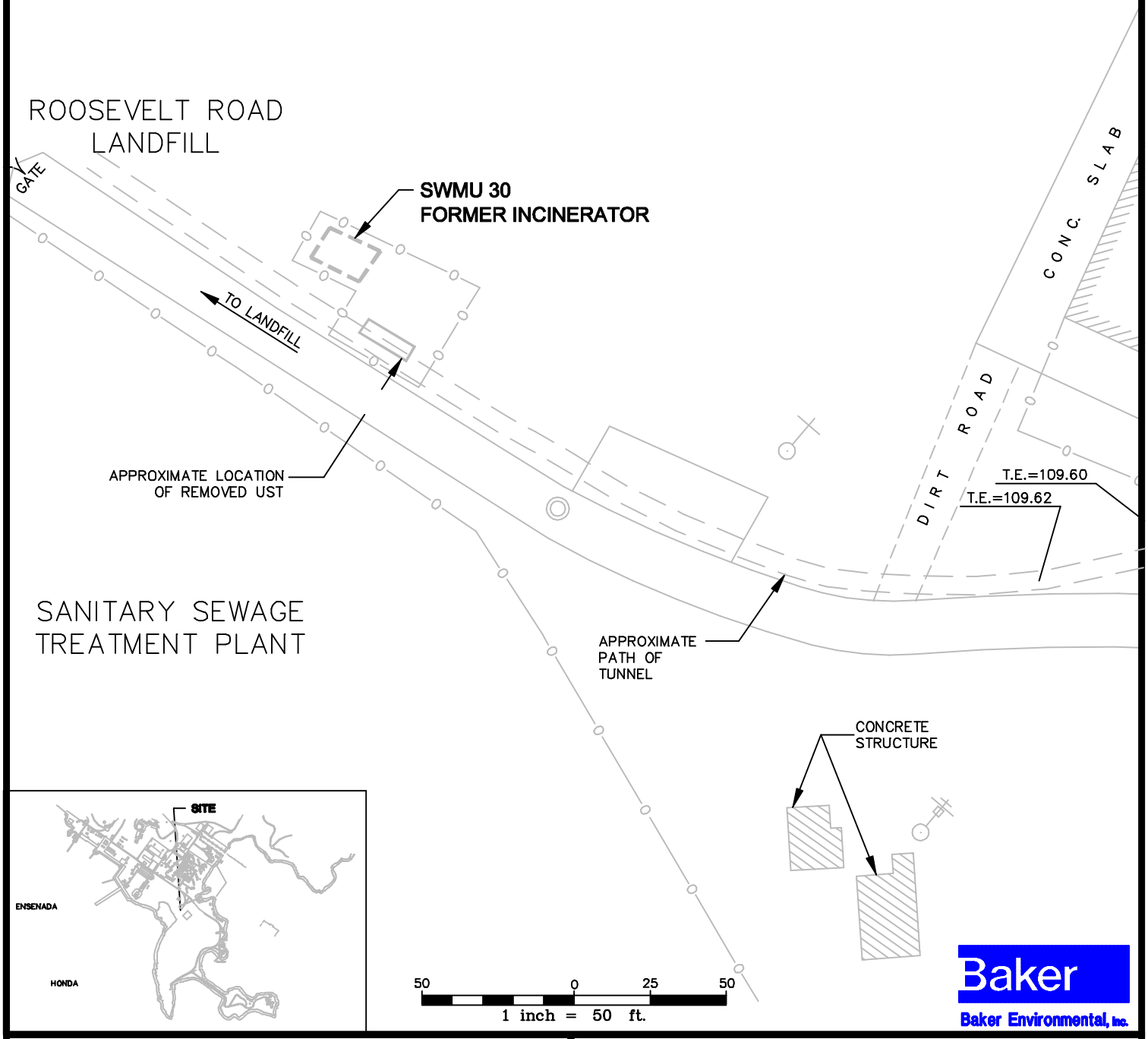


FIGURE 2-2
SWMU/AOC LOCATION MAP
NAVAL STATION ROOSEVELT ROADS
PUERTO RICO

099926WP



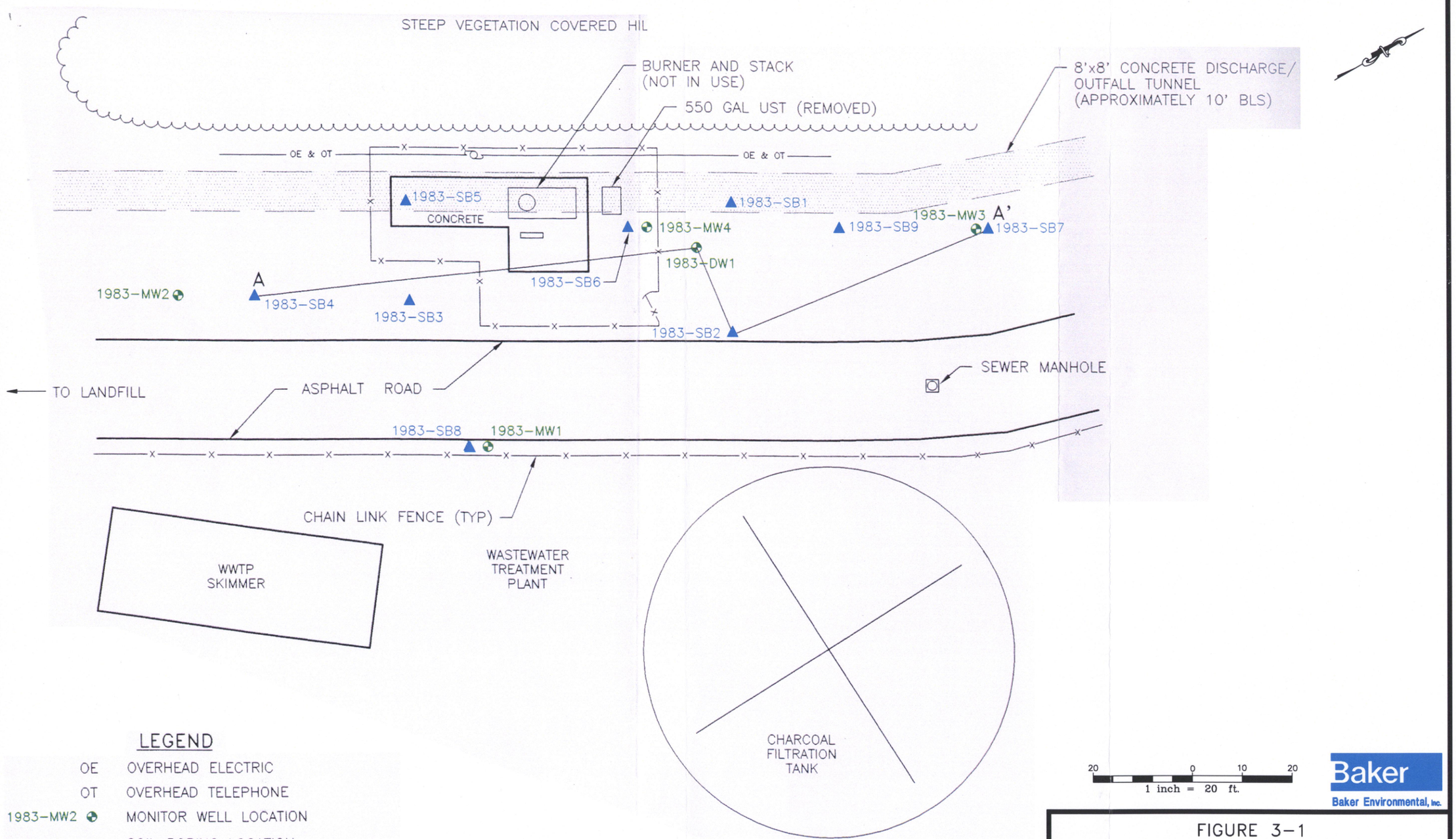
Baker
Baker Environmental, Inc.

LEGEND

SOURCE: LANTDIV, FEB. 1992.

FIGURE 2-3
SWMU 30- FORMER INCINERATOR AREA
SITE MAP
NAVAL STATION ROOSEVELT ROADS
PUERTO RICO

099915WP



LEGEND

OE	OVERHEAD ELECTRIC
OT	OVERHEAD TELEPHONE
1983-MW2	MONITOR WELL LOCATION
1983-SB4	SOIL BORING LOCATION
BLS	BELOW LAND SURFACE
A-A'	GEOLOGIC CROSS SECTION LOCATION (SEE FIGURE 2-1)

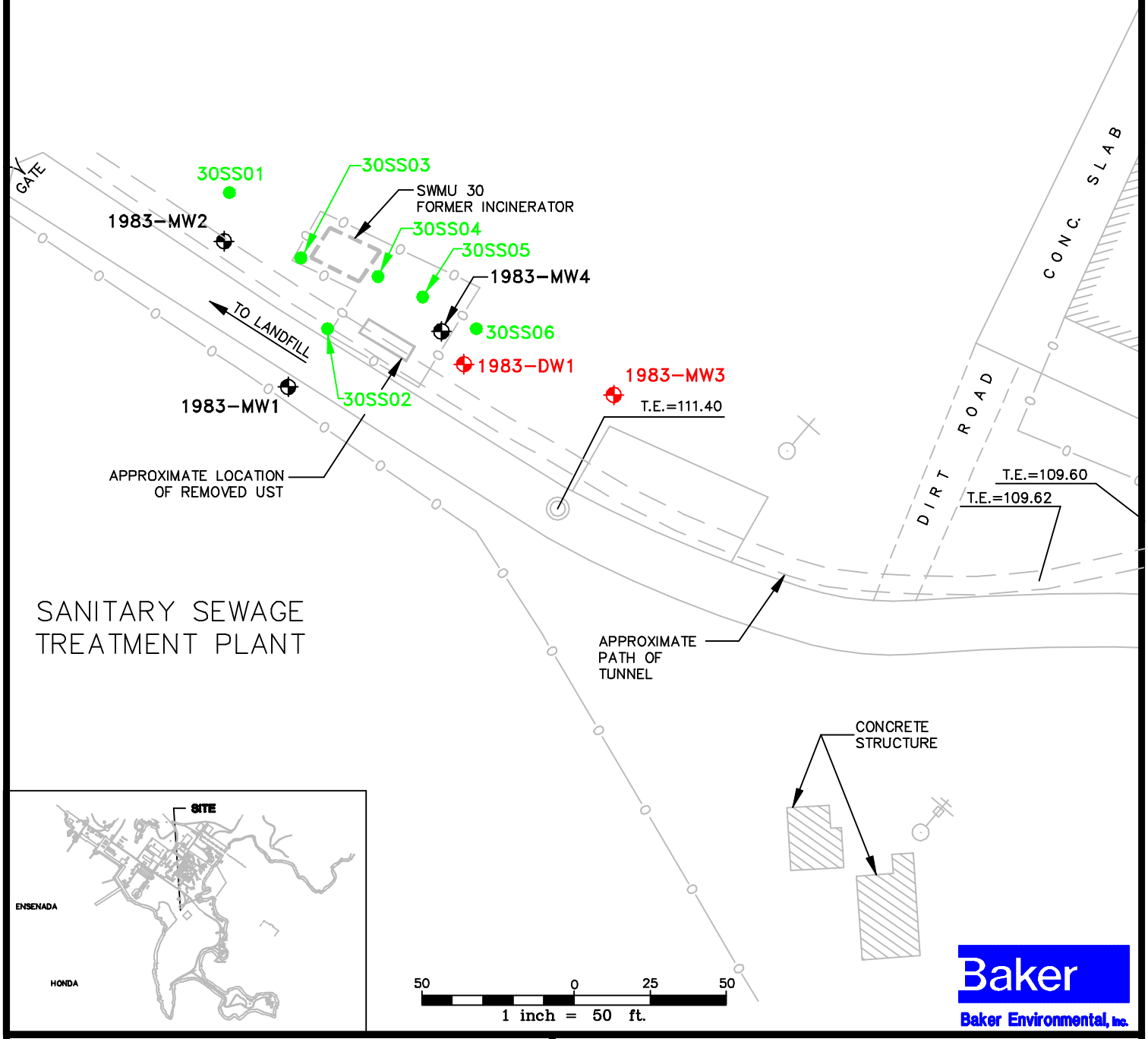
SOURCE: BLASLAND, BOUCK AND LEE, INC., 1994.

20 0 10 20
1 inch = 20 ft.

Baker
Baker Environmental, Inc.

FIGURE 3-1
1994 UST INVESTIGATION-SOIL BORING
AND MONITORING WELL LOCATIONS
SWMU 30- FORMER INCINERATOR AREA
NAVAL STATION ROOSEVELT ROADS
PUERTO RICO

09992DWP



Baker
Baker Environmental, Inc.

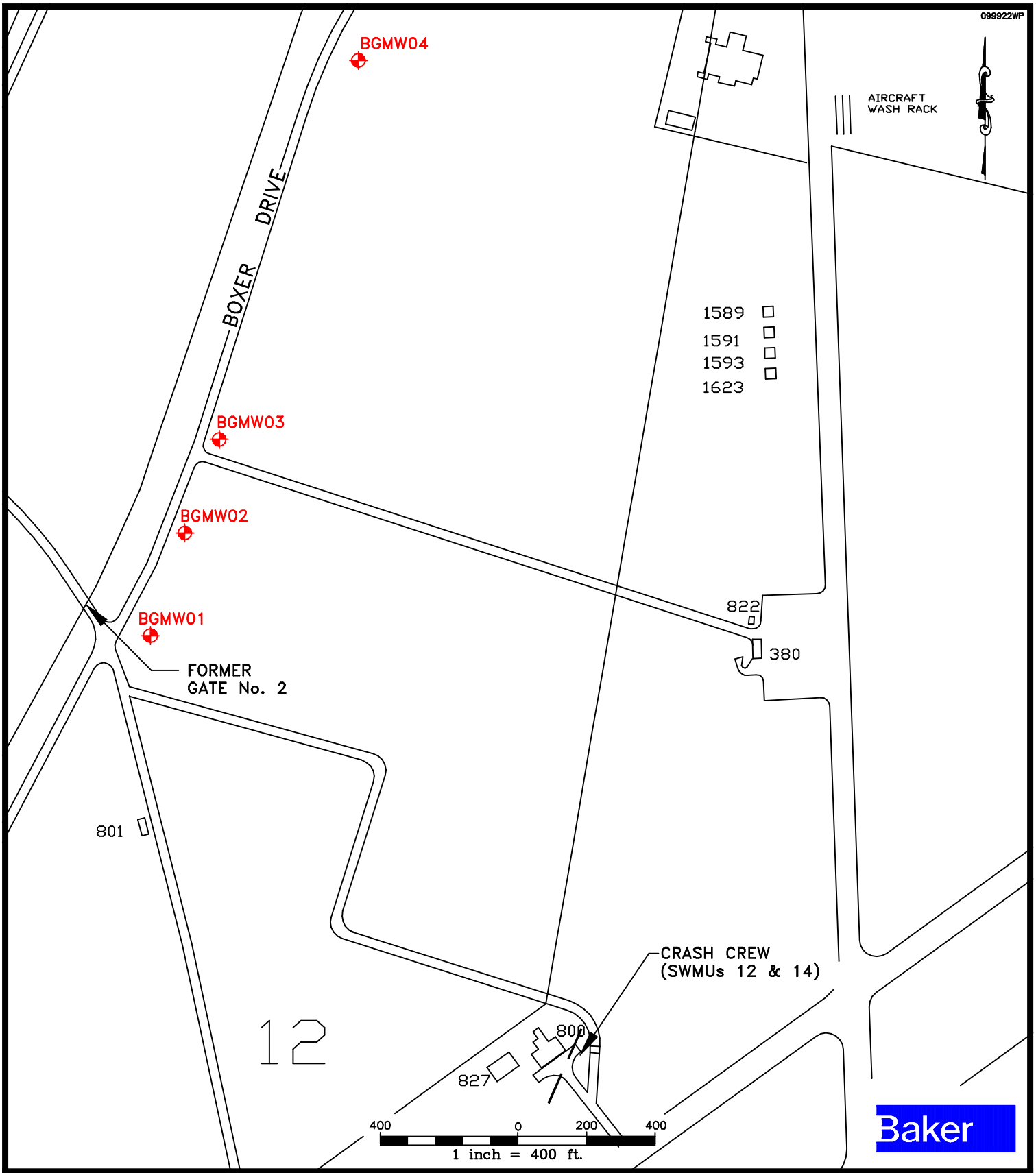
LEGEND

- EXISTING MONITORING WELL LOCATION (BLASLAND, BOUCK & LEE, INC. 1994)
- EXISTING MONITORING WELL SAMPLED IN PHASE I RFI
- SURFACE SOIL SAMPLE LOCATION

SOURCE: LANTDIV, FEB. 1992.

FIGURE 3–2
1995 PHASE I RFI SAMPLING LOCATIONS
SWMU 30– FORMER INCINERATOR AREA

NAVAL STATION ROOSEVELT ROADS
PUERTO RICO



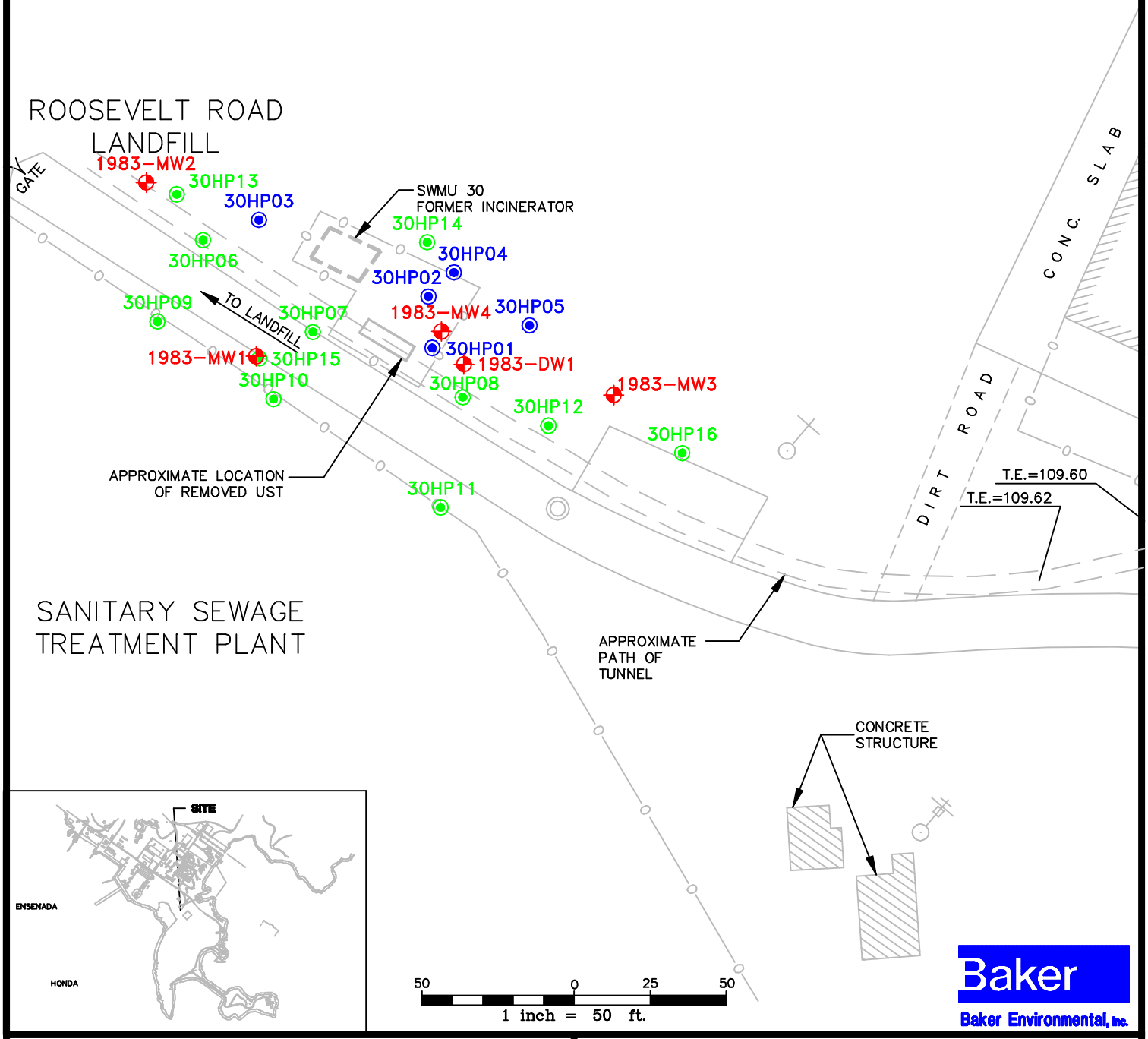
LEGEND

BGMW01 – BACKGROUND MONITORING WELL

FIGURE 3–3
BACKGROUND SAMPLE LOCATIONS
RCRA FACILITY INVESTIGATION

NAVAL STATION ROOSEVELT ROADS
PUERTO RICO

099919WP



Baker
Baker Environmental, Inc.

LEGEND

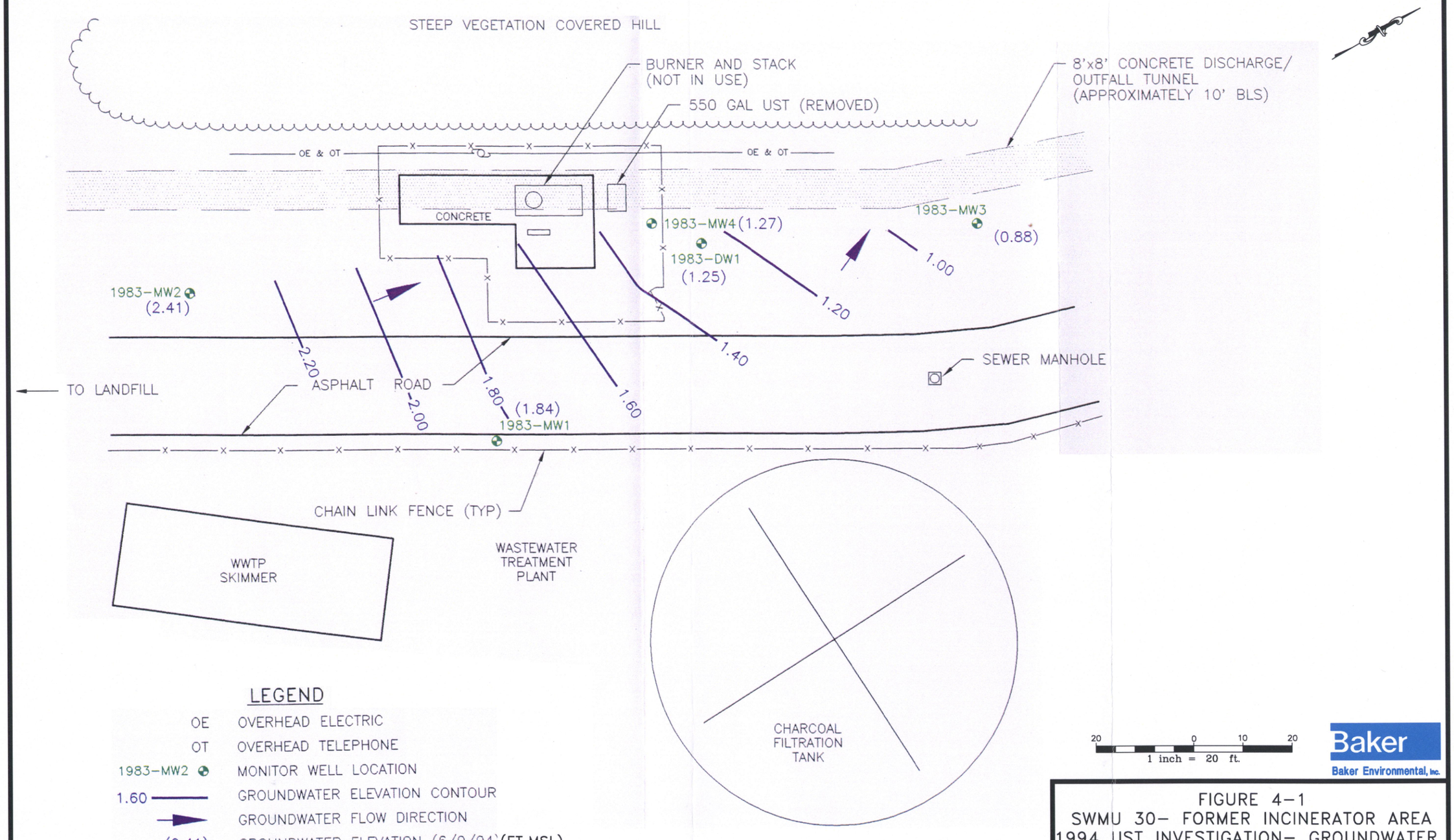
- EXISTING MONITORING WELL LOCATION (BLASLAND, BOUCK & LEE, INC. 1994)
- SOIL BORING LOCATIONS (BAKER, JUNE 1999)
- DETAILED SOIL BORING LOCATION (BAKER, JUNE 1999)

SOURCE: LANTDIV, FEB. 1992.

FIGURE 3–4
PHASE II RFI SOIL INVESTIGATION SAMPLING LOCATIONS
SWMU 30– FORMER INCINERATOR AREA

NAVAL STATION ROOSEVELT ROADS
PUERTO RICO

099913WP



LEGEND

OE	OVERHEAD ELECTRIC
OT	OVERHEAD TELEPHONE
1983-MW2	MONITOR WELL LOCATION
1.60	GROUNDWATER ELEVATION CONTOUR
→	GROUNDWATER FLOW DIRECTION
(2.41)	GROUNDWATER ELEVATION (6/9/94) (FT.MSL)

SOURCE: BLASLAND, BOUCK AND LEE, INC., 1994.

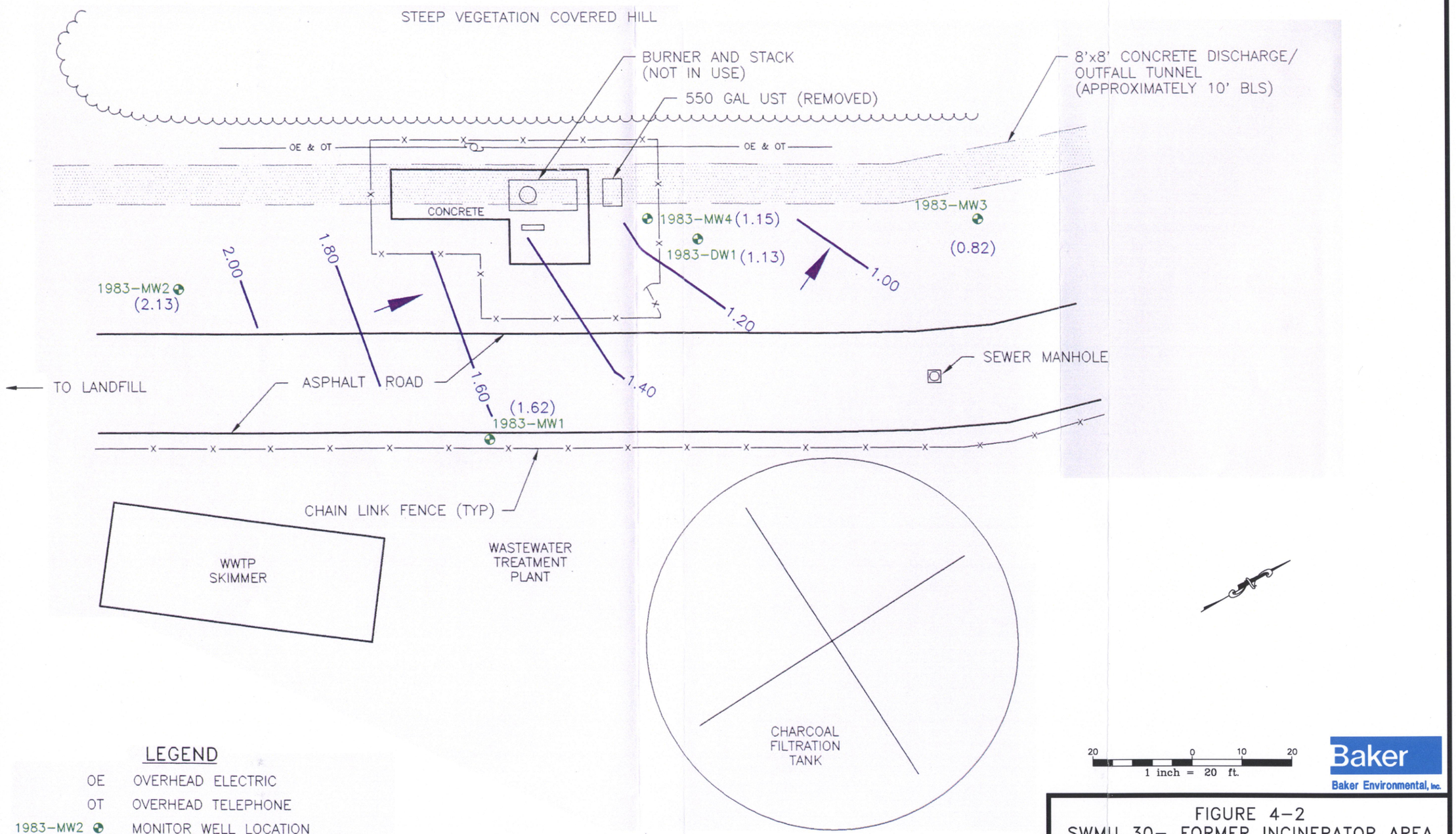
20 0 10 20
1 inch = 20 ft.

Baker
Baker Environmental, Inc.

FIGURE 4-1
SWMU 30- FORMER INCINERATOR AREA
1994 UST INVESTIGATION- GROUNDWATER ELEVATION CONTOURS

NAVAL STATION ROOSEVELT ROADS
PUERTO RICO

099914WP



LEGEND

OE	OVERHEAD ELECTRIC
OT	OVERHEAD TELEPHONE
1983-MW2	MONITOR WELL LOCATION
1.60	GROUNDWATER ELEVATION CONTOUR
	GROUNDWATER FLOW DIRECTION
(1.13)	GROUNDWATER ELEVATION (6/16/94) (FT. MSL)

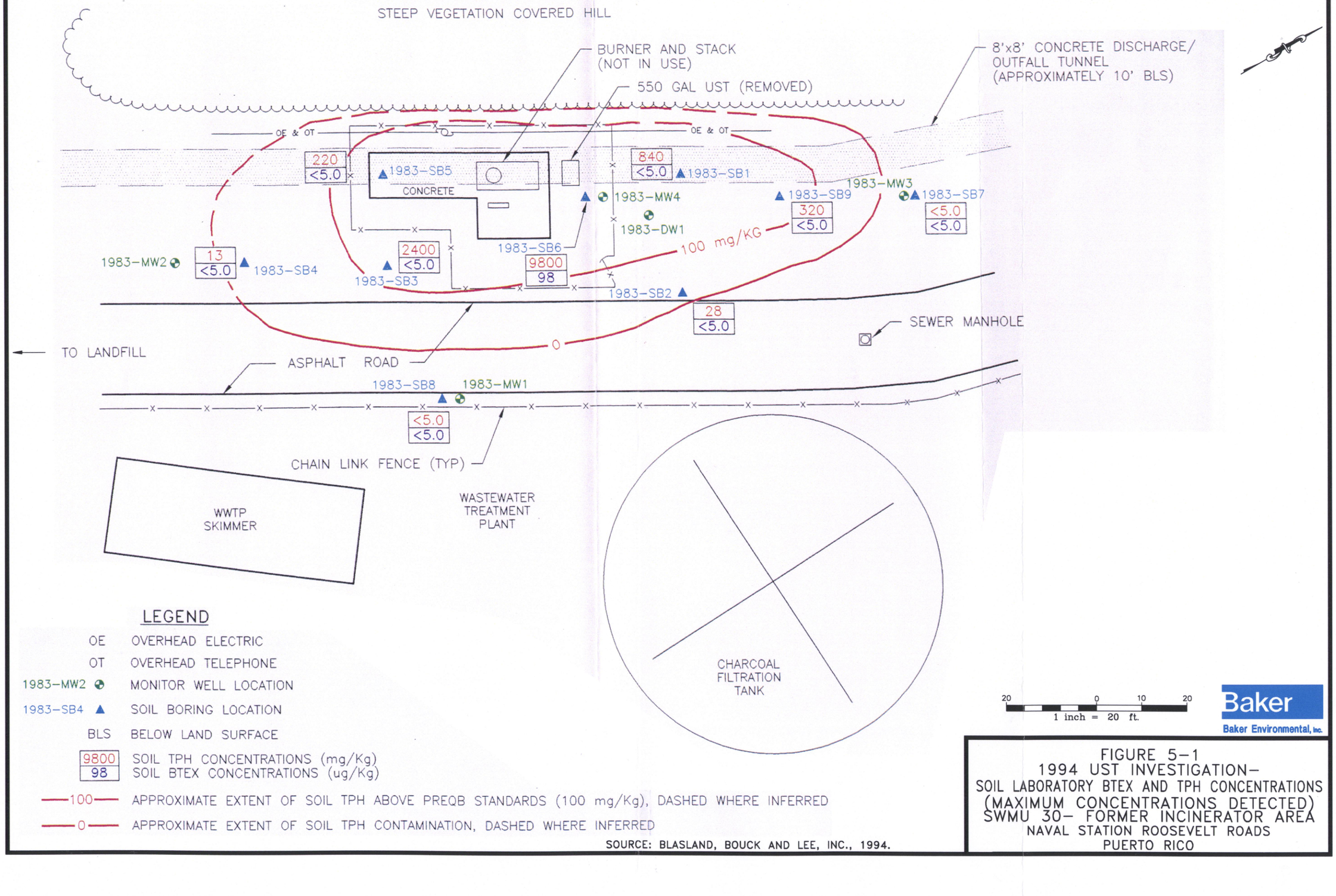
SOURCE: BLASLAND, BOUCK AND LEE, INC., 1994.

20 0 10 20
1 inch = 20 ft.

Baker
Baker Environmental, Inc.

FIGURE 4-2
SWMU 30- FORMER INCINERATOR AREA
1994 UST INVESTIGATION- GROUNDWATER ELEVATION CONTOURS
NAVAL STATION ROOSEVELT ROADS
PUERTO RICO

099916WP



LEGEND

OE	OVERHEAD ELECTRIC
OT	OVERHEAD TELEPHONE
1983-MW2	MONITOR WELL LOCATION
1983-SB4	SOIL BORING LOCATION
BLS	BELOW LAND SURFACE
9800 / 98	SOIL TPH CONCENTRATIONS (mg/Kg) / SOIL BTEX CONCENTRATIONS (ug/Kg)
—100—	APPROXIMATE EXTENT OF SOIL TPH ABOVE PREQB STANDARDS (100 mg/Kg), DASHED WHERE INFERRED
—0—	APPROXIMATE EXTENT OF SOIL TPH CONTAMINATION, DASHED WHERE INFERRED

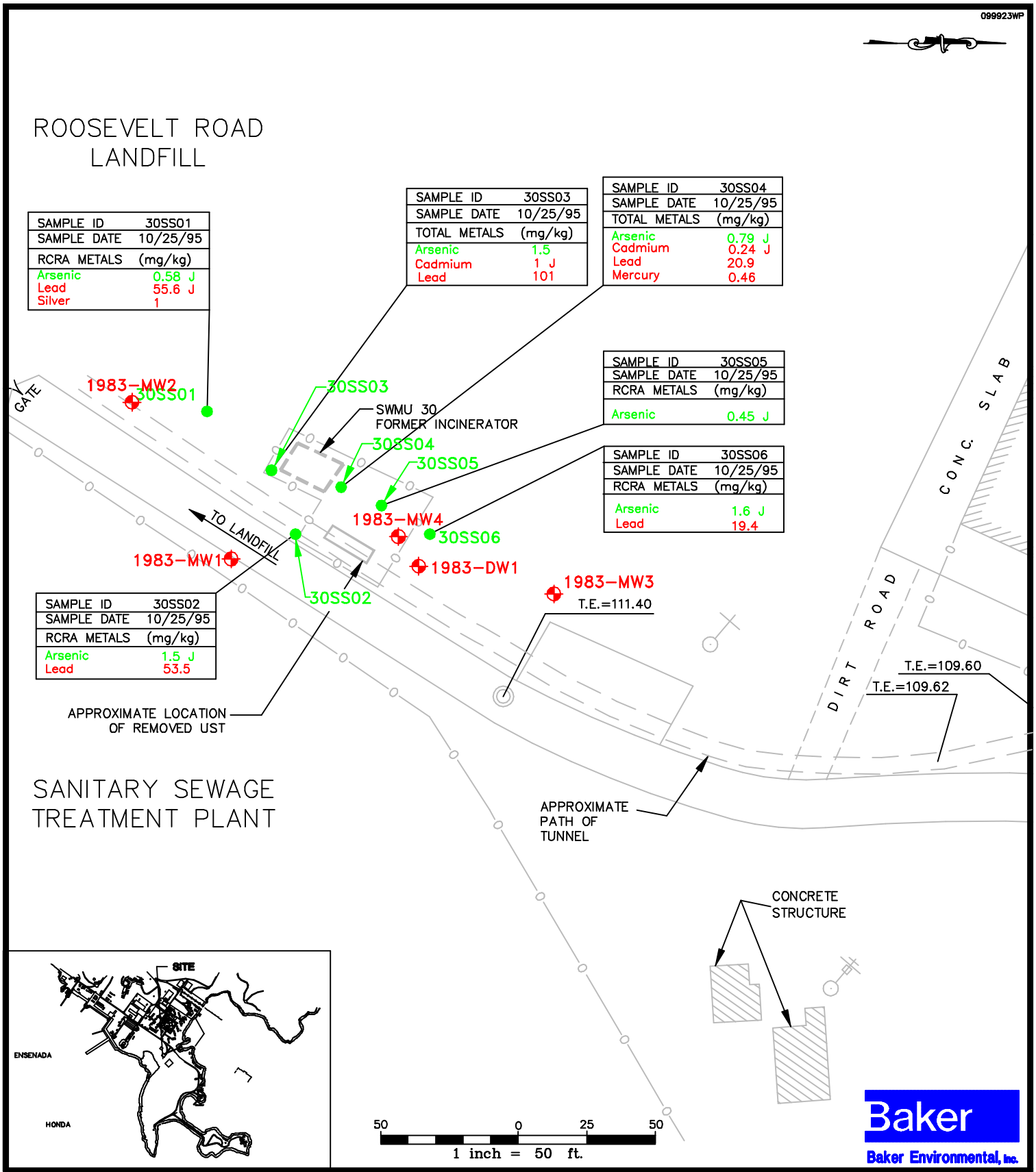
SOURCE: BLASLAND, BOUCK AND LEE, INC., 1994.

20 0 10 20
1 inch = 20 ft.

Baker
Baker Environmental, Inc.

FIGURE 5-1
1994 UST INVESTIGATION-
SOIL LABORATORY BTEX AND TPH CONCENTRATIONS
(MAXIMUM CONCENTRATIONS DETECTED)
SWMU 30- FORMER INCINERATOR AREA
NAVAL STATION ROOSEVELT ROADS
PUERTO RICO

099923WP



Baker
Baker Environmental, Inc.

LEGEND

- EXISTING MONITORING WELL LOCATION (BLASLAND, BOUCK & LEE, INC. 1994)
- SURFACE SOIL SAMPLE LOCATION (10/25/95)

mg/kg MILLIGRAM PER KILOGRAM

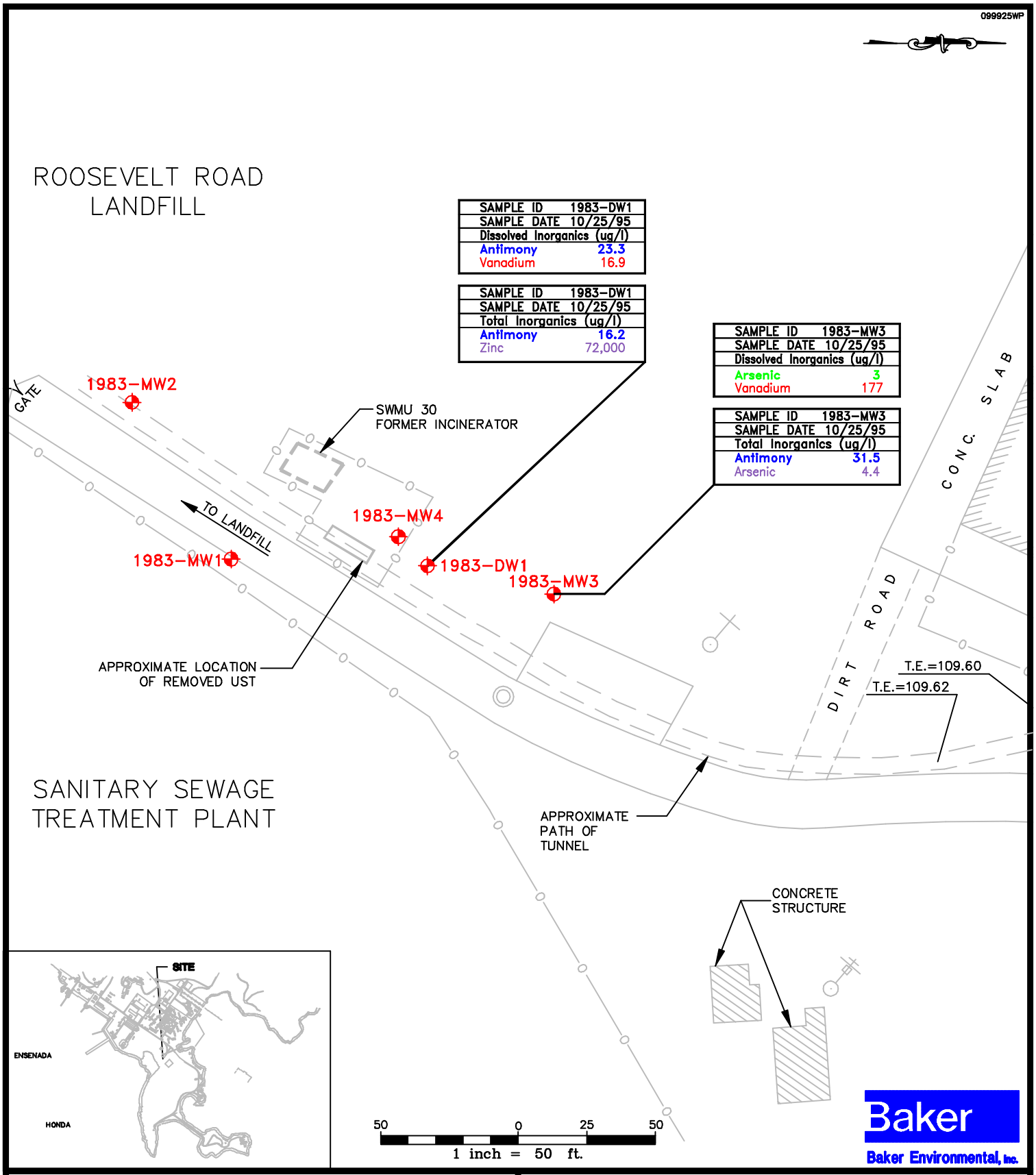
EXCEEDS EPA REGION III RESIDENTIAL RBC
EXCEEDS 2x AVERAGE DETECTED BACKGROUND

SOURCE: LANTDIV, FEB. 1992.

FIGURE 5-2
INORGANIC SURFACE SOIL DETECTIONS ABOVE SCREENING CRITERIA 1995 PHASE I RFI INVESTIGATION SWMU 30- FORMER INCINERATOR AREA

NAVAL STATION ROOSEVELT ROADS
PUERTO RICO

099925WP



LEGEND

EXISTING MONITORING WELL LOCATION
(BLASLAND, BOUCK & LEE, INC. 1994)
UNITS ARE MICROGRAMS PER LITER (ug/l)

EXCEEDS EPA REGION III TAP WATER RBC &
2X AVERAGE DETECTED BACKGROUND

EXCEEDS EPA REGION III TAP WATER RBC

EXCEEDS FEDERAL MCL & EPA REGION III TAP WATER RBC

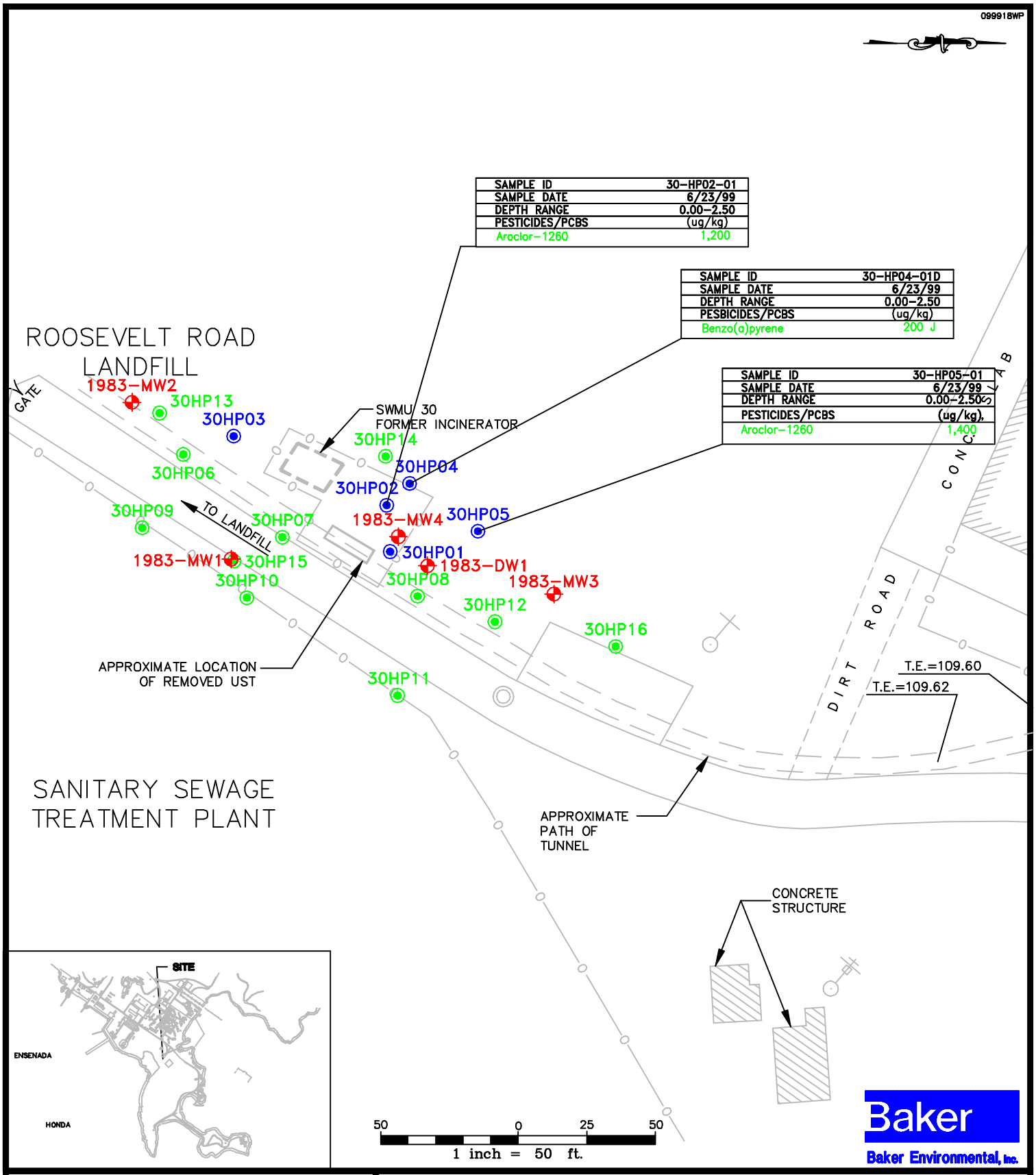
EXCEEDS 2X AVERAGE DETECTED BACKGROUND

SOURCE: LANTDIV, FEB. 1992.

FIGURE 5-3
GROUNDWATER- DISSOLVED AND TOTAL INORGANICS 1995 PHASE I RFI SWMU 30- FORMER INCINERATOR AREA

NAVAL STATION ROOSEVELT ROADS
PUERTO RICO

099918WP



LEGEND

- EXISTING MONITORING WELL LOCATION (BLASLAND, BOUCK & LEE, INC. 1994)
- SOIL BORING LOCATION (BAKER, JUNE 1999)
- DETAILED SOIL BORING LOCATION (BAKER, JUNE 1999)

UNITS ARE MICROGRAMS PER KILOGRAM (ug/kg)

EXCEEDS EPA REGION III INDUSTRIAL RBC

EXCEEDS EPA REGION III RESIDENTIAL RBC

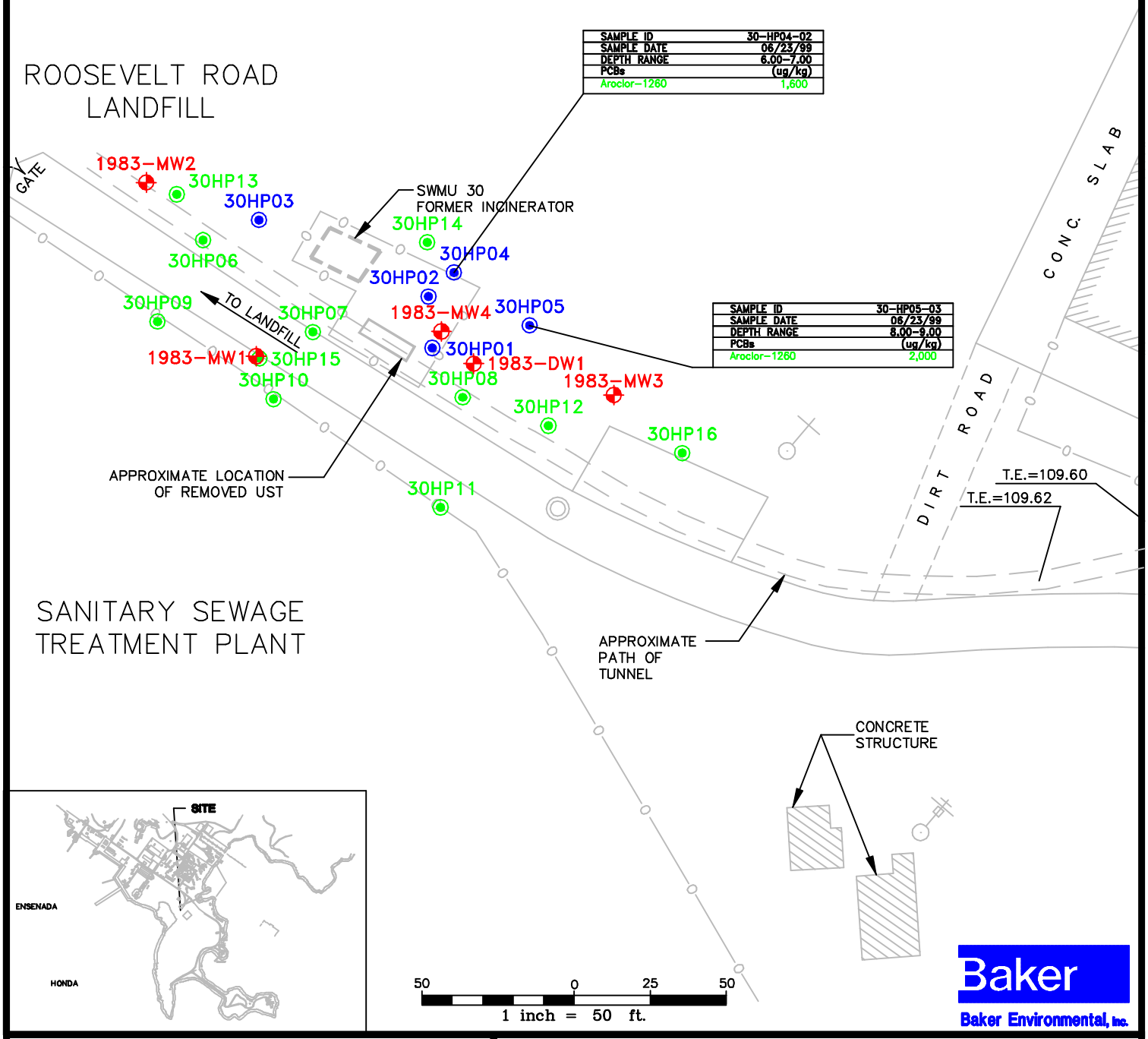
SOURCE: LANTDIV, FEB. 1992.

FIGURE 5-4
SURFACE SOILS (0-5 FT BGS)
ORGANIC DETECTIONS ABOVE SCREENING CRITERIA
PHASE II RFI SOILS INVESTIGATION
SWMU 30- FORMER INCINERATOR AREA

NAVAL STATION ROOSEVELT ROADS
PUERTO RICO

Baker
Baker Environmental, Inc.

099909WP



Baker
Baker Environmental, Inc.

LEGEND

- EXISTING MONITORING WELL LOCATION (BLASLAND, BOUCK & LEE, INC. 1994)
- SOIL BORING LOCATION (BAKER, JUNE 1999)
- DETAILED SOIL BORING LOCATION (BAKER, JUNE 1999)

UNITS ARE MICROGRAMS PER KILOGRAM (ug/kg)

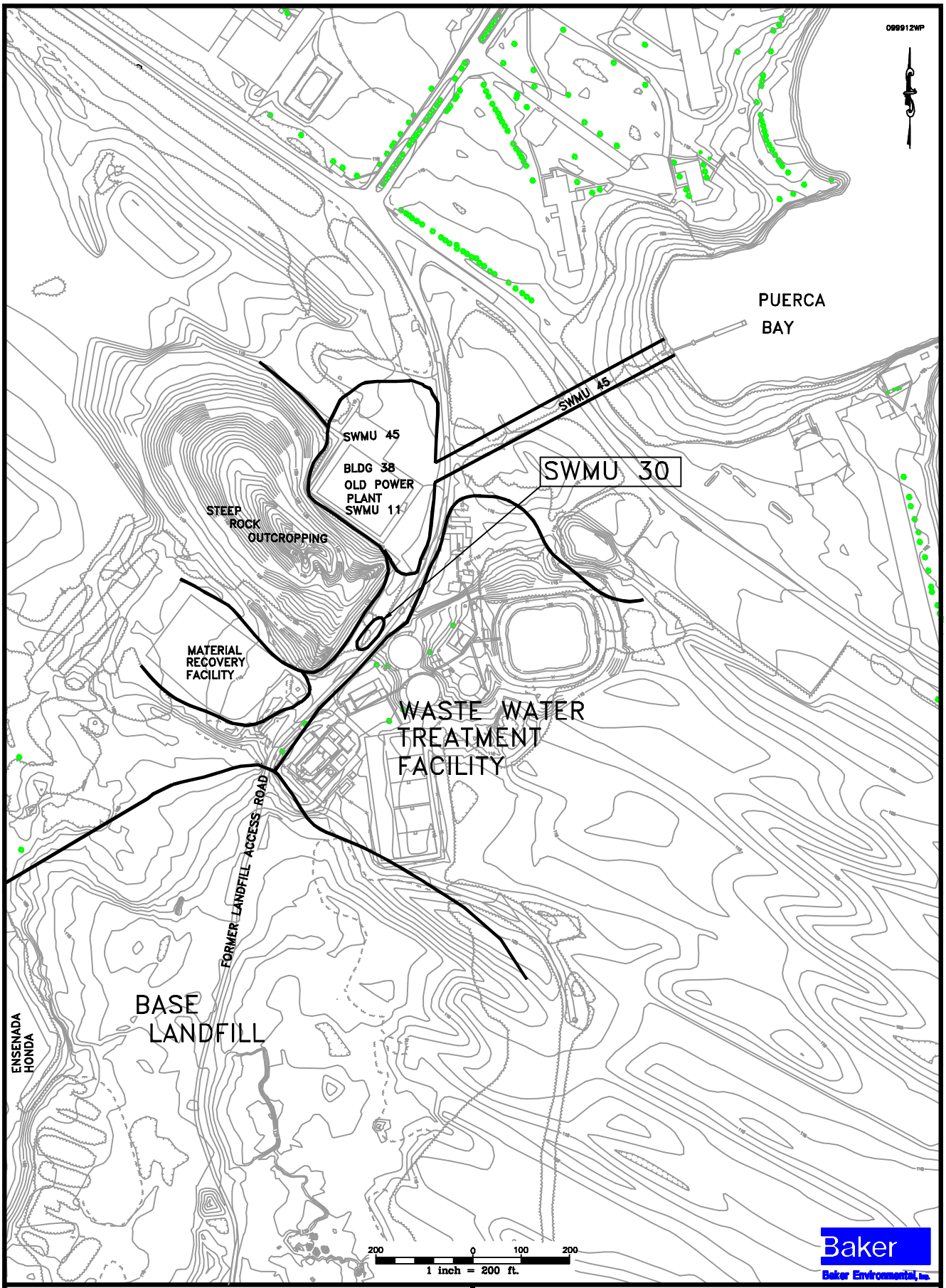
EXCEEDS EPA REGION III INDUSTRIAL RBC

EXCEEDS EPA REGION III RESIDENTIAL RBC

SOURCE: LANTDIV, FEB. 1992.

FIGURE 5-5
SUBSURFACE SOILS(5-10 FT. BGS)
ORGANIC DETECTIONS ABOVE SCREENING CRITERIA
PHASE II RFI SOILS INVESTIGATION
SWMU 30- FORMER INCINERATOR AREA

NAVAL STATION ROOSEVELT ROADS
PUERTO RICO



LEGEND

SOURCE: LANTDIV, FEB. 1992/1997

FIGURE 7-1
OU#1-SWMU 30 FORMER INCINERATOR
LOCAL LAND USE MAP

NAVAL STATION ROOSEVELT ROADS
PUERTO RICO

APPENDIX A-1
BLASLAND, BOUCK AND LEE UST SITE CHARACTERIZATION BORING LOGS

SOIL BORING LOG

Exploration for: Site Characterization	Location Site 1983 Roosevelt Roads - U.S. Naval Station Ceiba, Puerto Rico
Date: February 28, 1994	
Boring No.: 1983-SB1	Water Table ~ 9 ft BLS
Recorded By: Dan Press	
Drill Type: Hollow stem auger	
Weather: Sunny, 90°	

Sample No.	Type	Depth		No. of Blows	Soil Description and Boring Log
		From	To		
1	PH	0	2	NA	SAND, fine, very pale brown (10 YR 8/3), minor SHELL FRAGMENTS and ROCK FRAGMENTS.
2	PH	2	4	NA	Sand, pale brown (10 YR 6/3), very fine to silt with ROCK FRAGMENTS and CLAY.
3	SPT	4	6	6-7-7-8	SAND, fine, very light gray matrix, ROCK FRAGMENTS and greenish black CLAY, hydrocarbon odor.
4	SPT	6	8	5-6-50-refusal	CLAY, olive gray, medium stiffness auger refusal at 7 ft BLS, abandoned hole.

Remarks

PH - post hole

SPT - standard penetration test

NA - not applicable

SOIL BORING LOG

Exploration for: Site Characterization

Date: March 1, 1994

Boring No.: 1983-SB2

Recorded By: Tim Twist / Jose Garrido

Drill Type: Hollow stem auger

Weather: Sunny, 90°

Location

Site 1983
Roosevelt Roads - U.S. Naval Station
Ceiba, Puerto Rico

Water Table

~ 9 ft BLS

Sample No.	Type	Depth		No. of Blows	Soil Description and Boring Log
		From	To		
1	PH	0	2	NA	SAND, greenish gray, fine, minor SHELL FRAGMENTS and gravel.
2	PH	2	4	NA	Road fill/angular ROCK FRAGMENTS.
3	SPT	4	6	50-recovery*	Weathered rock (Diorite?).
4	SPT	6	8	50-recovery*	Weathered rock with dark green/olive gray CLAY.
5	SPT	8	10	50-receovry*	Weathered rock (Diorite?), brittle.
6	SPT	10	12	50-recovery*	Weathered rock (Diorite?), brittle.
7	SPT	12	14	50-recovery*	Weathered rock (Diorite?), brittle.
	Auger	14	17	N/A	Weathered rock (Diorite?), Brittle.

Remarks

* - 3 inch recovery

PH - post hole

SPT - standard penetration test

NA - not applicable

SOIL BORING LOG

Exploration for: Site Characterization	Location Site 1983 Roosevelt Roads - U.S. Naval Station Ceiba, Puerto Rico
Date: March 1, 1994	
Boring No.: 1983-SB3	Water Table ~ 9 ft BLS
Recorded By: Tim Twist / Jose Garrido	
Drill Type: Hollow stem auger	
Weather: Sunny, 90°	

Sample No.	Type	Depth		No. of Blows	Soil Description and Boring Log
		From	To		
1	PH	0	2	NA	ROCK FRAGMENTS, pale brown-brown road fill/angular.
2	PH	2	4	NA	SAND, pale brown-brown, fine with SHELL FRAGMENTS and some CLAY.
3	SPT	4	6	NA	Auger refusal at 4 ft BLS.

* Remarks

Auger refusal at 4 ft BLS, moved 4 ft along road towards landfill, auger refusal again at 4 ft BLS.

PH - post hole

SPT - standard penetration test

NA - not applicable

SOIL BORING LOG

Exploration for: Site Characterization	Location Site 1983 Roosevelt Roads - U.S. Naval Station Ceiba, Puerto Rico
Date: May 10, 1994	
Boring No.: 1983-SB3	Water Table
Recorded By: Dan Press	~ 10 ft BLS
Drill Type: Hollow stem auger	
Weather: Cloudy, overcast, possible rain, 80°	

Sample No.	Type	Depth		No. of Blows	Soil Description and Boring Log
		From	To		
1	SPT	0	2	11-20-32-41	Weathered DIORITE, pale brown, (10 YR 6/3 to 5/3).
2	SPT	2	4	21-18-18-18	Weathered DIORITE, pale brown, (10 YR 6/3 to 5/3).
3	SPT	4	6	6-7-6-8	Weathered DIORITE, dark brown, (10 YR 3/3).
4	SPT	6	8	6-6-8-14	SAND, tan (2.5 Y 5/1),dry, mild odor, gray CLAY with high odor.
5	SPT	8	10	23-23-50 for 5" recovery	SAND, tan (2.5 Y 5/1),dry, mild odor, gray CLAY with high odor, minor weathered DIORITE.
6	SPT	10	12	50 for 1" recovery	Hit CONCRETE.

* Remarks

SPT - standard penetration test

NA - not applicable

SOIL BORING LOG

Exploration for: Site Characterization	Location Site 1983 Roosevelt Roads - U.S. Naval Station Ceiba, Puerto Rico
Date: March 1, 1994	
Boring No.: 1983-SB4 (Abandoned)	
Recorded By: Tim Twist / Jose Garrido	Water Table ~ 9 ft BLS
Drill Type: Hollow stem auger	
Weather: Sunny, 90°	

Sample No.	Type	Depth		No. of Blows	Soil Description and Boring Log
		From	To		
1	PH	0	2	NA	Road fill/angular ROCK FRAGMENTS.
2	PH	2	4	NA	Road fill/angular ROCK FRAGMENTS.
3	SPT	4	6	8-12-7-11	Road fill/angular ROCK FRAGMENTS.
4	SPT	6	8	50-recovery	Road fill/angular ROCK FRAGMENTS.

* Remarks

Auger refusal at 6.6 ft BLS.

PH - post hole

SPT - standard penetration test

NA - not applicable

SOIL BORING LOG

Exploration for: Site Characterization

Date: May 3, 1994

Boring No.: 1983-SB4

Recorded By: Dan Press

Drill Type: Hollow stem auger

Weather: Sunny, 90°

Location

Site 1983
Roosevelt Roads - U.S. Naval Station
Ceiba, Puerto Rico

Water Table

~19 ft BLS

Sample No.	Type	Depth		No. of Blows	Soil Description and Boring Log
		From	To		
1	PH	0	2	NA	SAND, light brown (7.5 YR 6/3), fine, with slight ROCK FRAGMENTS.
2	PH	2	4	NA	SAND, light brown (7.5 YR 5/3), fine, with slight ROCK FRAGMENTS.
3	PH	4	6	NA	SAND, brown (7.5 YR 5/3), fine, with slight ROCK FRAGMENTS.
4	SPT	6	8	10-9-7-5	CLAY, light brown (7.5 YR 6/3), soft, DIORITE FRAGMENTS, moderate CLAY.
5	SPT	8	10	4-8-14-10	CLAY, dark brown (7.5 YR 4/2 to 6/3), SAND, light brown, minor ROCK FRAGMENTS.
6	SPT	10	12	5-5-6-12	SAND, Strong brown (7.5 YR 5/6 to 4/6), coarse to fine, wet, no odor. Fill for outfall?
7	SPT	12	14	4-11-15-43	SAND, brown (7.5 YR 5/3 to 4/1) coarse to fine, wet, no odor. About 13.5 ft BLS, dark gray fine SAND with slight ROCK FRAGMENTS, black/white weathered ROCK (CLAY) dry.
8	SPT	14	16	50 for 4" recovery	WEATHERED ROCK, very light gray matrix, greenish black (N8 Matrix, 5GY 2/1), dry and brittle (in the hand) diorite.
9	SPT	16	18	50 for 2" recovery	WEATHERED ROCK, brown (7.5 YR 5/4), dry and brittle diorite.
10	SPT	18	20	50 for 1" recovery	WEATHERED ROCK, very light gray matrix. Greenish black (N8 Matrix, 5GY 2/1), dry and brittle (in the hand) diorite.
11	SPT	20	22	50 for 1" recovery	WEATHERED ROCK, very light gray matrix. Greenish black (N8 Matrix, 5GY 2/1), dry and brittle (in the hand) diorite. Very wet, water at 19 ft.

* Remarks

PH - post hole NA - not applicable SPT - standard penetration test

SOIL BORING LOG

Exploration for: Site Characterization

Date: March 2, 1994

Boring No.: 1983-SB5

Recorded By: Dan Press

Drill Type: Hollow stem auger

Weather: Partly cloudy, 85°

Location

Site 1983
Roosevelt Roads - U.S. Naval Station
Ceiba, Puerto Rico

Water Table

~ 9 ft BLS

Sample No.	Type	Depth		No. of Blows	Soil Description and Boring Log
		From	To		
1	PH	0	2	NA	1 ft concrete, SAND, tan, fine, ROCK FRAGMENTS.
2	PH	2	4	NA	SAND, brown/tan, fine, minor concrete FRAGMENTS, CLAY, and SHELL FRAGMENTS.
3	SPT	4	6	12-8-6-7	SAND, brown, fine, slight intermittent CLAY. White CLAY with minor ROCK FRAGMENTS. Concrete FRAGMENTS.
4	SPT	6	8	5-6-7-50	CLAYEY SAND, brown, gray, fine, odor, moist.

* Remarks

PH - post hole

SPT - standard penetration test

NA - not applicable

SOIL BORING LOG

Exploration for: Site Characterization

Date: March 2, 1994

Boring No.: 1983-SB6

Recorded By: Dan Press

Drill Type: Hollow stem auger

Weather: Sunny, 90°

Location

Site 1983
Roosevelt Roads - U.S. Naval Station
Ceiba, Puerto Rico

Water Table

~ 9 ft BLS

Sample No.	Type	Depth		No. of Blows	Soil Description and Boring Log
		From	To		
1	PH	0	2	NA	SAND, brown, fine, minor CLAY, ROCK FRAGMENTS.
2	PH	2	4	NA	SAND, brown, fine, minor CLAY, ROCK FRAGMENTS.
3	SPT	4	6	5-5-6-50*	SAND, brown, fine, increase in minor CLAY, ROCK FRAGMENTS, strong hydrocarbon odor.

* Remarks

* - Auger refusal, hit concrete slab.

PH - post hole

SPT - standard penetration test

NA - not applicable

SOIL BORING LOG

Exploration for: Site Characterization

Date: May 3, 1994

Boring No.: 1983-SB6

Recorded By: Dan Press

Drill Type: Hollow stem auger

Weather: Sunny, 90°

Location

Site 1983
Roosevelt Roads - U.S. Naval Station
Ceiba, Puerto Rico

Water Table

~9 ft BLS

Sample No.	Type	Depth		No. of Blows	Soil Description and Boring Log
		From	To		
1	PH	0	2	NA	SAND, brown (10 YR 5/3) with ROCK FRAGMENTS.
2	PH	2	4	NA	SAND, brown (10 YR 4/3) with ROCK FRAGMENTS.
3	PH	4	6	NA	SAND, brown (10 YR 4/3) with ROCK FRAGMENTS.
4	SPT	6	8	10-6-5-5	SAND, dark gray (10 YR 6/3) CLAY, stained, odor.
5	SPT	8	10	3-3-5-6	Top of spoon, SAME AS ABOVE. (10 YR 4/1) CLAY, dark gray soft moist, odor.
6	SPT	10	12	2-5-5-4	CLAY, dark gray (10 YR 4/1) soft moist, odor. Decrease in CLAY from above description and an increase in weathered ROCK.
7	SPT	12	14	13-45-50 for 5" recovery	ROCK, very light gray (10 YR 4/1) matrix, greenish black (DIORITE - FELSIC), wet.
8	SPT	14	16	50 for 5" recovery	CLAY, brown (N8 Matrix, 5GY 2/1), light olive gray ROCK (DIORITE - FELSIC), wet.
9	SPT	16	18	50 for 2" recovery	ROCK, brown (5 Y 5/2, 7.5 YR 5/2 to 5/3) weathered. Dry and brittle DIORITE.
10	SPT	18	20	50 for 1" recovery	ROCK, very light gray (2.5 Y 4/3 to 4/41) matrix, weathered. Greenish black, dry and brittle (in the hand) DIORITE.

* Remarks

PH - post hole

SPT - standard penetration test

NA - not applicable

SOIL BORING LOG

Exploration for: Site Characterization

Date: May 2, 1994

Boring No.: 1983-SB7

Recorded By: Dan Press

Drill Type: Hollow stem auger

Weather: Sunny, 90°

Location

Site 1983
Roosevelt Roads - U.S. Naval Station
Ceiba, Puerto Rico

Water Table

~ 9 ft BLS

Sample No.	Type	Depth From	Depth To	No. of Blows	Soil Description and Boring Log
1	SPT	0	2	14-26-34-24	SAND, gray (7.5 YR 7/1 to 6/1) fine, slight SHELL FRAGMENTS, no odor, dry.
2	SPT	2	4	15-20-17-17	SAND, gray (7.5 YR 7/1 to 6/1) fine, slight CLAY, very little SHELL.
3	SPT	4	6	15-23-21-23	SAND, white/pinkish white (5 YR 8/1 to 8/2) fine, and ROCK FRAGMENTS moderate,(weathered DIORITE).
4	SPT	6	8	15-25-28-32	SAND, brown (7.5 YR 5/3) fine, and ROCK FRAGMENTS, (weathered DIORITE).
5	SPT	8	10	10-27-32-50 (recovery)	SAND, gray (5 Y 6/1) fine, minor ROCK FRAGMENTS weathered DIORITE, minor CLAY. Stained at 9.8 ft BLS, odor.
6	SPT	10	12	23-36-50 (recovery)	SAND, gray (5 Y 6/1) fine, minor ROCK FRAGMENTS weathered DIORITE, minor CLAY. Reddish brown stain, odor.
7	SPT	12	14	17-25-50 for 3"-recovery	SAND, gray (5 Y 6/1) fine, minor ROCK FRAGMENTS weathered DIORITE, minor CLAY. No staining or odor.
8	SPT	14	16	50 for 6" recovery	SAND, gray (5 Y 5/2 to 4/2, 10 YR 7/1) fine, 14.0 ft - 14.5 ft olive gray to light gray CLAY, dry, brittle, minor ROCK FRAGMENTS, (weathered DIORITE). No staining or odor.
9	SPT	16	18	27-50 for 4" recovery	SAND, light gray (10 YR 7/1) fine, minor ROCK FRAGMENTS (weathered DIORITE), CLAY. No staining or odor.

* Remarks

SPT - standard penetration test

NA - not applicable

SOIL BORING LOG

Exploration for: Site Characterization

Date: May 3, 1994

Boring No.: 1983-SB8

Recorded By: Dan Press

Drill Type: Hollow stem auger

Weather: Sunny, 90°

Location

Site 1983
Roosevelt Roads - U.S. Naval Station
Ceiba, Puerto Rico

Water Table

~9 ft BLS

Sample No.	Type	Depth		No. of Blows	Soil Description and Boring Log
		From	To		
1	SPT	0	2	42-42-30-35	SAND, brown, with minor ROCK FRAGMENTS.
2	SPT	2	4	16-24-14-11	SAND, brown, with minor ROCK FRAGMENTS.
3	SPT	4	6	14-17-3-1	SAND, brown, with minor ROCK FRAGMENTS. Increased ROCK FRAGMENTS and size.
4	SPT	6	8	15-50 for 2" recovery	SAND, brown, with minor ROCK FRAGMENTS. Increased ROCK FRAGMENTS and size.
5	SPT	8	10	50 for 0" recovery	
6	SPT	10	12	50 for 0" recovery	

* Remarks

SPT - standard penetration test

NA - not applicable

SOIL BORING LOG

Exploration for: Site Characterization

Date: May 4, 1994

Boring No.: 1983-SB8

Recorded By: Dan Press

Drill Type: Hollow stem auger

Weather: Sunny, Breezy, 90°

Location

Site 1983
Roosevelt Roads - U.S. Naval Station
Ceiba, Puerto Rico

Water Table

~10 ft BLS

Sample No.	Type	Depth		No. of Blows	Soil Description
		From	To		
1	SPT	0	2	39-50 for 2" recovery	0" - 3" asphalt. FINE SAND, (2.5 YR 8/6 to 7/2) reddish yellow, with ROCK FRAGMENTS, pinkish gray.
2	SPT	2	4	31-47-43-43	0" - 3" asphalt. FINE SAND, (2.5 YR 8/6 to 7/2) reddish yellow, with ROCK FRAGMENTS, pinkish gray.
3	SPT	4	6	20-48-50 for 3" recovery	0" - 3" asphalt. FINE SAND, (2.5 YR 8/6 to 7/2) reddish yellow, with ROCK FRAGMENTS, pinkish gray.
4	SPT	6	8	18-41-50 for 2" recovery	SAND, dark gray (10 YR 6/3) with CLAY, stained, odor.
5	SPT	8	10	50 for 4" recovery	Top of spoon, SAME AS ABOVE. CLAY, dark gray (10 YR 4/1) soft moist, odor.
6	SPT	10	12	50 for 6" recovery	CLAY, dark gray (10 YR 4/1) soft moist, odor. Decrease in CLAY from above description and an increase in weathered ROCK.
7	SPT	12	14	70 for 6" recovery	ROCK, very light gray matrix, greenish black (10 YR 4/1) (DIORITE - FELSIC), wet.
8	SPT	14	16	50 for 3" recovery	CLAY, brown, light olive gray (N8 Matrix, 5GY 2/1) ROCK (DIORITE - FELSIC), wet.
9	SPT	16	18	50 for 2" recovery	weathered ROCK, brown. (5 Y 5/2, 7.5 YR 5/2 to 5/3) Dry and brittle DIORITE.

* Remarks

SOIL BORING LOG

Exploration for: Site Characterization	Location Site 1983 Roosevelt Roads - U.S. Naval Station Ceiba, Puerto Rico
Date: May 4, 1994	
Boring No.: 1983-SB9 Abandoned	Water Table ~9 ft BLS
Recorded By: Dan Press	
Drill Type: Hollow stem auger	
Weather: Sunny, Breezy, 90°	

Sample No.	Type	Depth		No. of Blows	Soil Description and Boring Log
		From	To		
1	SPT	0	2	42-32-27-45	SAND, Light brown (7.5 YR 6/3), DIORITE FRAGMENTS.
2	SPT	2	4	60 for 5" recovery	SAND, Tan/pink (7.5 YR 7/3), dry, no odor.
3	SPT	4	6	50 for 5" recovery	Very light gray matrix, greenish black (N8 Matrix, 5 GY 2/1) weathered DIORITE.

* Remarks

SPT - standard penetration test

NA - not applicable

SOIL BORING LOG

Exploration for: Site Characterization	Location Site 1983 Roosevelt Roads - U.S. Naval Station Ceiba, Puerto Rico
Date: May 10, 1994	
Boring No.: 1983-SB9	Water Table ~9 ft BLS
Recorded By: Dan Press	
Drill Type: Hollow stem auger	
Weather: Cloudy, overcast, possible rain, 80°	

Sample No.	Type	Depth		No. of Blows	Soil Description and Boring Log
		From	To		
1	SPT	0	2	7-13-20-50 for 3" recovery	SAND, light brown (7.5 YR 6/3) with minor ROCK and SHELL hash.
2	SPT	2	4	15-21-20-20	CLAY, dark grayish brown (2.5 YR 4/2 to 4/3), olive brown weathered ROCK.
3	SPT	4	6	12-11-9-8	SAND, brown (10 YR 5/3 to 6/3), ROCK FRAGMENTS, minor pale brown CLAY.
4	SPT	6	8	10-10-13-10	CLAYEY SAND, pale brown (10 YR 6/3), dry, slight ROCK FRAGMENTS.
5	SPT	8	10	9-21-18-10	CLAYEY SAND, dark grayish brown (10 YR 4/2), dry, slight ROCK FRAGMENTS.
6	SPT	10	12	9-50 for 3" recovery	ROCK FRAGMENTS, dark gray-grayish black (N 3 to N 2), water.

* Remarks

SPT - standard penetration test

NA - not applicable

MONITOR WELL LITHOLOGIC LOG

Exploration for: Site Characterization	Location Site 1983 Roosevelt Roads - U.S. Naval Station Ceiba, Puerto Rico
Date: May 11, 1994	
Boring No.: 1983-MW1	Water Table
Recorded By: Dan Press	~ 10 ft BLS
Drill Type: Hollow stem auger	
Weather: Sunny, Breezy, 90°	

Sample No.	Type	Depth		No. of Blows	Soil Description
		From	To		
1	SPT	0	2	39-50 for 2" recovery	0" - 3" asphalt. FINE SAND, (2.5 YR 8/6 to 7/2) reddish yellow, with ROCK FRAGMENTS, pinkish gray.
2	SPT	2	4	31-47-43-43	0" - 3" asphalt. FINE SAND, (2.5 YR 8/6 to 7/2) reddish yellow, with ROCK FRAGMENTS, pinkish gray.
3	SPT	4	6	20-48-50 for 3" recovery	0" - 3" asphalt. FINE SAND, (2.5 YR 8/6 to 7/2) reddish yellow, with ROCK FRAGMENTS, pinkish gray.
4	SPT	6	8	18-41-50 for 2" recovery	SAND, dark gray (10 YR 6/3) with CLAY, stained, odor.
5	SPT	8	10	50 for 4" recovery	Top of spoon, SAME AS ABOVE. CLAY, dark gray (10 YR 4/1) soft moist, odor.
6	SPT	10	12	50 for 6" recovery	CLAY, dark gray (10 YR 4/1) soft moist, odor. Decrease in CLAY from above description and an increase in weathered ROCK.
7	SPT	12	14	70 for 6" recovery	ROCK, very light gray matrix, greenish black (10 YR 4/1) (DIORITE - FELSIC), wet.
8	SPT	14	16	50 for 3" recovery	CLAY, brown, light olive gray (N8 Matrix, 5GY 2/1) ROCK (DIORITE - FELSIC), wet.
9	SPT	16	18	50 for 2" recovery	weathered ROCK, brown. (5 Y 5/2, 7.5 YR 5/2 to 5/3) Dry and brittle DIORITE.

* Remarks

Total well depth - 18.65

MONITOR WELL LITHOLOGIC LOG

Exploration for: Site Characterization

Date: May 12, 1994

Boring No.: 1983-MW2

Recorded By: Dan Press

Drill Type: Hollow stem auger

Weather: Sunny, 90°

Location

Site 1983
Roosevelt Roads - U.S. Naval Station
Ceiba, Puerto Rico

Water Table

~19 ft BLS

Sample No.	Type	Depth		No. of Blows	Soil Description and Boring Log
		From	To		
1	PH	0	2	NA	SAND, light brown (7.5 YR 6/3), fine, with slight ROCK FRAGMENTS.
2	PH	2	4	NA	SAND, light brown (7.5 YR 5/3), fine, with slight ROCK FRAGMENTS.
3	PH	4	6	NA	SAND, brown (7.5 YR 5/3), fine, with slight ROCK FRAGMENTS.
4	SPT	6	8	10-9-7-5	CLAY, light brown (7.5 YR 6/3), soft, DIORITE FRAGMENTS, moderate CLAY.
5	SPT	8	10	4-8-14-10	CLAY, dark brown (7.5 YR 4/2 to 6/3), SAND, light brown, minor ROCK FRAGMENTS.
6	SPT	10	12	5-5-6-12	SAND, Strong brown (7.5 YR 5/6 to 4/6), coarse to fine, wet, no odor. Fill for outfall?
7	SPT	12	14	4-11-15-43	SAND, brown (7.5 YR 5/3 to 4/1) coarse to fine, wet, no odor. About 13.5 ft BLS, dark gray fine SAND with slight ROCK FRAGMENTS, black/white weathered ROCK (CLAY) dry.
8	SPT	14	16	50 for 4" recovery	WEATHERED ROCK, very light gray matrix, greenish black (N8 Matrix, 5GY 2/1), dry and brittle (in the hand) diorite.
9	SPT	16	18	50 for 2" recovery	WEATHERED ROCK, brown (7.5 YR 5/4), dry and brittle diorite.
10	SPT	18	20	50 for 1" recovery	WEATHERED ROCK, very light gray matrix. Greenish black (N8 Matrix, 5GY 2/1), dry and brittle (in the hand) diorite.
11	SPT	20	22	50 for 1" recovery	WEATHERED ROCK, very light gray matrix. Greenish black (N8 Matrix, 5GY 2/1), dry and brittle (in the hand) diorite. Very wet, water at 19 ft.

* Remarks

PH - post hole NA - not applicable SPT - standard penetration test

MONITOR WELL LITHOLOGIC LOG

Exploration for: Site Characterization	Location Site 1983 Roosevelt Roads - U.S. Naval Station Ceiba, Puerto Rico
Date: May 11, 1994	
Boring No.: 1983-MW3	Water Table ~ 9 ft BLS
Recorded By: Dan Press	
Drill Type: Hollow stem auger	
Weather: Sunny, 90°	

Sample No.	Type	Depth		No. of Blows	Soil Description and Boring Log
		From	To		
1	SPT	0	2	14-26-34-24	SAND, gray (7.5 YR 7/1 to 6/1) fine, slight SHELL FRAGMENTS, no odor, dry.
2	SPT	2	4	15-20-17-17	SAND, gray (7.5 YR 7/1 to 6/1) fine, slight CLAY, very little SHELL.
3	SPT	4	6	15-23-21-23	SAND, white/pinkish white (5 YR 8/1 to 8/2) fine, and ROCK FRAGMENTS moderate,(weathered DIORITE).
4	SPT	6	8	15-25-28-32	SAND, brown (7.5 YR 5/3) fine, and ROCK FRAGMENTS, (weathered DIORITE).
5	SPT	8	10	10-27-32-50 (recovery)	SAND, gray (5 Y 6/1) fine, minor ROCK FRAGMENTS weathered DIORITE, minor CLAY. Stained at 9.8 ft BLS, odor.
6	SPT	10	12	23-36-50 (recovery)	SAND, gray (5 Y 6/1) fine, minor ROCK FRAGMENTS weathered DIORITE, minor CLAY. Reddish brown stain, odor.
7	SPT	12	14	17-25-50 for 3"-recovery	SAND, gray (5 Y 6/1) fine, minor ROCK FRAGMENTS weathered DIORITE, minor CLAY. No staining or odor.
8	SPT	14	16	50 for 6" recovery	SAND, gray (5 Y 5/2 to 4/2, 10 YR 7/1) fine, 14.0 ft - 14.5 ft olive gray to light gray CLAY, dry, brittle, minor ROCK FRAGMENTS, (weathered DIORITE). No staining or odor.
9	SPT	16	18	27-50 for 4" recovery	SAND, light gray (10 YR 7/1) fine, minor ROCK FRAGMENTS (weathered DIORITE), CLAY. No staining or odor.

* Remarks

SPT - standard penetration test

NA - not applicable

MONITOR WELL LITHOLOGIC LOG

Exploration for: Site Characterization	Location Site 1983 Roosevelt Roads - U.S. Naval Station Ceiba, Puerto Rico
Date: May 12, 1994	
Boring No.: 1983-MW4	Water Table ~9 ft BLS
Recorded By: Dan Press	
Drill Type: Hollow stem auger	
Weather: Sunny, 90°	

Sample No.	Type	Depth		No. of Blows	Soil Description and Boring Log
		From	To		
1	PH	0	2	NA	SAND, brown (10 YR 5/3) with ROCK FRAGMENTS.
2	PH	2	4	NA	SAND, brown (10 YR 4/3) with ROCK FRAGMENTS.
3	PH	4	6	NA	SAND, brown (10 YR 4/3) with ROCK FRAGMENTS.
4	SPT	6	8	10-6-5-5	SAND, dark gray (10 YR 6/3) CLAY, stained, odor.
5	SPT	8	10	3-3-5-6	Top of spoon, SAME AS ABOVE. (10 YR 4/1) CLAY, dark gray soft moist, odor.
6	SPT	10	12	2-5-5-4	CLAY, dark gray (10 YR 4/1) soft moist, odor. Decrease in CLAY from above description and an increase in weathered ROCK.
7	SPT	12	14	13-45-50 for 5" recovery	ROCK, very light gray (10 YR 4/1) matrix, greenish black (DIORITE - FELSIC), wet.
8	SPT	14	16	50 for 5" recovery	CLAY, brown (N8 Matrix, 5GY 2/1), light olive gray ROCK (DIORITE - FELSIC), wet.
9	SPT	16	18	50 for 2" recovery	ROCK, brown (5 Y 5/2, 7.5 YR 5/2 to 5/3) weathered. Dry and brittle DIORITE.
10	SPT	18	20	50 for 1" recovery	ROCK, very light gray (2.5 Y 4/3 to 4/41) matrix, weathered. Greenish black, dry and brittle (in the hand) DIORITE.

* Remarks

PH - post hole

SPT - standard penetration test

NA - not applicable

MONITORING WELL LITHOLOGIC LOG

Exploration for: Site Characterization

Date: May 13 & 18, 1994

Boring No.: 1983-DW1

Recorded By: Dan Press

Drill Type: Hollow stem auger

Weather: Sunny, 90°

Location

Site 1983
Roosevelt Roads - U.S. Naval Station
Ceiba, Puerto Rico

Water Table

~ 9 ft BLS

Sample No.	Type	Depth		No. of Blows	Soil Description and Boring Log
		From	To		
1	PH	0	2	NA	SAND, fine, very pale brown (10 YR 8/3), minor SHELL FRAGMENTS and ROCK FRAGMENTS.
2	PH	2	4	NA	Sand, pale brown (10 YR 6/3), very fine to silt with ROCK FRAGMENTS and CLAY.
3	SPT	4	6	6-7-7-8	SAND, fine, very light gray matrix, ROCK FRAGMENTS and greenish black CLAY, hydrocarbon odor.
4	SPT	6	8	5-6-50-refusal	CLAY, olive gray, medium stiffness auger refusal at 7 ft BLS, abandoned hole.
5	SPT	8	10	3-3-5-6	Top of spoon, SAME AS ABOVE. (10 YR 4/1) CLAY, dark gray soft moist, odor.
6	SPT	10	12	2-5-5-4	CLAY, dark gray (10 YR 4/1) soft moist, odor. Decrease in CLAY from above description and an increase in weathered ROCK.
7	SPT	12	14	13-45-50-refusal	ROCK, very light gray (10 YR 4/1) matrix, greenish black (DIORITE - FELSIC), wet.
8	SPT	14	16	50 FOR 5" recovery	CLAY, brown (N8 Matrix, 5GY 2/1), light olive gray ROCK (DIORITE - FELSIC), wet.
9	SPT	16	18	50 FOR 2" recovery	ROCK, brown (5 Y 5/2, 7.5 YR 5/2 to 5/3) weathered. Dry and brittle DIORITE.
10	SPT	18	20	50 FOR 1" recovery	ROCK, very light gray (2.5 Y 4/3 to 4/41) matrix, weathered. Greenish black, dry and brittle (in the hand) DIORITE.
11	GRAB	20	22	NA	ROCK, very light gray (2.5 Y 4/3 to 4/41) matrix, weathered. Greenish black, dry and brittle (in the hand) DIORITE.
12	GRAB	22	30	NA	ROCK, dark green, very hard, dry. Wet at 27 ft. bls.

Remarks

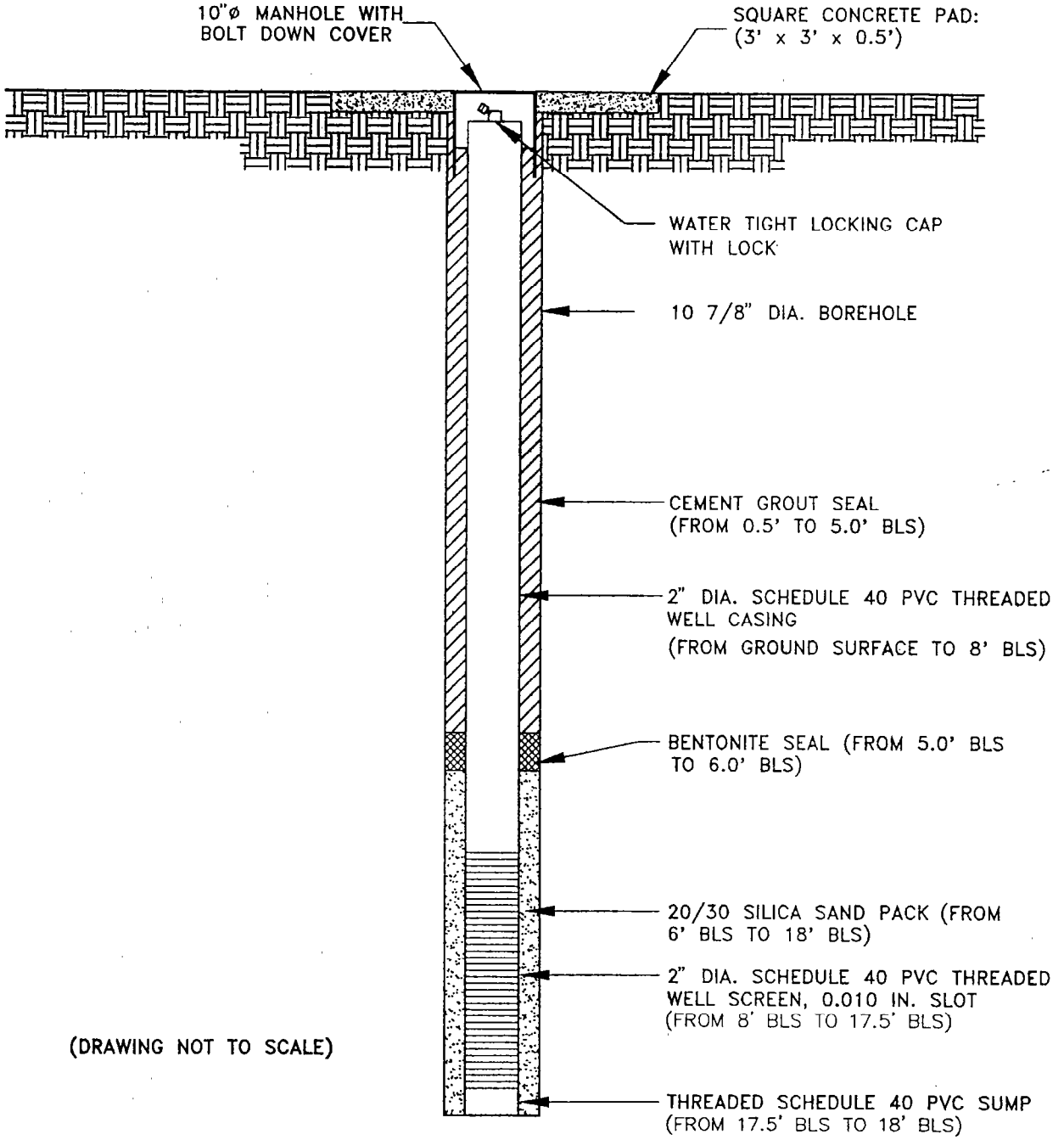
PH - post hole

SPT - standard penetration test

NA - not applicable

APPENDIX A-2
BLASLAND, BOUCK AND LEE UST SITE CHARACTERIZATION WELL CONSTRUCTION DIAGRAMS

1983–MW1



(DRAWING NOT TO SCALE)

PROJECT NO.: 399.04
WELL NO.: 1983–MW1
BY: DAN PRESS
DATE: 5/11/94
CASING ELEVATION: 11.65
DEPTH TO WATER UPON COMPLETION: 9 FT.
UNIT MONITORED: SURFICIAL

DRILLER: SOIL TECH, INC.
DRILLING METHOD: HOLLOW STEM AUGER
TOTAL DEPTH: 18 FEET
SAMPLE TYPE: SPLIT–SPOON
SAMPLE INTERVAL: CONTINUOUS

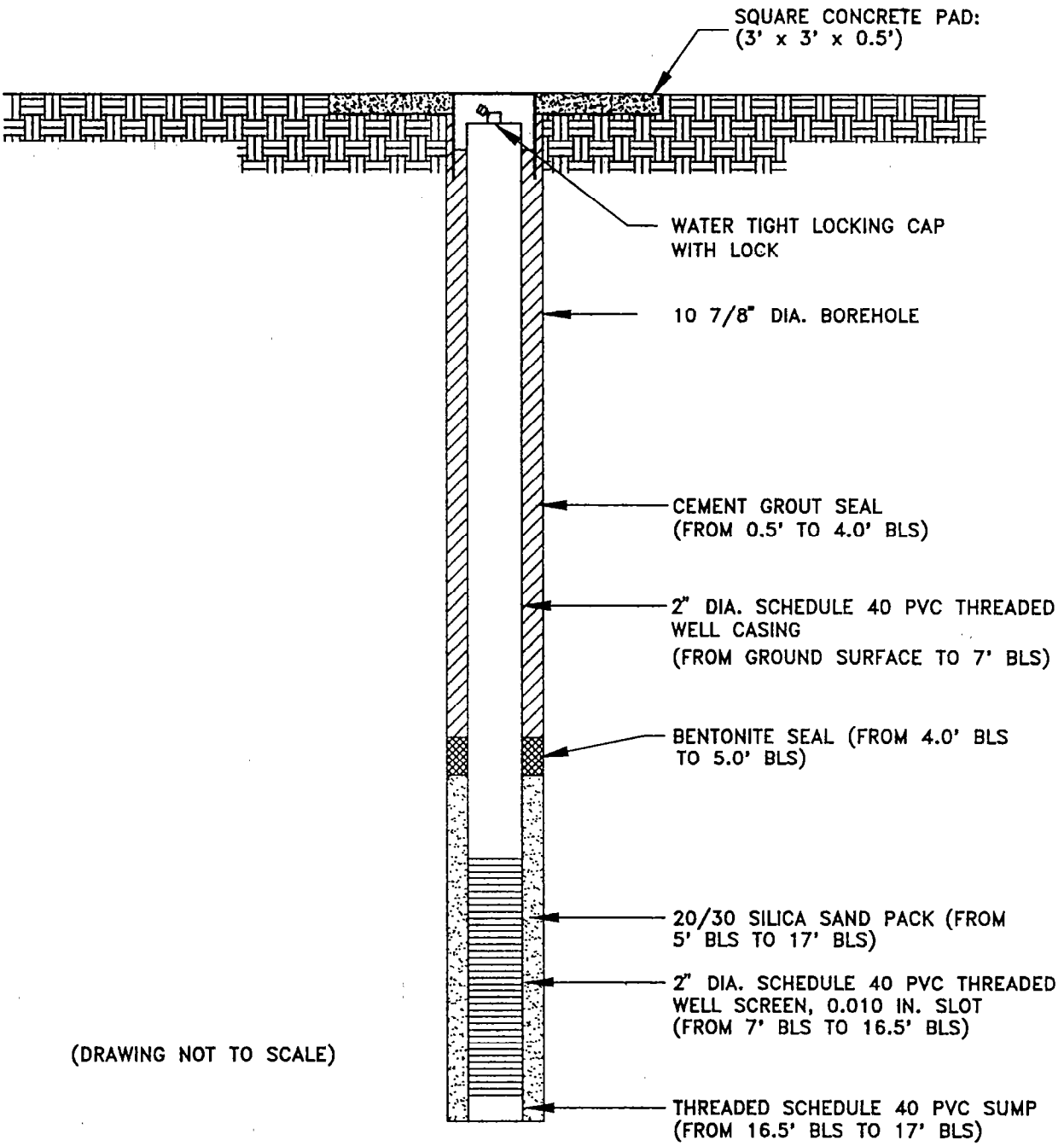
7/94 27 JHD
3990415R/39904G03.DWG

BLASLAND, BOUCK & LEE, INC.
ENGINEERS & SCIENTISTS

ROOSEVELT ROADS U.S. NAVAL STATION
SITE 1983
CEIBA, PUERTO RICO

MONTORING WELL 1983-MW1
CONSTRUCTION DETAILS

1983-MW2



(DRAWING NOT TO SCALE)

PROJECT NO.: 399.04
WELL NO.: 1983-MW2
BY: DAN PRESS
DATE: 5/11/94
CASING ELEVATION: 11.305
DEPTH TO WATER UPON COMPLETION: 12 FT.
UNIT MONITORED: SURFICIAL

DRILLER: SOIL TECH, INC.
DRILLING METHOD: HOLLOW STEM AUGER
TOTAL DEPTH: 17 FEET
SAMPLE TYPE: SPLIT-SPOON
SAMPLE INTERVAL: CONTINUOUS

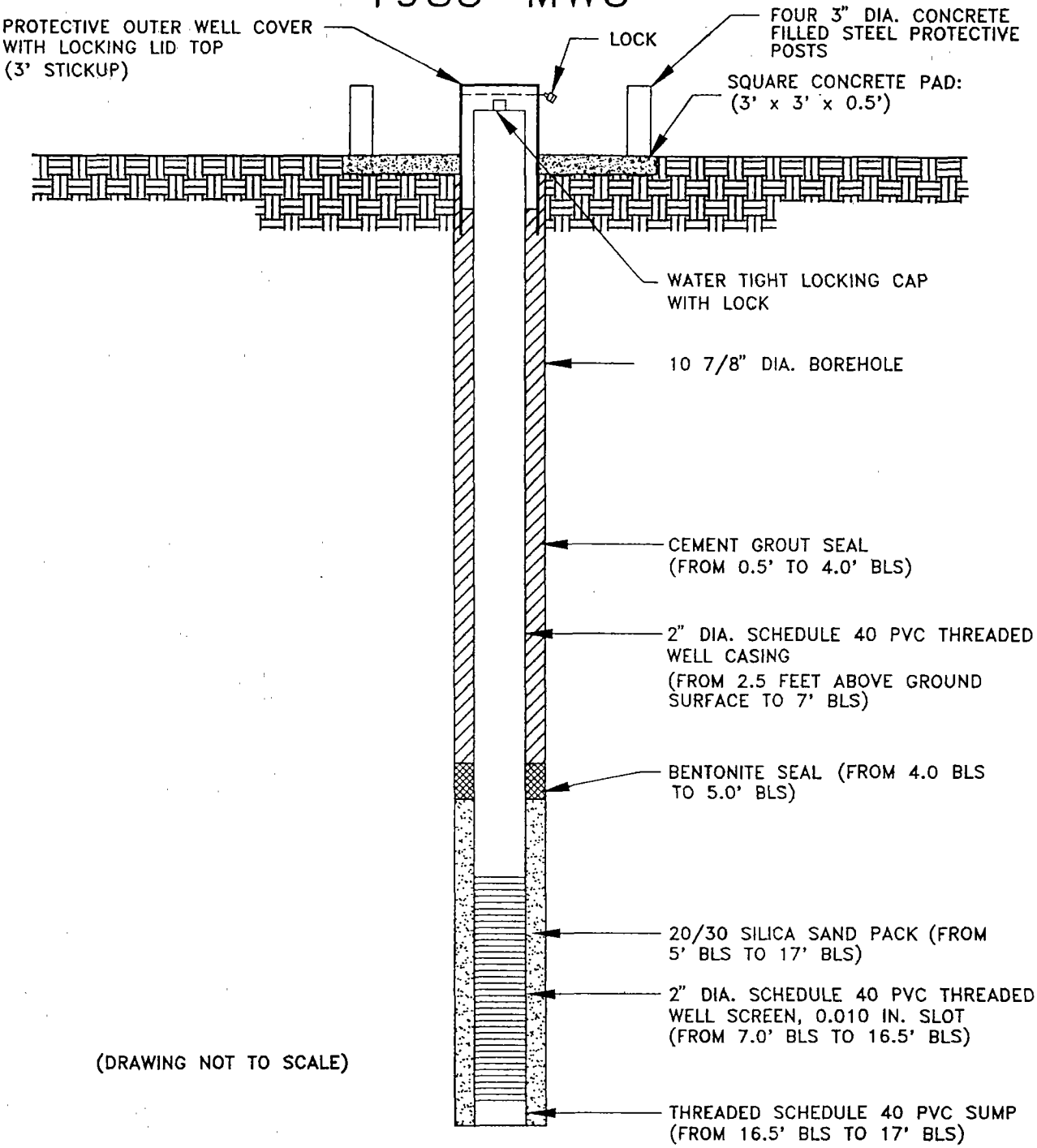
7/94 27 JHD
3990415R/39904C03.DWG

BLASLAND, BOUCK & LEE, INC.
ENGINEERS & SCIENTISTS

ROOSEVELT ROADS U.S. NAVAL STATION
SITE 1983
CEIBA, PUERTO RICO

MONTORING WELL 1983-MW2
CONSTRUCTION DETAILS

1983-MW3



(DRAWING NOT TO SCALE)

PROJECT NO.: 399.04
WELL NO.: 1983-MW3
BY: DAN PRESS
DATE: 5/12/94
CASING ELEVATION: 14.0
DEPTH TO WATER UPON COMPLETION: 8 FT.
UNIT MONITORED: SURFICIAL

DRILLER: SOIL TECH, INC.
DRILLING METHOD: HOLLOW STEM AUGER
TOTAL DEPTH: 17 FEET
SAMPLE TYPE: SPLIT-SPOON
SAMPLE INTERVAL: CONTINUOUS

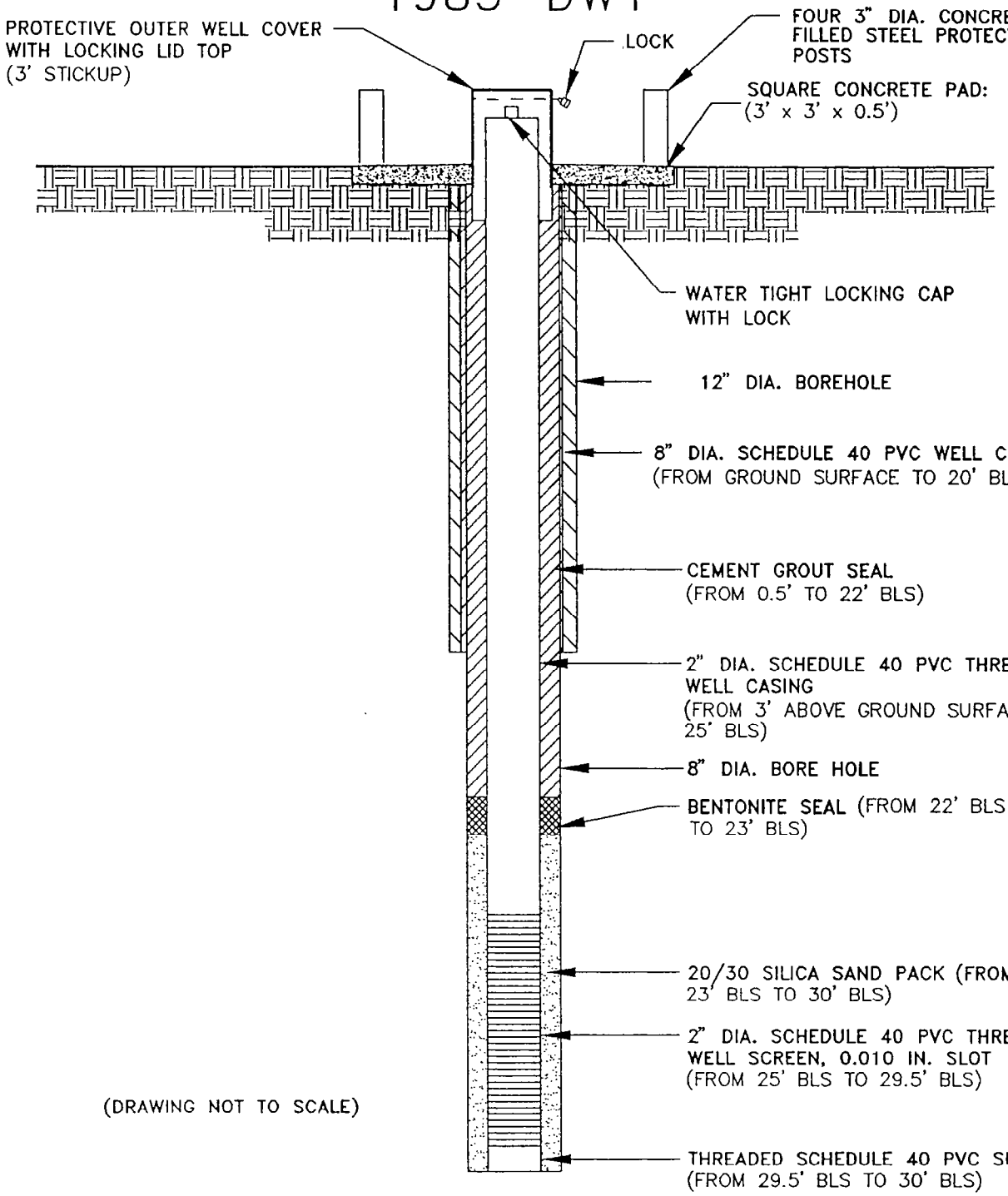
7/94 27 JHD
3990415R/39904G03.DWG

BLASLAND, BOUCK & LEE, INC.
ENGINEERS & SCIENTISTS

ROOSEVELT ROADS U.S. NAVAL STATION
SITE 1983
CEIBA, PUERTO RICO

MONTORING WELL 1983-MW3 CONSTRUCTION DETAILS

1983-DW1



(DRAWING NOT TO SCALE)

PROJECT NO.: 399.04
WELL NO.: 1983-DW1
BY: DAN PRESS
DATE: 5/13-5/18/94
CASING ELEVATION: 14.3
DEPTH TO WATER UPON COMPLETION: 13 FT.
UNIT MONITORED: SURFICIAL

DRILLER: SOIL TECH, INC.
DRILLING METHOD: HOLLOW STEM AUGER/DIRECT AIR ROTARY
TOTAL DEPTH: 30 FEET
SAMPLE TYPE: SPLIT-SPOON/CUTTINGS
SAMPLE INTERVAL: CONTINUOUS

10/11/94 27 JHD
3990415R/39904G03.DWG

BLASLAND, BOUCK & LEE, INC.
ENGINEERS & SCIENTISTS

ROOSEVELT ROADS U.S. NAVAL STATION
SITE 1983
CEIBA, PUERTO RICO

MONITORING WELL 1983-DW1 CONSTRUCTION DETAILS

APPENDIX B
1999 PHASE II RFI SOILS INVESTIGATION
BORING LOGS

Baker Environmental

TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: ROOSEVELT ROADS 26007-099-0000-03000
CTO NO.: 099 BORING NO.: 30-HP01
COORDINATES: EAST: NORTH:
ELEVATION: SURFACE: TOP OF PVC CASING:

Rig: Geoprobe	Split Spoon	Casing	Augers	Core Barrel	Date	Progress (Ft.)	Weather	Depth to Water (Ft.)	Time
Size (ID)	2				6/23/99	9.1	sunny	N/A	1550
Length	5								
Type									
Hammer Wt.									
Fall									
Stickup									

Remarks: spoon refusal at 9.1 feet

SAMPLE TYPE

S = Split Spoon A = Auger GLB = Geoprobe large bore
T = Shelby Tube W = Wash GMB = Geoprobe macro bore
R = Air Rotary C = Core
D = Denison P = Piston
N = No Sample

DEFINITIONS

SPT = Standard Penetration Test (ASTM D1586)
PID = Photo Ionization Detector measurement
Lab Class = USCS (ASTM D2487)

Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab Class.	PID (ppm)	Visual Description	Elevation (Ft. MSL)
1–2	GMB	100%	N/A	30-HP01-01	0	0-18" : fine grained sand, non-plastic,dry non-cemented	
3–6							
7	GMB	100%	N/A	30-HP 01-02	0	0-12" : fine grained sand, non-plastic, dry, non-cemented, shell fragments	
8							
9	GMB	100%	N/A	30-HP 01-03	41	0-12" : sand, dry, semi-cemented, non-plastic petroleum odor	
10							

DRILLING CO.: Inland Pollution Services Inc. BAKER REP.: David D. Schilling
DRILLER: Pedro J. Perez Quintero BORING NO.: 30-HP01 SHEET 1 OF 1

Baker Environmental

TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: ROOSEVELT ROADS 26007-099-0000-03000
CTO NO.: 099 BORING NO.: 30-HP02
COORDINATES: EAST: NORTH:
ELEVATION: SURFACE: TOP OF PVC CASING:

Rig: Geoprobe	Split Spoon	Casing	Augers	Core Barrel	Date	Progress (Ft.)	Weather	Depth to Water (Ft.)	Time
Size (ID)	2				6/23/99	9	sunny	N/A	1410
Length	5								
Type									
Hammer Wt.									
Fall									
Stickup									

Remarks: spoon refusal at 9.0 feet

SAMPLE TYPE

S = Split Spoon A = Auger GLB = Geoprobe large bore
T = Shelby Tube W = Wash GMB = Geoprobe macro bore
R = Air Rotary C = Core
D = Denison P = Piston
N = No Sample

DEFINITIONS

SPT = Standard Penetration Test (ASTM D1586)
PID = Photo Ionization Detector measurement
Lab Class = USCS (ASTM D2487)

Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab Class.	PID (ppm)	Visual Description	Elevation (Ft. MSL)
1-2	GMB	100%	N/A	30-HP02-01	0	0-18" : fine grained sand, non-plastic,dry non-cemented	
3-6							
7-8	GMB	100%	N/A	30-HP 02-02	35	0-12" : fine grained sand, non-plastic, dry, semi-cemented, petroleum odor	
9-10	GMB	100%	N/A	30-HP 02-03	52	0-7" : fine grained sand, non-cemented, non-plastic, dry 7-12" : clay, non-plastic, non-cemented, dry strong petroleum odor	

DRILLING CO.: Inland Pollution Services Inc. BAKER REP.: David D. Schilling
DRILLER: Pedro J. Perez Quintero BORING NO.: 30-HP02 SHEET 1 OF 1

Baker Environmental

TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: ROOSEVELT ROADS 26007-099-0000-03000
CTO NO.: 099 BORING NO.: 30-HP03
COORDINATES: EAST: NORTH:
ELEVATION: SURFACE: TOP OF PVC CASING:

Rig: Geoprobe	Split Spoon	Casing	Augers	Core Barrel	Date	Progress (Ft.)	Weather	Depth to Water (Ft.)	Time
Size (ID)	1				6/22/99	9	sunny	N/A	1855
Length	2								
Type									
Hammer Wt.									
Fall									
Stickup									

Remarks:

SAMPLE TYPE
S = Split Spoon A = Auger GLB = Geoprobe large bore
T = Shelby Tube W = Wash GMB = Geoprobe macro bore
R = Air Rotary C = Core
D = Denison P = Piston
N = No Sample

DEFINITIONS
SPT = Standard Penetration Test (ASTM D1586)
PID = Photo Ionization Detector measurement
Lab Class = USCS (ASTM D2487)

Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab Class.	PID (ppm)	Visual Description	Elevation (Ft. MSL)
1–2	GLB	38.89%	N/A	30-HP03-01	0	0-7" : sand, non-cemented, non-plastic, dry, gravel fragments, subangular	
3–5							
6	GLB	75.00%	N/A	30-HP 03-02	0	0-9" : clay & sand, non-plastic, non-cemented damp	
7–8							
9	GLB	66.67%	N/A	30-HP 03-03	0	0-8" : sand & clay, non-cemented, non-plastic damp	
10							

DRILLING CO.: Inland Pollution Services Inc. BAKER REP.: David D. Schilling
DRILLER: Pedro J. Perez Quintero BORING NO.: 30-HP03 SHEET 1 OF 1

Baker Environmental

TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: ROOSEVELT ROADS 26007-099-0000-03000
CTO NO.: 099 BORING NO.: 30-HP04
COORDINATES: EAST: NORTH:
ELEVATION: SURFACE: TOP OF PVC CASING:

Rig: Geoprobe	Split Spoon	Casing	Augers	Core Barrel	Date	Progress (Ft.)	Weather	Depth to Water (Ft.)	Time
Size (ID)	2				6/23/99	9	sunny	N/A	1320
Length	5								
Type									
Hammer Wt.									
Fall									
Stickup									

Remarks: spoon refusal at 9.0 feet

SAMPLE TYPE

S = Split Spoon A = Auger GLB = Geoprobe large bore
T = Shelby Tube W = Wash GMB = Geoprobe macro bore
R = Air Rotary C = Core
D = Denison P = Piston
N = No Sample

DEFINITIONS

SPT = Standard Penetration Test (ASTM D1586)
PID = Photo Ionization Detector measurement
Lab Class = USCS (ASTM D2487)

Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab Class.	PID (ppm)	Visual Description	Elevation (Ft. MSL)
1-2	GMB	100%	N/A	30-HP04-01	0	0-18" : fine grained sand, non-plastic,dry non-cemented, shell fragments	
3-6							
7	GMB	100%	N/A	30-HP 04-02	3.2	0-12" : fine grained sand, non-plastic, dry, non-cemented, shell fragments, petroleum odor	
8							
9-10	GMB	100%	N/A	30-HP 04-03	42	0-7" : fine grained sand, non-cemented, non-plastic, dry 7-12" : clay, hard, gray, non-plastic, non-cemented, rock fragments, strong petroleum odor	

DRILLING CO.: Inland Pollution Services Inc. BAKER REP.: David D. Schilling
DRILLER: Pedro J. Perez Quintero BORING NO.: 30-HP04 SHEET 1 OF 1

Baker Environmental

TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: ROOSEVELT ROADS 26007-099-0000-03000
CTO NO.: 099 BORING NO.: 30-HP05
COORDINATES: EAST: NORTH:
ELEVATION: SURFACE: TOP OF PVC CASING:

Rig: Geoprobe	Split Spoon	Casing	Augers	Core Barrel	Date	Progress (Ft.)	Weather	Depth to Water (Ft.)	Time
Size (ID)	2				6/23/99	9	sunny	N/A	1750
Length	5								
Type									
Hammer Wt.									
Fall									
Stickup									

Remarks:

SAMPLE TYPE
S = Split Spoon A = Auger GLB = Geoprobe large bore
T = Shelby Tube W = Wash GMB = Geoprobe macro bore
R = Air Rotary C = Core
D = Denison P = Piston
N = No Sample

DEFINITIONS
SPT = Standard Penetration Test (ASTM D1586)
PID = Photo Ionization Detector measurement
Lab Class = USCS (ASTM D2487)

Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab Class.	PID (ppm)	Visual Description	Elevation (Ft. MSL)
1–2	GMB	100%	N/A	30-HP05-01	0	0-18" : fine grained sand, non-plastic,dry non-cemented	
3–6							
7	GMB	100%	N/A	30-HP 05-02	0	0-12" : sand, non-plastic, dry, semi-cemented	
8							
9	GMB	100%	N/A	30-HP 05-03	50	0-12" : sand, dry, non-cemented, non-plastic petroleum odor, shell fragments	
10							

DRILLING CO.: Inland Pollution Services Inc. BAKER REP.: David D. Schilling
DRILLER: Pedro J. Perez Quintero BORING NO.: 30-HP05 SHEET 1 OF 1

Baker Environmental

TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: ROOSEVELT ROADS 26007-099-0000-03000
CTO NO.: 099 BORING NO.: 30-HP06
COORDINATES: EAST: NORTH:
ELEVATION: SURFACE: TOP OF PVC CASING:

Rig: Geoprobe	Split Spoon	Casing	Augers	Core Barrel	Date	Progress (Ft.)	Weather	Depth to Water (Ft.)	Time
Size (ID)	1				6/22/99	10	sunny	N/A	1650
Length	2								
Type									
Hammer Wt.									
Fall									
Stickup									

Remarks:

SAMPLE TYPE
S = Split Spoon A = Auger GLB = Geoprobe large bore
T = Shelby Tube W = Wash GMB = Geoprobe macro bore
R = Air Rotary C = Core
D = Denison P = Piston
N = No Sample

DEFINITIONS
SPT = Standard Penetration Test (ASTM D1586)
PID = Photo Ionization Detector measurement
Lab Class = USCS (ASTM D2487)

Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab Class.	PID (ppm)	Visual Description	Elevation (Ft. MSL)
1–5							
6	GLB	100%	N/A	30-HP 06-01	0	0-1' : sand, non-cemented, non-plastic, dry, shell & coral fragments, fine grained	
7–8							
9–10	GLB	50%	N/A	30-HP06-2	0	0-1' : coarse sand, semi-cemented, non-plastic, dry, light brown	
						Match to Sheet 2	

DRILLING CO.: Inland Pollution Services Inc. BAKER REP.: David D. Schilling
DRILLER: Pedro J. Perez Quintero BORING NO.: 30-HP06 SHEET 1 OF 1

Baker Environmental

TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: ROOSEVELT ROADS 26007-099-0000-03000
CTO NO.: 099 BORING NO.: 30-HP07
COORDINATES: EAST: NORTH:
ELEVATION: SURFACE: TOP OF PVC CASING:

Rig: Geoprobe	Split Spoon	Casing	Augers	Core Barrel	Date	Progress (Ft.)	Weather	Depth to Water (Ft.)	Time
Size (ID)	1				6/23/99	6.2	sunny	N/A	1040
Length	2								
Type									
Hammer Wt.									
Fall									
Stickup									

Remarks: spoon refusal at 6.2 feet

SAMPLE TYPE

S = Split Spoon A = Auger GLB = Geoprobe large bore
T = Shelby Tube W = Wash GMB = Geoprobe macro bore
R = Air Rotary C = Core
D = Denison P = Piston
N = No Sample

DEFINITIONS

SPT = Standard Penetration Test (ASTM D1586)
PID = Photo Ionization Detector measurement
Lab Class = USCS (ASTM D2487)

Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab Class.	PID (ppm)	Visual Description	Elevation (Ft. MSL)
1–5							
6	GLB	100%	N/A	30-HP 07-01	0	0-1': coarse sand, dry, semi-cemented, non-plastic, subangular grains	
7–10							

DRILLING CO.: Inland Pollution Services Inc. BAKER REP.: David D. Schilling
DRILLER: Pedro J. Perez Quintero BORING NO.: 30-HP07 SHEET 1 OF 1

Baker Environmental

TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: ROOSEVELT ROADS 26007-099-0000-03000
CTO NO.: 099 BORING NO.: 30-HP11
COORDINATES: EAST: NORTH:
ELEVATION: SURFACE: TOP OF PVC CASING:

Rig: Geoprobe	Split Spoon	Casing	Augers	Core Barrel	Date	Progress (Ft.)	Weather	Depth to Water (Ft.)	Time
Size (ID)	1				6/24/99	5.4	sunny	N/A	1204
Length	2								
Type									
Hammer Wt.									
Fall									
Stickup									

Remarks: spoon refusal at 5.4 feet

SAMPLE TYPE

S = Split Spoon A = Auger GLB = Geoprobe large bore
T = Shelby Tube W = Wash GMB = Geoprobe macro bore
R = Air Rotary C = Core
D = Denison P = Piston
N = No Sample

DEFINITIONS

SPT = Standard Penetration Test (ASTM D1586)
PID = Photo Ionization Detector measurement
Lab Class = USCS (ASTM D2487)

Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab Class.	PID (ppm)	Visual Description	Elevation (Ft. MSL)
1–5							
6	GLB	33.33%	N/A	30-HP 11-01	0	0-4" : sand, dry, cemented, non-plastic, hard	
7–10							

DRILLING CO.: Inland Pollution Services Inc. BAKER REP.: David D. Schilling
DRILLER: Pedro J. Perez Quintero BORING NO.: 30-HP11 SHEET 1 OF 1

Baker

Baker Environmental

TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: ROOSEVELT ROADS 26007-099-0000-03000
CTO NO.: 099 BORING NO.: 30-HP12
COORDINATES: EAST: NORTH:
ELEVATION: SURFACE: TOP OF PVC CASING:

Rig: Geoprobe	Split Spoon	Casing	Augers	Core Barrel	Date	Progress (Ft.)	Weather	Depth to Water (Ft.)	Time
Size (ID)	1				6/23/99	6	sunny	N/A	1650
Length	2								
Type									
Hammer Wt.									
Fall									
Stickup									

Remarks: Spoon refusal at 6.0 feet, relocated hole approx. 2' west of original hole and had spoon refusal at 4'

SAMPLE TYPE

S = Split Spoon A = Auger GLB = Geoprobe large bore
T = Shelby Tube W = Wash GMB = Geoprobe macro bore
R = Air Rotary C = Core
D = Denison P = Piston
N = No Sample

DEFINITIONS

SPT = Standard Penetration Test (ASTM D1586)
PID = Photo Ionization Detector measurement
Lab Class = USCS (ASTM D2487)

Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab Class.	PID (ppm)	Visual Description	Elevation (Ft. MSL)
1–5							
6	GLB	100%	N/A	30-HP 12-01	0	0-12" : sand, non-plastic, semi-cemented, dry	
7–10							

DRILLING CO.: Inland Pollution Services Inc. BAKER REP.: David D. Schilling
DRILLER: Pedro J. Perez Quintero BORING NO.: 30-HP12 SHEET 1 OF 1

Baker Environmental

TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: Roosevelt Roads 26007-099-0000-03000
CTO NO.: 099 BORING NO.: 30-HP13
COORDINATES: EAST: NORTH:
ELEVATION: SURFACE: TOP OF PVC CASING:

Rig:	Split Spoon	Casing	Augers	Core Barrel	Date	Progress (Ft.)	Weather	Depth to Water (Ft.)	Time
Size (ID)	1				6/22/99	12	sunny	9.4	1433
Length	2								
Type									
Hammer Wt.									
Fall									
Stickup									

Remarks:

SAMPLE TYPE
S = Split Spoon A = Auger GLB = Geoprobe large bore
T = Shelby Tube W = Wash GMB = Geoprobe macro bore
R = Air Rotary C = Core
D = Denison P = Piston
N = No Sample

DEFINITIONS
SPT = Standard Penetration Test (ASTM D1586)
PID = Photo Ionization Detector measurement
Lab Class = USCS (ASTM D2487)

Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab Class.	PID (ppm)	Visual Description	Elevation (Ft. MSL)
1–5							
6	GLB	41.70%	N/A	30-HP13-1	0	0-5" : gravel & sand, non-plastic, non-cemented, dry	
7	GLB	75.00%			0	0-5" : sand, non-plastic, non-cemented, subangular, dry 5-9" : sandy clay, non-cemented, semi-plastic, damp	
8							
9–10	GLB	31.25%	N/A	30-HP13-2	0	0-7.5" : coarse sand, non-cemented, non-plastic subangular grains, moist	
						Match to Sheet 2	

DRILLING CO.: Inland Pollution Services Inc. BAKER REP.: David D. Schilling
DRILLER: Pedro J. Perez Quintero BORING NO.: 30-HP13 SHEET 1 OF 2

Baker

Baker Environmental

TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: Roosevelt Roads 26007-099-0000-03000

CTO NO.: 099 BORING NO.: 30-HP13

SAMPLE TYPE

S = Split Spoon A = Auger GLB = Geoprobe large bore
T = Shelby Tube W = Wash GMB = Geoprobe macro bore
R = Air Rotary C = Core
D = Denison P = Piston N = No Sample

DEFINITIONS

SPT = Standard Penetration Test (ASTM D1586)
PID = Photo Ionization Detector measurement
Lab Class = USCS (ASTM D2487)

Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab Class.	PID (ppm)	Visual Description	Elevation (Ft. MSL)
11	GLB	58.30%	N/A	30-HP13-2	0	Continued from Sheet 1 0-12" : sand, non-cemented, non-plastic, very moist	
12							
13							
14							
15							
16							
17							
18							
19							
20							
21							
22							
23							
24							
25							
26							
27							
28							

DRILLING CO.: Inland Pollution Services Inc. BAKER REP.: David D. Schilling

DRILLER: Pedro J. Perez Quintero BORING NO.: 30-HP13 SHEET 2 OF 2

Baker Environmental

TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: ROOSEVELT ROADS 26007-099-0000-03000
CTO NO.: 099 BORING NO.: 30-HP14
COORDINATES: EAST: NORTH:
ELEVATION: SURFACE: TOP OF PVC CASING:

Rig: jackhammered mannually	Split Spoon	Casing	Augers	Core Barrel	Date	Progress (Ft.)	Weather	Depth to Water (Ft.)	Time
Size (ID)	1				6/27/99	6	sunny	N/A	1420
Length	2								
Type									
Hammer Wt.									
Fall									
Stickup									

Remarks: spoon refusal at 6.0 feet

SAMPLE TYPE

S = Split Spoon A = Auger GLB = Geoprobe large bore
T = Shelby Tube W = Wash GMB = Geoprobe macro bore
R = Air Rotary C = Core JH = Jackhammer
D = Denison P = Piston
N = No Sample

DEFINITIONS

SPT = Standard Penetration Test (ASTM D1586)
PID = Photo Ionization Detector measurement
Lab Class = USCS (ASTM D2487)

Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab Class.	PID (ppm)	Visual Description	Elevation (Ft. MSL)
1–5							
6	JH	100%	N/A	30-HP 14-01	0	0-12" : sandy clay, hard, dry, non-cemented non-plastic, greenish brown	
7–10							

DRILLING CO.: Inland Pollution Services Inc. BAKER REP.: David D. Schilling
DRILLER: Pedro J. Perez Quintero & Domingo Gonzalas BORING NO.: 30-HP14 SHEET 1 OF 1

Baker Environmental

TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: ROOSEVELT ROADS 26007-099-0000-03000
CTO NO.: 099 BORING NO.: 30-HP15
COORDINATES: EAST: NORTH:
ELEVATION: SURFACE: TOP OF PVC CASING:

Rig: Geoprobe	Split Spoon	Casing	Augers	Core Barrel	Date	Progress (Ft.)	Weather	Depth to Water (Ft.)	Time
Size (ID)	1				6/24/99	6.1	sunny	N/A	1330
Length	2								
Type									
Hammer Wt.									
Fall									
Stickup									

Remarks: spoon refusal at 6.1 feet

SAMPLE TYPE

S = Split Spoon A = Auger GLB = Geoprobe large bore
T = Shelby Tube W = Wash GMB = Geoprobe macro bore
R = Air Rotary C = Core
D = Denison P = Piston
N = No Sample

DEFINITIONS

SPT = Standard Penetration Test (ASTM D1586)
PID = Photo Ionization Detector measurement
Lab Class = USCS (ASTM D2487)

Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab Class.	PID (ppm)	Visual Description	Elevation (Ft. MSL)
1–5							
6	GLB	100%	N/A	30-HP 15-01	0	0-12" : coarse sand, moist, semi-cemented, non-plastic, subangular grains	
7–10							

DRILLING CO.: Inland Pollution Services Inc. BAKER REP.: David D. Schilling
DRILLER: Pedro J. Perez Quintero BORING NO.: 30-HP15 SHEET 1 OF 1

APPENDIX C
CHAIN-OF-CUSTODY FORMS
PHASE II RFI SOILS INVESTIGATION

Serial Number 146656

SL SAVANNAH LABORATORIES & ENVIRONMENTAL SERVICES, INC.

☒ 5102 LaRoche Avenue, Savannah, GA 31404 Phone: (912) 354-7858 Fax: (912) 352-0165
☐ 2846 Industrial Plaza Drive, Tallahassee, FL 32301 Phone: (904) 878-3994 Fax: (904) 878-9504
☐ 900 Lakeside Drive, Mobile, AL 36693 Phone: (334) 666-6633 Fax: (334) 666-6696
☐ 6712 Benjamin Road, Suite 100, Tampa, FL 33634 Phone: (813) 885-7427 Fax: (813) 885-7049
☐ 100 Alpha Drive, Suite 110, Destrehan, LA 70047 Phone: (504) 764-1100 Fax: (504) 725-1163

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

SWMU 30 - 01

PROJECT REFERENCE	PROJECT NO.	P.O. NUMBER
NAVAL STATION ROOS. ROADS	C76-C99	

PROJECT LOC. (State)	SAMPLER(s) NAME	PHONE	FAX
PR	MARK KIMES	787-717-0669	412-269-2002

CLIENT NAME	CLIENT PROJECT MANAGER
BAKER ENV.	TOM FULLER

CLIENT ADDRESS (CITY, STATE, ZIP): CORAOPOLIS, PA 15102

MATRIX TYPE: AQUEOUS (WATER) / SOLID OR SEMISOLID / AIR / NONAQUEOUS LIQUID (oil, solvent, etc)

REQUIRED ANALYSES: BTEX, GRO, DRO, SVOCs, PCBs, ANTIMONY

PAGE 1 OF 2

☒ STANDARD REPORT DELIVERY
☐ EXPEDITED REPORT DELIVERY (surcharge)
Date Due: _____

SAMPLE DATE	SAMPLE TIME	SL NO.	SAMPLE IDENTIFICATION	MATRIX	NUMBER OF CONTAINERS SUBMITTED						REMARKS
6/23			~~HP~~ 30-HPΦ1-Φ1 ✓	X	X	X	X	X	X	X	
6/23			30-HPΦ1-Φ2 ✓	X	X	X	X	X	X	X	
6/23			30-HPΦ1-Φ3 ✓	X	X	X	X	X	X	X	
6/23			30-HPΦ1-Φ3 MS/MSD ✓	X	X	X	X	X	X	X	
6/23			30-HPΦ2-Φ1 ✓	X	X	X	X	X	X	X	
6/23			30-HPΦ2-Φ2 ✓	X	X	X	X	X	X	X	
6/23			30-HPΦ2-Φ3 ✓	X	X	X	X	X	X	X	
6/22			30-HPΦ3-Φ1 ✓	X	X	X	X	X	X	X	
6/22			30-HPΦ3-Φ1D ✓	X	X	X	X	X	X	X	
6/22			30-HPΦ3-Φ2 ✓	X	X	X	X	X	X	X	
6/23			30-HPΦ4-Φ1 ✓	X	X	X	X	X	X	X	
6/23			30-HPΦ4-Φ1D ✓	X	X	X	X	X	X	X	
6/23			30-HPΦ4-Φ2 ✓	X	X	X	X	X	X	X	

RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RELINQUISHED BY: (SIGNATURE)	DATE	TIME
EMP...			[signature]	6/24	1500			
RECEIVED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	DATE	TIME
[signature]	6/21	1900						

LABORATORY USE ONLY

RECEIVED FOR LABORATORY BY: (SIGNATURE)	DATE	TIME	CUSTODY INTACT	CUSTODY SEAL NO.	SL LOG NO.	LABORATORY REMARKS:
			☐ YES ☐ NO			

CLIENTS FIELD COPY

Serial Number 116659

SL SAVANNAH LABORATORIES & ENVIRONMENTAL SERVICES, INC.

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

- ☒ 5102 LaRoche Avenue, Savannah, GA 31404 — Phone: (912) 354-7858 — Fax: (912) 352-0165
- ☐ 2846 Industrial Plaza Drive, Tallahassee, FL 32301 — Phone: (904) 878-3994 — Fax: (904) 878-9504
- ☐ 900 Lakeside Drive, Mobile, AL 36693 — Phone: (334) 666-6633 — Fax: (334) 666-6696
- ☐ 6712 Benjamin Road, Suite 100, Tampa, FL 33634 — Phone: (813) 885-7427 — Fax: (813) 885-7049
- ☐ 100 Alpha Drive, Suite 110, Destrehan, LA 70047 — Phone: (504) 764-1100 — Fax: (504) 725-1163

SMWU30-01

PROJECT REFERENCE	PROJECT NO.	P.O. NUMBER
Naval Station Roos. Roads	CTO-099	

PROJECT LOC. (State)	SAMPLER(s) NAME	PHONE	FAX
PR	MARK KIMES	787-717-0669	412-269-2002

CLIENT NAME	CLIENT PROJECT MANAGER
BAKER ENV.	TOM FULLER

CLIENT ADDRESS (CITY, STATE, ZIP): CORAOPOLIS 15102

MATRIX TYPE: AQUEOUS (WATER) | SOLID OR SEMISOLID | AIR | NONAQUEOUS LIQUID (oil, solvent, etc)

REQUIRED ANALYSES: BTEX | 8120 | DRO | SVOCs | PCBs | Antimony

PAGE 2 OF 2

☒ STANDARD REPORT DELIVERY

☐ EXPEDITED REPORT DELIVERY (surcharge)

Date Due: _____

SAMPLE DATE	SAMPLE TIME	SL NO.	SAMPLE IDENTIFICATION	AQUEOUS (WATER)	SOLID OR SEMISOLID	AIR	NONAQUEOUS LIQUID (oil, solvent, etc)	NUMBER OF CONTAINERS SUBMITTED: BTEX	8120	DRO	SVOCs	PCBs	Antimony	REMARKS
6/22			30-HPQ3-03		X			X	X	X	X	X	X	
6/24			30-TB01	X				X	X					

RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RELINQUISHED BY: (SIGNATURE)	DATE	TIME
EMPTY FOR CONTAINERS			Mark E. K	6/24	1700			
RECEIVED BY: (SIGNATURE)	**DATE**	**TIME**	**RECEIVED BY: (SIGNATURE)**	**DATE**	**TIME**	**RECEIVED BY: (SIGNATURE)**	**DATE**	**TIME**
Mark E. K	6/21	1900						

LABORATORY USE ONLY

RECEIVED FOR LABORATORY BY: (SIGNATURE)	DATE	TIME	CUSTODY INTACT	CUSTODY SEAL NO.	SL LOG NO.	LABORATORY REMARKS:
			☐ YES ☐ NO			

CLIENTS FIELD COPY

Serial Number 146658

SL SAVANNAH LABORATORIES & ENVIRONMENTAL SERVICES, INC.

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

☑ 5102 LaRoche Avenue, Savannah, GA 31404 — Phone: (912) 354-7858 — Fax: (912) 352-0165
☐ 2846 Industrial Plaza Drive, Tallahassee, FL 32301 — Phone: (904) 878-3994 — Fax: (904) 878-9504
☐ 900 Lakeside Drive, Mobile, AL 36693 — Phone: (334) 666-6633 — Fax: (334) 666-6696
☐ 6712 Benjamin Road, Suite 100, Tampa, FL 33634 — Phone: (813) 885-7427 — Fax: (813) 885-7049
☐ 100 Alpha Drive, Suite 110, Destrehan, LA 70047 — Phone: (504) 764-1100 — Fax: (504) 725-1163

SWM430-02

PROJECT REFERENCE	PROJECT NO.	P.O. NUMBER
NAV. STA. ROOS. RDS.	CTO-099	

PROJECT LOC. (State)	SAMPLER(s) NAME	PHONE	FAX
PR	MARK KIMES	787-717-0069	412-269-2002

CLIENT NAME	CLIENT PROJECT MANAGER
BAKER ENV.	TOM FULLER

CLIENT ADDRESS (CITY, STATE, ZIP): CORAOPOLIS, PA 15108

PAGE 1 OF 1

☒ STANDARD REPORT DELIVERY
☐ EXPEDITED REPORT DELIVERY (surcharge)
Date Due: _____

SAMPLE DATE	SAMPLE TIME	SL NO.	SAMPLE IDENTIFICATION	MATRIX: AQUEOUS (WATER)	MATRIX: SOLID OR SEMISOLID	MATRIX: AIR	MATRIX: NONAQUEOUS LIQUID (oil, solvent, etc)	NUMBER OF CONTAINERS SUBMITTED: BTEX	GRO	DRO	SVOCs	PCBs	Bulk Hmony					REMARKS
~~6/22~~			~~30-HP03-03~~		X			X	X	X	X	X	X				CANCEL	
6/23			30-HP04-03		X			X	X	X	X	X	X					
6/23			30-HP05-01		X			X	X	X	X	X	X					
6/22			30-HP05-02		X			X	X	X	X	X	X					
6/23			30-HP05-03		X			X	X	X	X	X	X					
6/22			30-HP06-01		X				X	X								
6/22			30-HP06-02		X				X	X								
6/22			30-HP07-01		X				X	X								
6/23			30-HP12-01		X				X	X								
6/22			30-HP13-01		X				X	X								
6/22			30-HP13-02		X				X	X								
~~6/24~~			~~30-TB-01~~	X				X	X								CANCEL	

RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RELINQUISHED BY: (SIGNATURE)	DATE	TIME
EMPTY CONTAINERS			Mark E. Kimes	6/24	1500			
RECEIVED BY: (SIGNATURE)	**DATE**	**TIME**	**RECEIVED BY: (SIGNATURE)**	**DATE**	**TIME**	**RECEIVED BY: (SIGNATURE)**	**DATE**	**TIME**
Mark E. Kimes EMPTY CONTAINERS	6/24	1900						

LABORATORY USE ONLY

RECEIVED FOR LABORATORY BY: (SIGNATURE)	DATE	TIME	CUSTODY INTACT	CUSTODY SEAL NO.	SL LOG NO.	LABORATORY REMARKS:
			☐ YES ☐ NO			

CLIENTS FIELD COPY

Serial Number 146675

SL SAVANNAH LABORATORIES & ENVIRONMENTAL SERVICES, INC.

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

- ☑ 5102 LaRoche Avenue, Savannah, GA 31404 — Phone: (912) 354-7858 — Fax: (912) 352-0165
- ☐ 2846 Industrial Plaza Drive, Tallahassee, FL 32301 — Phone: (904) 878-3994 — Fax: (904) 878-9504
- ☐ 900 Lakeside Drive, Mobile, AL 36693 — Phone: (334) 666-6633 — Fax: (334) 666-6696
- ☐ 6712 Benjamin Road, Suite 100, Tampa, FL 33634 — Phone: (813) 885-7427 — Fax: (813) 885-7049
- ☐ 100 Alpha Drive, Suite 110, Destrehan, LA 70047 — Phone: (504) 764-1100 — Fax: (504) 725-1163

PROJECT REFERENCE	PROJECT NO.	P.O. NUMBER
Naval Sta. Loos. Road	CTO-099	

PROJECT LOC. (State)	SAMPLER(s) NAME	PHONE	FAX
PR	MARK Kimes	(787)717-0669	(412)269-2002

CLIENT NAME	CLIENT PROJECT MANAGER
Baker Env.	Tom Fuller

CLIENT ADDRESS (CITY, STATE, ZIP): Coraopolis, PA. 15108

MATRIX TYPE: AQUEOUS (WATER) | SOLID OR SEMISOLID | AIR | NONAQUEOUS LIQUID (oil, solvent, etc)

REQUIRED ANALYSES: Summa 30-04; GRO; DRO; (12)

PAGE 1 OF 1

☒ STANDARD REPORT DELIVERY

☐ EXPEDITED REPORT DELIVERY (surcharge)

Date Due: _____

SAMPLE DATE	SAMPLE TIME	SL NO.	SAMPLE IDENTIFICATION	AQUEOUS (WATER)	SOLID OR SEMISOLID	AIR	NONAQUEOUS LIQUID (oil, solvent, etc)	NUMBER OF CONTAINERS SUBMITTED	REMARKS
6/27			30 HP14 -01 ✓		X	X	X		
→ 6/28			30 TB-04 ✓	X		X			

RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RELINQUISHED BY: (SIGNATURE)	DATE	TIME
EMPTY CONTAINERS			Mark E. K—	9/29	1400			
RECEIVED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	DATE	TIME
Mark E. K—	9/21	1900						

LABORATORY USE ONLY

RECEIVED FOR LABORATORY BY: (SIGNATURE)	DATE	TIME	CUSTODY INTACT	CUSTODY SEAL NO.	SL LOG NO.	LABORATORY REMARKS
			☐ YES ☐ NO			

CLIENTS FIELD COPY

Serial Number 146545

SL SAVANNAH LABORATORIES & ENVIRONMENTAL SERVICES, INC.

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

	Address	Phone	Fax
[X]	5102 LaRoche Avenue, Savannah, GA 31404	Phone: (912) 354-7858	Fax: (912) 352-0165
[ ]	2846 Industrial Plaza Drive, Tallahassee, FL 32301	Phone: (904) 878-3994	Fax: (904) 878-9504
[ ]	900 Lakeside Drive, Mobile, AL 36693	Phone: (334) 666-6633	Fax: (334) 666-6696
[ ]	6712 Benjamin Road, Suite 100, Tampa, FL 33634	Phone: (813) 885-7427	Fax: (813) 885-7049
[ ]	100 Alpha Drive, Suite 110, Destrehan, LA 70047	Phone: (504) 764-1100	Fax: (504) 725-1163

PROJECT REFERENCE: NAVAL Sta Roos Roads
PROJECT NO.: CTO-099
P.O. NUMBER:
PROJECT LOC. (State): PR
SAMPLER(s) NAME: Mark Kimes
PHONE: 787) 717-0669
FAX: 412) 269-2002
CLIENT NAME: Baker Env.
CLIENT PROJECT MANAGER: Tom Fuller
CLIENT ADDRESS (CITY, STATE, ZIP): Coraopolis, PA 15108

PAGE 1 OF 1

MATRIX TYPE: AQUEOUS (WATER) / SOLID OR SEMISOLID / AIR / NONAQUEOUS LIQUID (oil, solvent, etc)

REQUIRED ANALYSES: Dioxin; SVOC/PCB's; DRO; Antimony; Ar(?) 1

[X] STANDARD REPORT DELIVERY
[ ] EXPEDITED REPORT DELIVERY (surcharge)
Date Due: ________

SAMPLE DATE	SAMPLE TIME	SL NO.	SAMPLE IDENTIFICATION	AQUEOUS (WATER)	SOLID OR SEMISOLID	AIR	NONAQUEOUS LIQUID	Dioxin	SVOC/PCB's	DRO	Antimony	Ar 1						REMARKS
6/30			99 FB01					X	X	X	X	X						

RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RELINQUISHED BY: (SIGNATURE)	DATE	TIME
			[signature]	6/30	[illegible]			
RECEIVED BY: (SIGNATURE)	**DATE**	**TIME**	**RECEIVED BY: (SIGNATURE)**	**DATE**	**TIME**	**RECEIVED BY: (SIGNATURE)**	**DATE**	**TIME**
[signature]	6/21	1700						

LABORATORY USE ONLY

RECEIVED FOR LABORATORY BY: (SIGNATURE)	DATE	TIME	CUSTODY INTACT	CUSTODY SEAL NO.	SL LOG NO.	LABORATORY REMARKS:
			[ ] YES [ ] NO			

CLIENTS FIELD COPY

Serial Number 146542

SL SAVANNAH LABORATORIES & ENVIRONMENTAL SERVICES, INC.

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

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- ☐ 2846 Industrial Plaza Drive, Tallahassee, FL 32301 — Phone: (904) 878-3994 — Fax: (904) 878-9504
- ☐ 900 Lakeside Drive, Mobile, AL 36693 — Phone: (334) 666-6633 — Fax: (334) 666-6696
- ☐ 6712 Benjamin Road, Suite 100, Tampa, FL 33634 — Phone: (813) 885-7427 — Fax: (813) 885-7049
- ☐ 100 Alpha Drive, Suite 110, Destrehan, LA 70047 — Phone: (504) 764-1100 — Fax: (504) 725-1163

PROJECT REFERENCE	PROJECT NO.	P.O. NUMBER
Naval Sta Roos Road	CTO-099	

PROJECT LOC. (State)	SAMPLER(s) NAME	PHONE	FAX
PR	Mark Kimes	(787) 717-0669	(412) 269-3002

CLIENT NAME	CLIENT PROJECT MANAGER
Baker Env.	Tom Fuller

CLIENT ADDRESS (CITY, STATE, ZIP): Coraopolis, PA 15108

MATRIX TYPE: AQUEOUS (WATER) / SOLID OR SEMISOLID / AIR / NONAQUEOUS LIQUID (oil, solvent, etc)

REQUIRED ANALYSES: Dioxin; PCB/SVOC; DRO; Extract; App IX Metals

PAGE 1 OF 1

☑ STANDARD REPORT DELIVERY

☐ EXPEDITED REPORT DELIVERY (surcharge)

Date Due: _____

SAMPLE DATE	SAMPLE TIME	SL NO.	SAMPLE IDENTIFICATION	AQUEOUS (WATER)	SOLID OR SEMISOLID	AIR	NONAQUEOUS LIQUID (oil, solvent, etc)	NUMBER OF CONTAINERS SUBMITTED: Dioxin	PCB/SVOC	DRO	Extract	App IX Metals	REMARKS
6/30			~~FB~~ - 99FB-02	X				X	X	X	X	X	

RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RELINQUISHED BY: (SIGNATURE)	DATE	TIME
EMPTY CONTAINERS	6/23/99			6/30	1400			
RECEIVED BY: (SIGNATURE)	**DATE**	**TIME**	**RECEIVED BY: (SIGNATURE)**	**DATE**	**TIME**	**RECEIVED BY: (SIGNATURE)**	**DATE**	**TIME**
EMPTY CONTAINERS	7/1	[illegible]						

LABORATORY USE ONLY

RECEIVED FOR LABORATORY BY: (SIGNATURE)	DATE	TIME	CUSTODY INTACT	CUSTODY SEAL NO.	SL LOG NO.	LABORATORY REMARKS:
			☐ YES ☐ NO			BB

CLIENTS FIELD COPY

Serial Number 146646

SL SAVANNAH LABORATORIES & ENVIRONMENTAL SERVICES, INC.

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

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☐ 900 Lakeside Drive, Mobile, AL 36693 — Phone: (334) 666-6633 — Fax: (334) 666-6696
☐ 6712 Benjamin Road, Suite 100, Tampa, FL 33634 — Phone: (813) 885-7427 — Fax: (813) 885-7049
☐ 100 Alpha Drive, Suite 110, Destrehan, LA 70047 — Phone: (504) 764-1100 — Fax: (504) 725-1163

PROJECT REFERENCE	PROJECT NO.	P.O. NUMBER
NSWS Stn Loos Rd	CTO-099	

PROJECT LOC. (State)	SAMPLER(s) NAME	PHONE	FAX
PA	Mark Kings	(787) 917-0664	(410) 269-2002

CLIENT NAME	CLIENT PROJECT MANAGER
~~Mark Kings~~ BAKER	Tom Fuller

CLIENT ADDRESS (CITY, STATE, ZIP): Conshohocken, PA 19428

MATRIX TYPE: AQUEOUS (WATER) / SOLID OR SEMISOLID / AIR / NONAQUEOUS LIQUID (oil, solvent, etc)

REQUIRED ANALYSES: Dioxin | SVOC | RCRA | DRO | Cyanide | Sulfide | Ignitability | Appix IX | TAL Metals

PAGE 1 OF 1

☒ STANDARD REPORT DELIVERY

☐ EXPEDITED REPORT DELIVERY (surcharge)

Date Due: _____

SAMPLE DATE	SAMPLE TIME	SL NO.	SAMPLE IDENTIFICATION	AQUEOUS (WATER)	SOLID OR SEMISOLID	AIR	NONAQUEOUS LIQUID (oil, solvent, etc)	NUMBER OF CONTAINERS SUBMITTED	REMARKS
6/30			ET 99 ER 01	X				X X X X X X X X	

RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RELINQUISHED BY: (SIGNATURE)	DATE	TIME
[illegible]			[illegible]	6/30/99	1400			
RECEIVED BY: (SIGNATURE)	**DATE**	**TIME**	**RECEIVED BY: (SIGNATURE)**	**DATE**	**TIME**	**RECEIVED BY: (SIGNATURE)**	**DATE**	**TIME**
[illegible]	6/30	1400						

LABORATORY USE ONLY

RECEIVED FOR LABORATORY BY: (SIGNATURE)	DATE	TIME	CUSTODY INTACT	CUSTODY SEAL NO.	SL LOG NO.	LABORATORY REMARKS:
			☐ YES ☐ NO			

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Serial Number 146614

SL SAVANNAH LABORATORIES & ENVIRONMENTAL SERVICES, INC.

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

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- [ ] 900 Lakeside Drive, Mobile, AL 36693 — Phone: (334) 666-6633 — Fax: (334) 666-6696
- [ ] 6712 Benjamin Road, Suite 100, Tampa, FL 33634 — Phone: (813) 885-7427 — Fax: (813) 885-7049
- [ ] 100 Alpha Drive, Suite 110, Destrehan, LA 70047 — Phone: (504) 764-1100 — Fax: (504) 725-1163

SWMU 4

PROJECT REFERENCE	PROJECT NO.	P.O. NUMBER
NAVSTA Roos. Roads	GTO-099	

PROJECT LOC. (State)	SAMPLER(s) NAME	PHONE	FAX
PR	MARK KIMES	(787) 717-0069	(412) 269-2002

CLIENT NAME	CLIENT PROJECT MANAGER
BOLEN ENV.	TOM FULLER

CLIENT ADDRESS (CITY, STATE, ZIP): CORAOPOLIS, PA 15108

MATRIX TYPE: AQUEOUS (WATER); SOLID OR SEMISOLID; AIR; NONAQUEOUS LIQUID (oil, solvent, etc)

REQUIRED ANALYSES: VOCs; BTEX/MTBE; GRO; Chloride; SULFIDE; APP IX Inorganic Anions; DRO; SVOCs

PAGE ____ OF ____

- [x] STANDARD REPORT DELIVERY
- [ ] EXPEDITED REPORT DELIVERY (surcharge)

Date Due: _____

SAMPLE DATE	SAMPLE TIME	SL NO.	SAMPLE IDENTIFICATION	AQUEOUS (WATER)	SOLID OR SEMISOLID	AIR	NONAQUEOUS LIQUID (oil, solvent, etc)	NUMBER OF CONTAINERS SUBMITTED									REMARKS
6/30			99-ER-01	X				X		X							
6/30			99-ER-02	X				X		X							
6/30			99-ER-03					X		X	X	X	X	X	X		
6/30			99-ER-04	X				X									
6/30			99-FB-01	X				X	X								
6/30			99-FB-02	X				X	X								

RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RELINQUISHED BY: (SIGNATURE)	DATE	TIME
[illegible]	6/30		[illegible]	6/30	1400			
RECEIVED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	DATE	TIME
[illegible] SONTAINERS	6/21	1900						

LABORATORY USE ONLY

RECEIVED FOR LABORATORY BY: (SIGNATURE)	DATE	TIME	CUSTODY INTACT	CUSTODY SEAL NO.	SL LOG NO.	LABORATORY REMARKS:
			☐ YES ☐ NO			

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Serial Number 146615

SL SAVANNAH LABORATORIES & ENVIRONMENTAL SERVICES, INC.

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

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☐ 900 Lakeside Drive, Mobile, AL 36693 — Phone: (334) 666-6633 — Fax: (334) 666-6696
☐ 6712 Benjamin Road, Suite 100, Tampa, FL 33634 — Phone: (813) 885-7427 — Fax: (813) 885-7049
☐ 100 Alpha Drive, Suite 110, Destrehan, LA 70047 — Phone: (504) 764-1100 — Fax: (504) 725-1163

SWMU 4

PROJECT REFERENCE	PROJECT NO.	P.O. NUMBER
NAVAL STA Roos. Roads	GO-099	

PROJECT LOC. (State)	SAMPLER(s) NAME	PHONE	FAX
PR	MARK Kimes	(787) 717-0669	(412) 269-2002

CLIENT NAME	CLIENT PROJECT MANAGER
Baker Env	Tom Tullen

CLIENT ADDRESS (CITY, STATE, ZIP): Coraopolis, PA 15108

MATRIX TYPE: AQUEOUS (WATER) / SOLID OR SEMISOLID / AIR / NONAQUEOUS LIQUID (oil, solvent, etc)

REQUIRED ANALYSES: DRO, Boron, Silver, Sulfide, Cyanide, Appendix IX VOA

PAGE 1 OF 1

☒ STANDARD REPORT DELIVERY
☐ EXPEDITED REPORT DELIVERY (surcharge)
Date Due: _____

SAMPLE DATE	SAMPLE TIME	SL NO.	SAMPLE IDENTIFICATION	AQUEOUS (WATER)	SOLID OR SEMISOLID	AIR	NONAQUEOUS LIQUID (oil, solvent, etc)	NUMBER OF CONTAINERS SUBMITTED	REMARKS
6/30			99-ER02	X				4 4 3 3 3 3	
6/30			99-ER04	X				3 3 3 3	

RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RELINQUISHED BY: (SIGNATURE)	DATE	TIME
[signature]	7/1/04		[signature]	6/30/04	1400			
RECEIVED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	DATE	TIME
[signature]	7/1	1400						

LABORATORY USE ONLY

RECEIVED FOR LABORATORY BY: (SIGNATURE)	DATE	TIME	CUSTODY INTACT	CUSTODY SEAL NO.	SL LOG NO.	LABORATORY REMARKS:
			☐ YES ☐ NO			

CLIENTS FIELD COPY

APPENDIX D
BACKGROUND ANALYTICAL DATA

APPENDIX C. 1 (continued)

SUMMARY OF ANALYTICAL RESULTS, SURFACE SOIL - ORGANICS
BACKGROUND
NAVAL STATION ROOSEVELT ROADS, PUERTO RICO

Sample ID	BGMW01-00	BGMW02-00	BGMW03-00	BGMW04-00
Sample Date	04/04/96	04/04/96	04/04/96	04/04/96
Depth Range (ft.)	0.0-1.0	0.0-1.0	0.0-1.0	0.0-1.0
VOLATILES (ug/kg)				
1,1,1,2-Tetrachloroethane	12 UJ	12 U	12 U	12 U
1,1,1-Trichloroethane	6 U	6 U	6 U	6 U
1,1,2,2-Tetrachloroethane	6 UJ	6 U	6 U	6 U
1,1,2-Trichloroethane	6 U	6 U	6 U	6 U
1,1-Dichloroethane	6 U	6 U	6 U	6 U
1,1-Dichloroethene	6 U	6 U	6 U	6 U
1,2,3-Trichloropropane	12 UJ	12 U	12 U	12 U
1,2-Dibromo-3-chloropropane	24 UJ	23 UJ	24 U	24 U
1,2-Dibromoethane	24 UJ	23 U	24 U	24 U
1,2-Dichloroethane	6 U	6 U	6 U	6 U
1,2-Dichloroethene (Total)	6 U	6 U	6 U	6 U
1,2-Dichloropropane	6 U	6 U	6 U	6 U
2-Butanone	12 U	12 UJ	12 U	12 U
2-Chloro-1,3-butadiene	120 UJ	120 U	120 U	120 U
2-Hexanone	12 UJ	12 U	12 U	12 U
3-Chloropropene	24 UJ	23 U	24 U	24 U
4-Methyl-2-pentanone	12 U	12 U	12 U	12 U
Acetone	12 UJ	12 UJ	12 UJ	12 U
Acetonitrile	120 UJ	120 U	120 U	120 U
Acrolein	600 UJ	580 UJ	610 U	590 U
Acrylonitrile	120 UJ	120 U	120 U	120 U
Benzene	6 U	6 U	6 U	6 U
Bromodichloromethane	6 U	6 U	6 U	6 U
Bromoform	6 UJ	6 U	6 U	6 U
Bromomethane	12 U	12 U	12 U	12 U
Carbon disulfide	6 UJ	6 UJ	6 UJ	6 U
Carbon tetrachloride	6 U	6 U	6 U	6 U
Chlorobenzene	6 UJ	6 U	6 U	6 U
Chloroethane	12 U	12 U	12 U	12 U
Chloroform	6 U	6 U	6 U	6 U
Chloromethane	12 U	12 U	12 UJ	12 U
cis-1,3-Dichloropropene	6 U	6 UJ	6 U	6 U
VOLATILES (ug/kg) (cont.)				
Dibromochloromethane	6 UJ	6 U	6 U	6 U

APPENDIX C. 1 (continued)

SUMMARY OF ANALYTICAL RESULTS, SURFACE SOIL - ORGANICS
BACKGROUND
NAVAL STATION ROOSEVELT ROADS, PUERTO RICO

Sample ID	BGMW01-00	BGMW02-00	BGMW03-00	BGMW04-00
Sample Date	04/04/96	04/04/96	04/04/96	04/04/96
Depth Range (ft.)	0.0-1.0	0.0-1.0	0.0-1.0	0.0-1.0
Dibromomethane	12 UJ	12 U	12 U	12 U
Dichlorodifluoromethane	24 U	23 UJ	24 UJ	24 U
Ethyl methacrylate	24 UJ	23 U	24 U	24 U
Ethylbenzene	6 UJ	6 U	6 U	6 U
Iodomethane	12 UJ	12 UJ	12 U	12 U
Isobutanol	2,400 R	2,300 R	2,400 R	2,400 U
Methacrylonitrile	24 UJ	23 U	24 U	24 U
Methyl methacrylate	24 UJ	23 U	24 U	24 U
Methylene chloride	6 U	6 UJ	6 U	6 U
Pentachloroethane	24 UJ	23 U	24 U	24 U
Propionitrile	60 UJ	58 R	61 U	59 U
Styrene	6 UJ	6 U	6 U	6 U
Tetrachloroethene	6 U	6 U	6 UJ	6 U
Toluene	6 U	6 U	6 U	6 U
trans-1,3-Dichloropropene	6 U	6 UJ	6 U	6 U
trans-1,4-Dichloro-2-butene	24 UJ	23 U	24 U	24 U
Trichloroethene	6 U	6 U	6 U	6 U
Trichlorofluoromethane	12 UJ	12 U	12 UJ	12 U
Vinyl Acetate	12 UJ	12 UJ	12 UJ	12 U
Vinyl chloride	12 U	12 U	12 UJ	12 U
Xylene (total)	6 UJ	6 U	6 U	6 U
SEMIVOLATILES (ug/kg)				
1,2,4,5-Tetrachlorobenzene	390 U	380 U	400 U	380 U
1,2,4-Trichlorobenzene	390 U	380 U	400 U	380 U
1,2-Dichlorobenzene	390 U	380 U	400 U	380 U
1,2-Diphenylhydrazine	390 U	380 U	400 U	380 U
1,3-Dichlorobenzene	390 U	380 U	400 U	380 U
1,4-Dichlorobenzene	390 U	380 U	400 U	380 U
1,4-Dioxane	780 UJ	760 UJ	810 UJ	770 UJ
1,4-Naphthoquinone	2,000 UJ	1,900 UJ	2,000 UJ	1,900 UJ
1-Naphthylamine	390 U	380 U	810 U	380 U
SEMIVOLATILES (ug/kg) (cont.)				
2,2'-Oxybis(1-Chloropropane)	390 UJ	380 UJ	400 UJ	380 UJ
2,3,4,6-Tetrachlorophenol	390 UJ	380 UJ	400 UJ	380 UJ
2,4,5-Trichlorophenol	2,000 U	1,900 U	2,000 U	1,900 U

APPENDIX C. 1 (continued)

SUMMARY OF ANALYTICAL RESULTS, SURFACE SOIL - ORGANICS
BACKGROUND
NAVAL STATION ROOSEVELT ROADS, PUERTO RICO

Sample ID	BGMW01-00	BGMW02-00	BGMW03-00	BGMW04-00
Sample Date	04/04/96	04/04/96	04/04/96	04/04/96
Depth Range (ft.)	0.0-1.0	0.0-1.0	0.0-1.0	0.0-1.0
2,4,6-Trichlorophenol	390 U	380 U	400 U	380 U
2,4-Dichlorophenol	390 U	380 U	400 U	380 U
2,4-Dimethylphenol	390 U	380 U	400 U	380 U
2,4-Dinitrophenol	2,000 UJ	1,900 U	2,000 U	1,900 UJ
2,4-Dinitrotoluene	390 U	380 U	400 U	380 U
2,6-Dichlorophenol	390 UJ	380 UJ	400 UJ	380 UJ
2,6-Dinitrotoluene	390 U	380 U	400 U	380 U
2-Acetylaminofluorene	780 U	760 U	810 U	770 U
2-Chloronaphthalene	390 U	380 U	400 U	380 U
2-Chlorophenol	390 U	380 U	400 U	380 U
2-Methylnaphthalene	390 UJ	380 UJ	400 UJ	380 UJ
2-Naphthylamine	390 UJ	380 UJ	1,000 UJ	380 UJ
2-Nitroaniline	2,000 U	1,900 UJ	2,000 UJ	1,900 U
2-Nitrophenol	390 U	380 U	400 U	380 U
2-Picoline	390 UJ	380 U	400 UJ	380 UJ
2-sec-butyl-4,6-dinitrophenol	780 UJ	760 UJ	810 UJ	770 UJ
3,3'-Dichlorobenzidine	780 U	760 U	810 U	770 U
3,3'-Dimethylbenzidine	780 U	760 UJ	2,000 U	770 U
3-Methylcholanthrene	390 U	380 U	400 U	380 U
3-Nitroaniline	2,000 U	1,900 U	2,000 U	1,900 U
4,6-Dinitro-2-methylphenol	2,000 U	1,900 U	2,000 U	1,900 U
4-Aminobiphenyl	390 U	760 U	810 U	770 U
4-Bromophenyl phenyl ether	390 U	380 U	400 U	380 U
4-Chloro-3-methylphenol	780 U	760 U	810 U	770 U
4-Chloroaniline	780 U	760 U	810 U	770 U
4-Chlorophenyl phenyl ether	390 U	380 U	400 U	380 U
4-Nitroaniline	2,000 U	1,900 U	2,000 U	1,900 U
4-Nitrophenol	2,000 U	1,900 UJ	2,000 UJ	1,900 U
4-Nitroquinoline-1-oxide				
SEMIVOLATILES (ug/kg) (cont.)				
5-Nitro-o-toluidine	780 U	760 U	810 U	770 U
7,12-Dimethylbenz(a)anthracene	780 U	760 U	810 U	770 U
Acenaphthene	390 U	380 U	400 U	380 U
Acenaphthylene	390 U	380 U	400 U	380 U
Acetophenone	390 UJ	380 U	400 UJ	380 UJ

APPENDIX C. 1 (continued)

SUMMARY OF ANALYTICAL RESULTS, SURFACE SOIL - ORGANICS
BACKGROUND
NAVAL STATION ROOSEVELT ROADS, PUERTO RICO

Sample ID	BGMW01-00	BGMW02-00	BGMW03-00	BGMW04-00
Sample Date	04/04/96	04/04/96	04/04/96	04/04/96
Depth Range (ft.)	0.0-1.0	0.0-1.0	0.0-1.0	0.0-1.0
alpha, alpha-Dimethylphenethylamine	2,000 UJ	1,900 UJ	2,000 UJ	1,900 UJ
Aniline	2,000 UJ	1,900 UJ	2,000 UJ	1,900 UJ
Anthracene	390 U	380 U	400 U	380 U
Aramite	780 UJ	760 UJ	810 UJ	770 UJ
Benzidine	3,900 U	3,800 UJ	4,000 U	3,800 U
Benzo(a)anthracene	390 U	380 U	400 U	380 U
Benzo(a)pyrene	390 U	380 U	400 U	380 U
Benzo(b)fluoranthene	390 U	380 U	400 U	380 U
Benzo(g,h,i)perylene	390 U	380 U	400 U	380 U
Benzo(k)fluoranthene	390 U	380 U	400 U	380 U
Benzoic acid	2,000 U	1,900 U	2,000 U	1,900 U
Benzyl alcohol	390 U	380 UJ	400 UJ	380 U
Bis(2-chloroethoxy)methane	390 U	380 U	400 U	380 U
Bis(2-chloroethyl)ether	390 U	380 U	400 U	380 U
Bis(2-ethylhexyl)phthalate	92 J	380 U	400 U	380 U
Butylbenzylphthalate	62 J	380 U	400 U	380 U
Carbazole	390 U	380 U	400 U	380 U
Chlorobenzilate	390 UJ	380 UJ	400 UJ	380 UJ
Chrysene	390 U	380 U	400 U	380 U
Diallate	390 U	380 UJ	400 U	380 U
Dibenzo(a,h)anthracene	390 U	380 U	400 U	380 U
Dibenzofuran	390 U	380 U	400 U	380 U
Diethylphthalate	390 U	380 U	400 U	380 U
Dimethylphthalate	390 U	380 U	400 U	380 U
Di-n-butylphthalate	390 U	380 U	400 U	380 U
Di-n-octylphthalate	390 U	380 U	400 U	380 U
Diphenylamine	390 U	380 U	400 U	380 U
SEMIVOLATILES (ug/kg) (cont.)				
Ethyl methanesulfonate	390 U	380 U	400 U	380 U
Fluoranthene	46 J	380 U	400 U	380 U
Fluorene	390 U	380 U	400 U	380 U
Hexachlorobenzene	390 U	380 U	400 U	380 U
Hexachlorobutadiene	390 U	380 U	400 U	380 U
Hexachlorocyclopentadiene	390 U	380 U	400 U	380 U
Hexachloroethane	390 U	380 U	400 U	380 U

APPENDIX C. 1 (continued)

SUMMARY OF ANALYTICAL RESULTS, SURFACE SOIL - ORGANICS
BACKGROUND
NAVAL STATION ROOSEVELT ROADS, PUERTO RICO

Sample ID	BGMW01-00	BGMW02-00	BGMW03-00	BGMW04-00
Sample Date	04/04/96	04/04/96	04/04/96	04/04/96
Depth Range (ft.)	0.0-1.0	0.0-1.0	0.0-1.0	0.0-1.0
Hexachlorophene	3,900 UJ	3,800 UJ	4,000 R	3,800 UJ
Hexachloropropene	780 R	760 R	2,000 U	770 R
Indeno(1,2,3-cd)pyrene	390 U	380 U	400 U	380 U
Isophorone	390 U	380 U	400 U	380 U
Isosafrole	390 U	380 U	400 U	380 U
m&p Cresol	390 U	380 U	400 U	380 U
Meta-Dinitrobenzene	780 U	760 U	810 U	770 U
Methapyrilene	980 U	950 U	1,000 UJ	960 U
Methyl methanesulfonate	390 U	380 U	400 U	380 U
Naphthalene	390 U	380 U	400 U	380 U
Nitrobenzene	390 U	380 UJ	400 U	380 U
N-Nitrosodiethylamine	390 U	380 UJ	400 U	380 U
N-Nitrosodimethylamine	390 UJ	380 UJ	400 U	380 UJ
N-Nitroso-di-n-butylamine	390 UJ	380 U	400 U	380 UJ
N-Nitroso-di-n-propylamine	390 U	380 UJ	400 U	380 U
N-Nitrosodiphenylamine (1)	390 U	380 U	400 U	380 U
N-Nitrosomethylethylamine	390 UJ	380 UJ	400 U	380 UJ
N-Nitrosomorpholine	780 UJ	760 U	810 UJ	770 UJ
N-Nitrosopiperidine	390 U	380 UJ	400 U	380 U
N-Nitrosopyrrolidine	2,000 UJ	1,900 U	2,000 UJ	1,900 UJ
o-Cresol	390 U	380 U	400 U	380 U
o-Toluidine	390 R	380 R	400 R	380 R
p-Dimethylaminoazobenzene	780 U	760 U	810 UJ	770 U
Pentachlorobenzene	390 U	380 U	400 U	380 U
Pentachloronitrobenzene	390 U	380 U	400 U	380 U
SEMIVOLATILES (ug/kg) (cont.)				
Pentachlorophenol	2,000 U	1,900 U	2,000 U	1,900 U
Phenacetin	390 UJ	380 U	400 U	380 UJ
Phenanthrene	390 U	380 U	400 U	380 U
Phenol	390 U	380 U	400 U	380 U
p-Phenylenediamine	780 R	760 R	810 R	770 R
Pronamide	390 U	380 U	400 U	380 U
Pyrene	390 U	380 U	400 U	380 U
Pyridine	780 UJ	760 UJ	810 U	770 UJ
Safrole	390 U	380 UJ	400 U	380 U

APPENDIX C. 1 (continued)

SUMMARY OF ANALYTICAL RESULTS, SURFACE SOIL - ORGANICS
BACKGROUND
NAVAL STATION ROOSEVELT ROADS, PUERTO RICO

Sample ID	BGMW01-00	BGMW02-00	BGMW03-00	BGMW04-00
Sample Date	04/04/96	04/04/96	04/04/96	04/04/96
Depth Range (ft.)	0.0-1.0	0.0-1.0	0.0-1.0	0.0-1.0
sym-Trinitrobenzene	3,900 U	3,800 U	4,000 UJ	3,800 U
PESTICIDES/PCBS (ug/kg)				
4,4'-DDD	19 U	9.2 U	9.6 U	19 U
4,4'-DDE	19 U	9.2 U	9.6 U	19 U
4,4'-DDT	19 U	9.2 U	9.6 U	19 U
Aldrin	9.3 U	4.6 U	4.8 U	9.4 U
alpha-BHC	9.3 U	4.6 U	4.8 U	9.4 U
alpha-Chlordane	93 U	46 U	48 U	94 U
beta-BHC	9.3 U	4.6 U	4.8 U	9.4 U
delta-BHC	9.3 U	4.6 U	4.8 U	9.4 U
Dieldrin	19 U	9.2 U	9.6 U	19 U
Endosulfan I	9.3 U	4.6 U	4.8 U	9.4 U
Endosulfan II	19 U	9.2 U	9.6 U	19 U
Endosulfan sulfate	19 U	9.2 U	9.6 U	19 U
Endrin	19 U	9.2 U	9.6 U	19 U
Endrin aldehyde	19 U	9.2 U	9.6 U	19 U
gamma-BHC (Lindane)	9.3 U	4.6 U	4.8 U	9.4 U
gamma-Chlordane	93 U	46 U	48 U	94 U
Heptachlor	9.3 U	4.6 U	4.8 U	9.4 U
Heptachlor epoxide	9.3 U	4.6 U	4.8 U	9.4 U
Isodrin	9.3 U	4.6 U	4.8 U	9.4 U
Kepone	19 U	9.2 U	9.6 U	19 U

APPENDIX C. 1 (continued)

SUMMARY OF ANALYTICAL RESULTS, SURFACE SOIL - ORGANICS
BACKGROUND
NAVAL STATION ROOSEVELT ROADS, PUERTO RICO

Sample ID	BGMW01-00	BGMW02-00	BGMW03-00	BGMW04-00
Sample Date	04/04/96	04/04/96	04/04/96	04/04/96
Depth Range (ft.)	0.0-1.0	0.0-1.0	0.0-1.0	0.0-1.0
PESTICIDES/PCBS (ug/kg) (cont.)				
Methoxychlor	93 U	46 U	48 U	94 U
Toxaphene	190 U	92 U	96 U	190 U
Aroclor-1016	93 U	46 U	48 U	94 U
Aroclor-1221	93 U	46 U	48 U	94 U
Aroclor-1232	93 U	46 U	48 U	94 U
Aroclor-1242	93 U	46 U	48 U	94 U
Aroclor-1248	93 U	46 U	48 U	94 U
Aroclor-1254	190 U	92 U	96 U	190 U
Aroclor-1260	190 U	92 U	96 U	190 U
CHLORINATED HERBICIDES (ug/kg)				
2,4,5-T	39 U	39 U	40 U	39 U
2,4,5-TP (Silvex)	39 U	39 U	40 U	39 U
2,4-D	390 U	390 U	400 U	390 U
OP-PESTICIDES (ug/kg)				
Dimethoate	79 U	77 U	80 U	78 U
Disulfoton	79 U	77 U	80 U	78 U
Famphur	79 U	77 U	80 U	78 U
Methyl parathion	79 U	77 U	80 U	78 U
O,O,O-Triethylphosphorothioate	79 U	77 U	80 U	78 U
Parathion	79 U	77 U	80 U	78 U
Phorate	79 U	77 U	80 U	78 U
Sulfotepp	79 U	77 U	80 U	78 U
Thionazin	79 U	77 U	80 U	78 U
DIOXINS (ug/kg)				
2,3,7,8-TCDD	0.06 U	0.13 U	0.07 U	0.09 U
Total HxCDD	0.16 U	0.26 U	0.21 U	0.18 U
Total HxCDF	0.09 U	0.14 U	0.13 U	0.14 U
Total PeCDD	0.17 U	0.3 U	0.19 U	0.17 U
Total PeCDF	0.15 U	0.21 U	0.17 U	0.22 U
Total TCDD	0.08 U	0.13 U	0.1 U	0.11 U
Total TCDF	0.09 U	0.1 U	0.11 U	0.09 U

APPENDIX C. 2

SUMMARY OF ANALYTICAL RESULTS, SURFACE SOIL - INORGANICS
BACKGROUND
NAVAL STATION ROOSEVELT ROADS, PUERTO RICO

Sample ID	BGMW01-00	BGMW02-00	BGMW03-00	BGMW04-00
Sample Date	04/04/96	04/04/96	04/04/96	04/04/96
Depth Range (ft.)	0.0-1.0	0.0-1.0	0.0-1.0	0.0-1.0
Inorganics, Total (mg/kg)				
Antimony	2.4 UJ	2.2 UJ	2.3 UJ	2.3 UJ
Arsenic	1.2	0.35 J	1.5	1.8
Barium	169	94.1	35.6	63.7
Beryllium	0.36	0.1 U	0.28	0.21
Cadmium	0.28 U	0.26 U	0.27 U	0.27 U
Chromium	44.1 J	11 J	33.6 J	29.9 J
Cobalt	30.2	27	9.5	21.2
Copper	98.5	250	57	62.9
Lead	9.6	2.4	6.6	11.9
Mercury	0.06	0.04 U	0.07	0.07
Nickel	10.9	7.8	5.8	8.6
Selenium	0.56 J	0.13 UJ	1.2 J	1.1 J
Silver	0.39 U	0.35 U	0.37 U	0.37 U
Sulfide	29.2 U	28.8 U	29.2 U	26.7 U
Thallium	0.1 J	0.08 U	0.09 UJ	0.09 UJ
Tin	1.3 U	1.2 U	1.4	2.2
Vanadium	227	123	189	170
Zinc	106 J	66.2 J	34.2 J	43.9 J
Cyanide	0.47 U	0.57 U	0.46 U	0.56 U

APPENDIX C. 3 (continued)

SUMMARY OF ANALYTICAL RESULTS, SUBSURFACE SOIL - ORGANICS
BACKGROUND
NAVAL STATION ROOSEVELT ROADS

Sample ID	BGMW01-04	BGMW01-06	BGMW02-05	BGMW02-08	BGMW03-03	BGMW03-04	BGMW03-04D	BGMW04-02	BGMW04-04
Sample Date	04/23/96	04/23/96	04/22/96	04/22/96	04/12/96	04/12/96	04/12/96	04/24/96	04/24/96
Depth Range (ft.)	8.0-10.0	12.0-14.0	10.0-12.0	16.0-18.0	6.0-8.0	8.0-10.0	8.0-10.0	4.0-6.0	8.0-10.0
VOLATILES (ug/kg)									
1,1,1,2-Tetrachloroethane	13 U	15 U	16 U	14 U	14 U	14 U	15 U	13 U	14 U
1,1,1-Trichloroethane	7 U	7 U	8 U	7 U	7 U	7 U	8 U	6 U	7 U
1,1,2,2-Tetrachloroethane	7 U	7 U	8 U	7 U	7 U	7 U	8 U	6 U	7 U
1,1,2-Trichloroethane	7 U	7 U	8 U	7 U	7 U	7 U	8 U	6 U	7 U
1,1-Dichloroethane	7 U	7 U	8 U	7 U	7 U	7 U	8 U	6 U	7 U
1,1-Dichloroethene	7 U	7 U	8 U	7 U	7 U	7 U	8 U	6 U	7 U
1,2,3-Trichloropropane	13 U	15 U	16 U	14 U	14 U	14 U	15 U	13 U	14 U
1,2-Dibromo-3-chloropropane	27 UJ	30 UJ	33 UJ	28 UJ	28 U	27 U	30 U	26 UJ	27 UJ
1,2-Dibromoethane	27 U	30 U	33 U	28 U	28 U	27 U	30 U	26 U	27 U
1,2-Dichloroethane	7 U	7 U	8 U	7 U	7 U	7 U	8 U	6 U	7 U
1,2-Dichloroethene (Total)	7 U	7 U	8 U	7 U	7 U	7 U	8 U	6 U	7 U
1,2-Dichloropropane	7 U	7 U	8 U	7 U	7 U	7 U	8 U	6 U	7 U
2-Butanone	13 UJ	15 UJ	16 UJ	14 UJ	14 UJ	14 UJ	15 UJ	13 UJ	14 U
2-Chloro-1,3-butadiene	130 U	150 U	160 U	140 U	140 U	140 U	150 U	130 U	140 U
2-Hexanone	13 U	15 U	16 U	14 U	14 UJ	14 UJ	15 UJ	13 U	14 U
3-Chloropropene	27 U	30 U	33 U	28 U	28 U	27 U	30 U	26 U	27 U
4-Methyl-2-pentanone	13 U	15 U	16 U	14 U	14 U	14 U	15 U	13 U	14 U
Acetone	13 UJ	15 UJ	16 UJ	14 UJ	14 UJ	14 UJ	15 UJ	13 UJ	14 U
Acetonitrile	130 U	150 U	160 U	140 U	140 U	140 U	150 U	130 U	140 U
Acrolein	670 UJ	740 UJ	820 UJ	710 UJ	690 U	680 U	760 U	640 UJ	680 UJ
Acrylonitrile	130 U	150 U	160 U	140 U	140 UJ	140 UJ	150 UJ	130 U	140 U
Benzene	7 U	7 U	8 U	7 U	7 U	7 U	8 U	6 U	7 U
Bromodichloromethane	7 U	7 U	8 U	7 U	7 U	7 U	8 U	6 U	7 U
Bromoform	7 U	7 U	8 U	7 U	7 U	7 U	8 U	6 U	7 U
Bromomethane	13 U	15 U	16 U	14 U	14 U	14 U	15 U	13 U	14 UJ
Carbon disulfide	7 U	7 U	8 U	7 U	7 UJ	7 UJ	8 UJ	6 U	7 U
Carbon tetrachloride	7 U	7 U	8 U	7 U	7 U	7 U	8 U	6 U	7 U
Chlorobenzene	7 U	7 U	8 U	7 U	7 U	7 U	8 U	6 U	7 U
Chloroethane	13 U	15 U	16 U	14 U	14 U	14 U	15 U	13 U	14 U
Chloroform	7 U	7 U	8 U	7 U	7 U	7 U	8 U	6 U	7 U
Chloromethane	13 U	15 U	16 U	14 U	14 UJ	14 UJ	15 UJ	13 U	14 U
cis-1,3-Dichloropropene	7 UJ	7 UJ	8 UJ	7 UJ	7 U	7 U	8 U	6 UJ	7 U
Dibromochloromethane	7 U	7 U	8 U	7 U	7 U	7 U	8 U	6 U	7 U
Dibromomethane	13 UJ	15 UJ	16 UJ	14 UJ	14 U	14 U	15 U	13 UJ	14 UJ

APPENDIX C. 3 (continued)

SUMMARY OF ANALYTICAL RESULTS, SUBSURFACE SOIL - ORGANICS
BACKGROUND
NAVAL STATION ROOSEVELT ROADS

Sample ID	BGMW01-04	BGMW01-06	BGMW02-05	BGMW02-08	BGMW03-03	BGMW03-04	BGMW03-04D	BGMW04-02	BGMW04-04
Sample Date	04/23/96	04/23/96	04/22/96	04/22/96	04/12/96	04/12/96	04/12/96	04/24/96	04/24/96
Depth Range (ft.)	8.0-10.0	12.0-14.0	10.0-12.0	16.0-18.0	6.0-8.0	8.0-10.0	8.0-10.0	4.0-6.0	8.0-10.0
VOLATILES (ug/kg) (cont.)									
Dichlorodifluoromethane	27 UJ	30 UJ	33 UJ	28 UJ	28 UJ	27 UJ	30 UJ	26 UJ	27 UJ
Ethyl methacrylate	27 U	30 U	33 U	28 U	28 UJ	27 UJ	30 UJ	26 U	27 U
Ethylbenzene	7 U	7 U	8 U	7 U	7 U	7 U	8 U	6 U	7 U
Iodomethane	13 UJ	15 UJ	16 UJ	14 UJ	14 U	14 U	15 U	13 UJ	14 UJ
Isobutanol	2,700 R	3,000 R	3,300 R	2,800 R	2,800 R	2,700 R	3,000 R	2,600 R	2,700 R
Methacrylonitrile	27 U	30 U	33 U	28 U	28 U	27 U	30 U	26 U	27 U
Methyl methacrylate	27 U	30 U	33 U	28 U	28 U	27 U	30 U	26 U	27 U
Methylene chloride	7 UJ	7 UJ	8 UJ	7 UJ	7 UJ	7 UJ	8 UJ	6 UJ	7 UJ
Pentachloroethane	27 U	30 U	33 U	28 U	28 UJ	27 UJ	30 UJ	26 U	27 U
Propionitrile	67 U	74 U	82 U	71 U	69 R	68 R	76 R	64 U	68 R
Styrene	7 U	7 U	8 U	7 U	7 U	7 U	8 U	6 U	7 U
Tetrachloroethene	7 U	7 U	8 U	7 U	7 U	7 U	8 U	6 U	7 U
Toluene	7 U	7 U	8 U	7 U	7 U	7 U	8 U	6 U	7 U
trans-1,3-Dichloropropene	7 U	7 U	8 U	7 U	7 U	7 U	8 U	6 U	7 U
trans-1,4-Dichloro-2-butene	27 U	30 U	33 U	28 U	28 U	27 U	30 U	26 U	27 U
Trichloroethene	7 U	7 U	8 U	7 U	7 U	7 U	8 U	6 U	7 U
Trichlorofluoromethane	13 U	15 U	16 U	14 U	14 U	14 U	15 U	13 U	14 U
Vinyl Acetate	13 UJ	15 UJ	16 UJ	14 UJ	14 UJ	14 UJ	15 UJ	13 UJ	14 U
Vinyl chloride	13 U	15 U	16 U	14 U	14 U	14 U	15 U	13 U	14 U
Xylene (total)	2 J	3 J	8 U	7 U	7 U	2 J	8 U	6 U	7 U

APPENDIX C. 3 (continued)

SUMMARY OF ANALYTICAL RESULTS, SUBSURFACE SOIL - ORGANICS
BACKGROUND
NAVAL STATION ROOSEVELT ROADS

Sample ID	BGMW01-04	BGMW01-06	BGMW02-05	BGMW02-08	BGMW03-03	BGMW03-04	BGMW03-04D	BGMW04-02	BGMW04-04
Sample Date	04/23/96	04/23/96	04/22/96	04/22/96	04/12/96	04/12/96	04/12/96	04/24/96	04/24/96
Depth Range (ft.)	8.0-10.0	12.0-14.0	10.0-12.0	16.0-18.0	6.0-8.0	8.0-10.0	8.0-10.0	4.0-6.0	8.0-10.0
SEMIVOLATILES (ug/kg)									
1,2,4,5-Tetrachlorobenzene	440 U	490 U	540 U	470 U	460 U	440 U	490 U	420 U	420 U
1,2,4-Trichlorobenzene	440 U	490 U	540 U	470 U	460 U	440 U	490 U	420 U	420 U
1,2-Dichlorobenzene	440 U	490 U	540 U	470 U	460 U	440 U	490 U	420 U	420 U
1,2-Diphenylhydrazine	440 U	490 U	540 U	470 U	460 U	440 U	490 U	420 U	420 U
1,3-Dichlorobenzene	440 U	490 U	540 U	470 U	460 U	440 U	490 U	420 U	420 U
1,4-Dichlorobenzene	440 U	490 U	540 U	470 U	460 U	440 U	490 U	420 U	420 U
1,4-Dioxane	880 R	980 R	1,100 R	940 R	910 U	880 U	970 U	840 R	850 R
1,4-Naphthoquinone	2,200 UJ	2,400 UJ	2,700 UJ	2,300 UJ	2,300 UJ	2,200 UJ	2,400 UJ	2,100 UJ	2,100 UJ
1-Naphthylamine	880 U	980 U	1,100 U	940 U	910 U	880 U	970 U	840 U	850 U
2,2'-Oxybis(1-Chloropropane)	440 U	490 U	540 U	470 U	460 U	440 U	490 U	420 U	420 U
2,3,4,6-Tetrachlorophenol	440 UJ	490 UJ	540 UJ	470 UJ	460 U	440 U	490 U	420 UJ	420 UJ
2,4,5-Trichlorophenol	2,200 U	2,400 U	2,700 U	2,300 U	2,300 U	2,200 U	2,400 U	2,100 U	2,100 U
2,4,6-Trichlorophenol	440 U	490 U	540 U	470 U	460 U	440 U	490 U	420 U	420 U
2,4-Dichlorophenol	440 U	490 U	540 U	470 U	460 U	440 U	490 U	420 U	420 U
2,4-Dimethylphenol	440 U	490 U	540 U	470 U	460 U	440 U	490 U	420 U	420 U
2,4-Dinitrophenol	2,200 U	2,400 U	2,700 U	2,300 U	2,300 U	2,200 U	2,400 U	2,100 U	2,100 U
2,4-Dinitrotoluene	440 U	490 U	540 U	470 U	460 U	440 U	490 U	420 U	420 U
2,6-Dichlorophenol	440 U	490 U	540 U	470 U	460 U	440 U	490 U	420 U	420 U
2,6-Dinitrotoluene	440 U	490 U	540 U	470 U	460 U	440 U	490 U	420 U	420 U
2-Acetylaminofluorene	880 U	980 U	1,100 U	940 U	910 U	880 U	970 U	840 U	850 U
2-Chloronaphthalene	440 U	490 U	540 U	470 U	460 U	440 U	490 U	420 U	420 U
2-Chlorophenol	440 U	490 U	540 U	470 U	460 U	440 U	490 U	420 U	420 U
2-Methylnaphthalene	440 U	490 U	540 U	470 U	460 U	440 U	490 U	420 U	420 U
2-Naphthylamine	1,100 U	1,200 U	1,300 U	1,200 U	1,100 U	1,100 U	1,200 U	1,000 U	1,000 U
2-Nitroaniline	2,200 U	2,400 U	2,700 U	2,300 U	2,300 U	2,200 U	2,400 U	2,100 U	2,100 U
2-Nitrophenol	440 U	490 U	540 U	470 U	460 U	440 U	490 U	420 U	420 U
2-Picoline	440 UJ	490 UJ	540 UJ	470 UJ	460 U	440 U	490 U	420 UJ	420 UJ
2-sec-butyl-4,6-dinitrophenol	880 UJ	980 UJ	1,100 UJ	940 UJ	910 U	880 U	970 U	840 UJ	850 UJ
3,3'-Dichlorobenzidine	880 U	980 U	1,100 U	940 U	910 U	880 U	970 U	840 U	850 U
3,3'-Dimethylbenzidine	2,200 U	2,400 U	2,700 U	2,300 U	2,300 R	2,200 R	2,400 R	2,100 U	2,100 U
3-Methylcholanthrene	440 U	490 U	540 U	470 U	460 U	440 U	490 U	420 U	420 U
3-Nitroaniline	2,200 U	2,400 U	2,700 U	2,300 U	2,300 U	2,200 U	2,400 U	2,100 U	2,100 U
4,6-Dinitro-2-methylphenol	2,200 U	2,400 U	2,700 U	2,300 U	2,300 U	2,200 U	2,400 U	2,100 U	2,100 U
4-Aminobiphenyl	880 U	980 U	1,100 U	940 U	910 U	880 U	970 U	840 U	850 U

APPENDIX C. 3 (continued)

SUMMARY OF ANALYTICAL RESULTS, SUBSURFACE SOIL - ORGANICS
BACKGROUND
NAVAL STATION ROOSEVELT ROADS

Sample ID	BGMW01-04	BGMW01-06	BGMW02-05	BGMW02-08	BGMW03-03	BGMW03-04	BGMW03-04D	BGMW04-02	BGMW04-04
Sample Date	04/23/96	04/23/96	04/22/96	04/22/96	04/12/96	04/12/96	04/12/96	04/24/96	04/24/96
Depth Range (ft.)	8.0-10.0	12.0-14.0	10.0-12.0	16.0-18.0	6.0-8.0	8.0-10.0	8.0-10.0	4.0-6.0	8.0-10.0
SEMIVOLATILES (ug/kg) (cont.)									
4-Bromophenyl phenyl ether	440 U	490 U	540 U	470 U	460 U	440 U	490 U	420 U	420 U
4-Chloro-3-methylphenol	880 U	980 U	1,100 U	940 U	910 U	880 U	970 U	840 U	850 U
4-Chloroaniline	880 U	980 U	1,100 U	940 U	910 U	880 U	970 U	840 U	850 U
4-Chlorophenyl phenyl ether	440 U	490 U	540 U	470 U	460 U	440 U	490 U	420 U	420 U
4-Nitroaniline	2,200 U	2,400 U	2,700 U	2,300 U	2,300 U	2,200 U	2,400 U	2,100 U	2,100 U
4-Nitrophenol	2,200 UJ	2,400 UJ	2,700 UJ	2,300 UJ	2,300 U	2,200 U	2,400 U	2,100 UJ	2,100 UJ
4-Nitroquinoline-1-oxide	2,200 R	2,400 R	2,700 R	2,300 R	2,300 R	2,200 R	2,400 R	2,100 R	2,100 R
5-Nitro-o-toluidine	880 U	980 U	1,100 U	940 U	910 U	880 U	970 U	840 U	850 U
7,12-Dimethylbenz(a)anthracene	880 U	980 U	1,100 U	940 U	910 U	880 U	970 U	840 U	850 U
Acenaphthene	440 U	490 U	540 U	470 U	460 U	440 U	490 U	420 U	420 U
Acenaphthylene	440 U	490 U	540 U	470 U	460 U	440 U	490 U	420 U	420 U
Acetophenone	440 U	490 U	540 U	470 U	460 U	440 U	490 U	420 U	420 U
alpha, alpha-Dimethylphenethylamine	2,200 UJ	2,400 UJ	2,700 UJ	2,300 UJ	2,300 UJ	2,200 UJ	2,400 UJ	2,100 UJ	2,100 UJ
Aniline	2,200 U	2,400 U	2,700 U	2,300 U	2,300 U	2,200 U	2,400 U	2,100 U	2,100 U
Anthracene	440 U	490 U	540 U	470 U	460 U	440 U	490 U	420 U	420 U
Aramite	880 UJ	980 UJ	1,100 UJ	940 UJ	910 U	880 U	970 U	840 UJ	850 UJ
Benzidine	4,400 U	4,900 U	5,400 U	4,700 U	4,600 UJ	4,400 UJ	4,900 UJ	4,200 U	4,200 U
Benzo(a)anthracene	440 U	490 U	540 U	470 U	460 U	440 U	490 U	420 U	420 U
Benzo(a)pyrene	440 U	490 U	540 U	470 U	460 U	440 U	490 U	420 U	420 U
Benzo(b)fluoranthene	440 U	490 U	540 U	470 U	460 U	440 U	490 U	420 U	420 U
Benzo(g,h,i)perylene	440 U	490 U	540 U	470 U	460 U	440 U	490 U	420 U	420 U
Benzo(k)fluoranthene	440 U	490 U	540 U	470 U	460 U	440 U	490 U	420 U	420 U
Benzoic acid	2,200 U	2,400 U	2,700 U	2,300 U	2,300 U	2,200 U	2,400 U	2,100 U	2,100 U
Benzyl alcohol	440 U	490 U	540 U	470 U	460 U	440 U	490 U	420 U	420 U
Bis(2-chloroethoxy)methane	440 U	490 U	540 U	470 U	460 U	440 U	490 U	420 U	420 U
Bis(2-chloroethyl)ether	440 U	490 U	540 U	470 U	460 U	440 U	490 U	420 U	420 U
Bis(2-ethylhexyl)phthalate	440 U	490 U	540 U	470 U	460 U	440 U	490 U	420 U	420 U
Butylbenzylphthalate	440 U	490 U	540 U	470 U	460 U	440 U	490 U	420 U	420 U
Carbazole	440 U	490 U	540 U	470 U	460 U	440 U	490 U	420 U	420 U
Chlorobenzilate	440 UJ	490 UJ	540 UJ	470 UJ	460 U	440 U	490 U	420 UJ	420 UJ
Chrysene	440 U	490 U	540 U	470 U	460 U	440 U	490 U	420 U	420 U
Cresols									
Diallate	440 U	490 U	540 U	470 U	460 U	440 U	490 U	420 U	420 U
Dibenzo(a,h)anthracene	440 U	490 U	540 U	470 U	460 U	440 U	490 U	420 U	420 U

APPENDIX C. 3 (continued)

SUMMARY OF ANALYTICAL RESULTS, SUBSURFACE SOIL - ORGANICS
BACKGROUND
NAVAL STATION ROOSEVELT ROADS

Sample ID	BGMW01-04	BGMW01-06	BGMW02-05	BGMW02-08	BGMW03-03	BGMW03-04	BGMW03-04D	BGMW04-02	BGMW04-04
Sample Date	04/23/96	04/23/96	04/22/96	04/22/96	04/12/96	04/12/96	04/12/96	04/24/96	04/24/96
Depth Range (ft.)	8.0-10.0	12.0-14.0	10.0-12.0	16.0-18.0	6.0-8.0	8.0-10.0	8.0-10.0	4.0-6.0	8.0-10.0
SEMIVOLATILES (ug/kg) (cont.)									
Dibenzofuran	440 U	490 U	540 U	470 U	460 U	440 U	490 U	420 U	420 U
Diethylphthalate	440 U	490 U	540 U	470 U	460 U	440 U	490 U	420 U	420 U
Dimethylphthalate	440 U	490 U	540 U	470 U	460 U	440 U	490 U	420 U	420 U
Di-n-butylphthalate	440 U	490 U	320 J	470 U	460 U	440 U	490 U	420 U	420 U
Di-n-octylphthalate	440 U	490 U	540 U	470 U	460 U	440 U	490 U	420 U	420 U
Diphenylamine	440 U	490 U	540 U	470 U	460 U	440 U	490 U	420 U	420 U
Ethyl methanesulfonate	440 U	490 U	540 U	470 U	460 U	440 U	490 U	420 U	420 U
Fluoranthene	440 U	490 U	540 U	470 U	460 U	440 U	490 U	420 U	420 U
Fluorene	440 U	490 U	540 U	470 U	460 U	440 U	490 U	420 U	420 U
Hexachlorobenzene	440 U	490 U	540 U	470 U	460 U	440 U	490 U	420 U	420 U
Hexachlorobutadiene	440 U	490 U	540 U	470 U	460 U	440 U	490 U	420 U	420 U
Hexachlorocyclopentadiene	440 U	490 U	540 U	470 U	460 UJ	440 UJ	490 UJ	420 U	420 U
Hexachloroethane	440 U	490 U	540 U	470 U	460 U	440 U	490 U	420 U	420 U
Hexachlorophene	4,400 R	4,900 R	5,400 R	4,700 R	4,600 U	4,400 U	4,900 U	4,200 R	4,200 R
Hexachloropropene	2,200 U	2,400 U	2,700 U	2,300 U	2,300 U	2,200 U	2,400 U	2,100 U	2,100 U
Indeno(1,2,3-cd)pyrene	440 U	490 U	540 U	470 U	460 U	440 U	490 U	420 U	420 U
Isophorone	440 U	490 U	540 U	470 U	460 U	440 U	490 U	420 U	420 U
Isosafrole	440 U	490 U	540 U	470 U	460 U	440 U	490 U	420 U	420 U
m&p Cresol	440 U	490 U	540 U	470 U	460 U	440 U	490 U	420 U	420 U
Meta-Dinitrobenzene	880 U	980 U	1,100 U	940 U	910 U	880 U	970 U	840 U	850 U
Methapyrilene	1,100 UJ	1,200 UJ	1,300 UJ	1,200 UJ	1,100 U	1,100 U	1,200 U	1,000 UJ	1,000 UJ
Methyl methanesulfonate	440 U	490 U	540 U	470 U	460 U	440 U	490 U	420 U	420 U
Naphthalene	440 U	490 U	540 U	470 U	460 U	440 U	490 U	420 U	420 U
Nitrobenzene	440 U	490 U	540 U	470 U	460 U	440 U	490 U	420 U	420 U
N-Nitrosodiethylamine	440 U	490 U	540 U	470 U	460 U	440 U	490 U	420 U	420 U
N-Nitrosodimethylamine	440 UJ	490 UJ	540 UJ	470 UJ	460 U	440 U	490 U	420 UJ	420 UJ
N-Nitroso-di-n-butylamine	440 U	490 U	540 U	470 U	460 U	440 U	490 U	420 U	420 U
N-Nitroso-di-n-propylamine	440 U	490 U	540 U	470 U	460 U	440 U	490 U	420 U	420 U
N-Nitrosodiphenylamine (1)	440 U	490 U	540 U	470 U	460 U	440 U	490 U	420 U	420 U
N-Nitrosomethylethylamine	440 U	490 U	540 U	470 U	460 U	440 U	490 U	420 U	420 U
N-Nitrosomorpholine	880 U	980 U	1,100 U	940 U	910 U	880 U	970 U	840 U	850 U
N-Nitrosopiperidine	440 U	490 U	540 U	470 U	460 U	440 U	490 U	420 U	420 U
N-Nitrosopyrrolidine	2,200 U	2,400 U	2,700 U	2,300 U	2,300 U	2,200 U	2,400 U	2,100 U	2,100 U
o-Cresol	440 U	490 U	540 U	470 U	460 U	440 U	490 U	420 U	420 U

APPENDIX C. 3 (continued)

SUMMARY OF ANALYTICAL RESULTS, SUBSURFACE SOIL - ORGANICS
BACKGROUND
NAVAL STATION ROOSEVELT ROADS

Sample ID	BGMW01-04	BGMW01-06	BGMW02-05	BGMW02-08	BGMW03-03	BGMW03-04	BGMW03-04D	BGMW04-02	BGMW04-04
Sample Date	04/23/96	04/23/96	04/22/96	04/22/96	04/12/96	04/12/96	04/12/96	04/24/96	04/24/96
Depth Range (ft.)	8.0-10.0	12.0-14.0	10.0-12.0	16.0-18.0	6.0-8.0	8.0-10.0	8.0-10.0	4.0-6.0	8.0-10.0
SEMIVOLATILES (ug/kg) (cont.)									
o-Toluidine	440 R	490 R	540 R	470 R	460 U	440 U	490 U	420 R	420 R
p-Dimethylaminoazobenzene	880 UJ	980 UJ	1,100 UJ	940 UJ	910 U	880 U	970 U	840 UJ	850 UJ
Pentachlorobenzene	440 U	490 U	540 U	470 U	460 U	440 U	490 U	420 U	420 U
Pentachloronitrobenzene	440 U	490 U	540 U	470 U	460 R	440 R	490 R	420 U	420 U
Pentachlorophenol	2,200 U	2,400 U	2,700 U	2,300 U	2,300 U	2,200 U	2,400 U	2,100 U	2,100 U
Phenacetin	440 U	490 U	540 U	470 U	460 U	440 U	490 U	420 U	420 U
Phenanthrene	440 U	490 U	540 U	470 U	460 U	440 U	490 U	420 U	420 U
Phenol	440 U	490 U	540 U	470 U	460 U	440 U	490 U	420 U	420 U
p-Phenylenediamine	880 R	980 R	1,100 R	940 R	910 UJ	880 UJ	970 UJ	840 R	850 R
Pronamide	440 U	490 U	540 U	470 U	460 U	440 U	490 U	420 U	420 U
Pyrene	440 U	490 U	540 U	470 U	460 U	440 U	490 U	420 U	420 U
Pyridine	880 U	980 U	1,100 U	940 U	910 U	880 U	970 U	840 U	850 U
Safrole	440 U	490 U	540 U	470 U	460 U	440 U	490 U	420 U	420 U
sym-Trinitrobenzene	4,400 U	4,900 U	5,400 U	4,700 U	4,600 U	4,400 U	4,900 U	4,200 U	4,200 U

APPENDIX C. 3 (continued)

SUMMARY OF ANALYTICAL RESULTS, SUBSURFACE SOIL - ORGANICS
BACKGROUND
NAVAL STATION ROOSEVELT ROADS

Sample ID	BGMW01-04	BGMW01-06	BGMW02-05	BGMW02-08	BGMW03-03	BGMW03-04	BGMW03-04D	BGMW04-02	BGMW04-04
Sample Date	04/23/96	04/23/96	04/22/96	04/22/96	04/12/96	04/12/96	04/12/96	04/24/96	04/24/96
Depth Range (ft.)	8.0-10.0	12.0-14.0	10.0-12.0	16.0-18.0	6.0-8.0	8.0-10.0	8.0-10.0	4.0-6.0	8.0-10.0
PESTICIDES/PCBS (ug/kg)									
4,4'-DDD	10 U	12 U	13 U	11 U	11 U	11 U	12 U	10 U	10 U
4,4'-DDE	10 U	12 U	13 U	11 U	11 U	11 U	12 U	10 U	10 U
4,4'-DDT	10 U	12 U	13 U	11 U	11 U	11 U	12 U	10 U	10 U
Aldrin	5.3 U	5.8 U	6.4 U	5.6 U	5.4 U	5.5 U	6 U	5 U	5.3 U
alpha-BHC	5.3 U	5.8 U	6.4 U	5.6 U	5.4 U	5.5 U	6 U	5 U	5.3 U
alpha-Chlordane	53 U	58 U	64 U	56 U	54 U	55 U	60 U	50 U	53 U
beta-BHC	5.3 U	5.8 U	6.4 U	5.6 U	5.4 U	5.5 U	6 U	5 U	5.3 U
delta-BHC	5.3 U	5.8 U	6.4 U	5.6 U	5.4 U	5.5 U	6 U	5 U	5.3 U
Dieldrin	10 U	12 U	13 U	11 U	11 U	11 U	12 U	10 U	10 U
Endosulfan I	5.3 U	5.8 U	6.4 U	5.6 U	5.4 U	5.5 U	6 U	5 U	5.3 U
Endosulfan II	10 U	12 U	13 U	11 U	11 U	11 U	12 U	10 U	10 U
Endosulfan sulfate	10 U	12 U	13 U	11 U	11 U	11 U	12 U	10 U	10 U
Endrin	10 U	12 U	13 U	11 U	11 U	11 U	12 U	10 U	10 U
Endrin aldehyde	10 U	12 U	13 U	11 U	11 U	11 U	12 U	10 U	10 U
gamma-BHC (Lindane)	5.3 U	5.8 U	6.4 U	5.6 U	5.4 U	5.5 U	6 U	5 U	5.3 U
gamma-Chlordane	53 U	58 U	64 U	56 U	54 U	55 U	60 U	50 U	53 U
Heptachlor	5.3 U	5.8 U	6.4 U	5.6 U	5.4 U	5.5 U	6 U	5 U	5.3 U
Heptachlor epoxide	5.3 U	5.8 U	6.4 U	5.6 U	5.4 U	5.5 U	6 U	5 U	5.3 U
Isodrin	5.3 U	5.8 U	6.4 U	5.6 U	5.4 U	5.5 U	6 U	5 U	5.3 U
Kepone	10 U	12 U	13 U	11 U	11 UJ	11 UJ	12 UJ	10 U	10 U
Methoxychlor	53 U	58 U	64 U	56 U	54 U	55 U	60 U	50 U	53 U
Toxaphene	100 U	120 U	130 U	110 U	110 U	110 U	120 U	100 U	100 U
Aroclor-1016	53 U	58 U	64 U	56 U	54 U	55 U	60 U	50 U	53 U
Aroclor-1221	53 U	58 U	64 U	56 U	54 U	55 U	60 U	50 U	53 U
Aroclor-1232	53 U	58 U	64 U	56 U	54 U	55 U	60 U	50 U	53 U
Aroclor-1242	53 U	58 U	64 U	56 U	54 U	55 U	60 U	50 U	53 U
Aroclor-1248	53 U	58 U	64 U	56 U	54 U	55 U	60 U	50 U	53 U
Aroclor-1254	100 U	120 U	130 U	110 U	110 U	110 U	120 U	100 U	100 U
Aroclor-1260	100 U	120 U	130 U	110 U	110 U	110 U	120 U	100 U	100 U

APPENDIX C. 3 (continued)

SUMMARY OF ANALYTICAL RESULTS, SUBSURFACE SOIL - ORGANICS
BACKGROUND
NAVAL STATION ROOSEVELT ROADS

Sample ID	BGMW01-04	BGMW01-06	BGMW02-05	BGMW02-08	BGMW03-03	BGMW03-04	BGMW03-04D	BGMW04-02	BGMW04-04
Sample Date	04/23/96	04/23/96	04/22/96	04/22/96	04/12/96	04/12/96	04/12/96	04/24/96	04/24/96
Depth Range (ft.)	8.0-10.0	12.0-14.0	10.0-12.0	16.0-18.0	6.0-8.0	8.0-10.0	8.0-10.0	4.0-6.0	8.0-10.0
HERBICIDES (ug/kg)									
2,4,5-TP (Silvex)	44 U	48 U	53 U	47 U	46 U	45 U	50 U	42 U	45 U
2,4,5-T	44 U	27 J	53 U	47 U	46 U	45 U	50 U	42 U	45 U
2,4-D	440 U	480 U	530 U	470 U	460 U	450 U	500 U	420 U	450 U
O-PEST (ug/kg)									
O,O,O-Triethylphosphorothioate	89 U	98 U	110 U	93 U	92 U	91 U	99 U	84 U	90 U
Phorate	89 U	98 U	110 U	93 U	92 U	91 U	99 U	84 U	90 U
Thionazin	89 U	98 U	110 U	93 U	92 U	91 U	99 U	84 U	90 U
Disulfoton	89 U	98 U	110 U	93 U	92 U	91 U	99 U	84 U	90 U
Sulfotepp	89 U	98 U	110 U	93 U	92 U	91 U	99 U	84 U	90 U
Dimethoate	89 U	98 U	110 U	93 U	92 U	91 U	99 U	84 U	90 U
Methyl parathion	89 U	98 U	110 U	93 U	92 U	91 U	99 U	84 U	90 U
Parathion	89 U	98 U	110 U	93 U	92 U	91 U	99 U	84 U	90 U
Famphur	89 U	98 U	110 U	93 U	92 U	91 U	99 U	84 U	90 U
DIOXINS (ug/kg)									
2,3,7,8-TCDD	0.11 U	0.11 U	0.13 U	0.1 U	0.22 U	0.26 U	0.24 U	0.38 U	0.24 U
Total TCDF	0.1 U	0.14 U	0.17 U	0.1 U	0.22 U	0.21 U	0.32 U	0.32 U	0.34 U
Total PeCDF	0.16 U	0.2 U	0.21 U	0.15 U	0.26 U	0.33 U	0.33 U	0.48 U	0.39 U
Total HxCDD	0.14 U	0.23 U	0.3 U	0.13 U	0.31 J	0.26 U	0.38 U	0.35 U	0.42 U
Total PeCDD	0.16 U	0.28 U	0.29 U	0.22 U	0.32 U	0.39 U	0.38 U	0.47 U	0.47 U
Total TCDD	0.11 U	0.11 U	0.13 U	0.1 U	0.22 U	0.26 U	0.24 U	0.38 U	0.24 U
Total HxCDF	0.12 U	0.19 U	0.16 U	0.09 U	0.25 U	0.29 U	0.26 U	0.34 U	0.39 U

APPENDIX C. 4

SUMMARY OF ANALYTICAL RESULTS, SUBSURFACE SOIL - INORGANICS
BACKGROUND
NAVAL STATION ROOSEVELT ROADS, PUERTO RICO

Sample ID	BGMW01-04	BGMW01-06	BGMW02-05	BGMW02-08	BGMW03-03	BGMW03-04	BGMW03-04D	BGMW04-02	BGMW04-04
Sample Date	04/23/96	04/23/96	04/22/96	04/22/96	04/12/96	04/12/96	04/12/96	04/24/96	04/24/96
Depth Range (ft.)	8.0-10.0	12.0-14.0	10.0-12.0	16.0-18.0	6.0-8.0	8.0-10.0	8.0-10.0	4.0-6.0	8.0-10.0
Inorganics, Total (mg/kg)									
Antimony	2.6 R	3 R	3.4 R	2.8 R	2.8 UJ	2.8 UJ	3 UJ	2.6 R	2.7 R
Arsenic	1.7	0.22 UJ	0.71 J	1	2.4 J	0.76 J	0.94 J	0.72	0.79
Barium	13 J	243 J	178 J	178 J	9.7	3.5	10	246 J	17.3 J
Beryllium	0.29	0.7	0.37	0.74	0.15	0.25	0.26	0.33	0.13
Cadmium	0.46	0.44	0.4 U	0.62	0.33 UJ	0.33 UJ	0.36 UJ	0.48	0.43
Chromium	101 J	84.1 J	148 J	29.1 J	58.9 R	63.6 R	45.9 R	34.7 J	10.9 J
Cobalt	3.7	14	15.7	42.4	2	4.3	3.8	33.8	4.1
Copper	65.3	120	144	131	72.9 R	94.5 R	90.1 R	107	37.6
Lead	4.8	4.9	3.3	2.6	4.1 J	3.4 J	2.4 J	5	6.6
Mercury	0.05 U	0.06 U	0.06 U	0.05 U	0.06 UJ	0.17 J	0.25 J	0.06 U	0.06 U
Nickel	7.2	39.9	35.6	23	3.7	5.8	5.7	10.2	2.2
Selenium	0.22 J	0.17 UJ	0.19 UJ	0.16 UJ	1.2 J	0.3 UJ	0.32 UJ	0.37 J	0.16 UJ
Silver	0.42 U	0.48 U	0.55 U	0.46 U	0.46 U	0.45 U	0.9	0.42 U	0.43 U
Sulfide	30.4 U	32.7 U	36.1 U	33.6 U	33.1 U	33.9 U	37.8 U	28.3 U	32.5 U
Thallium	0.59 UJ	0.13 UJ	0.15 UJ	0.13 UJ	0.11 UJ	0.11 UJ	0.11 UJ	0.12 UJ	0.12 UJ
Tin	1.4 UJ	3.1 J	1.9 UJ	3.4 J	1.5 UJ	1.5 UJ	1.7 UJ	1.4 UJ	1.5 J
Vanadium	206	256	373	232	204	260	236	234	83.9
Zinc	24.1 J	64.6 J	55.7 J	98.5 J	14 J	23 J	20.1 J	56.2 J	18.4 J
Cyanide	0.57 U	0.7 U	0.76 U	0.69 U	0.46 U	0.61 U	0.69 U	0.59 U	0.64 U

APPENDIX C. 5

SUMMARY OF ANALYTICAL RESULTS, GROUNDWATER - ORGANICS
BACKGROUND
NAVAL STATION ROOSEVELT ROADS, PUERTO RICO

Sample ID	BGMW01	BGMW02	BGMW03	BGMW04
Sample Date	04/27/96	04/27/96	04/16/96	04/27/96
VOLATILES (ug/l)				
1,1,1,2-Tetrachloroethane	10 U	10 U	10 U	10 U
1,1,1-Trichloroethane	5 U	5 U	5 U	5 U
1,1,2,2-Tetrachloroethane	5 UJ	5 UJ	5 U	5 U
1,1,2-Trichloroethane	5 U	5 U	5 U	5 U
1,1-Dichloroethane	5 U	5 U	5 U	5 U
1,1-Dichloroethene	5 U	5 U	5 U	5 U
1,2,3-Trichloropropane	10 UJ	10 UJ	10 U	10 U
1,2-Dibromo-3-chloropropane	20 UJ	20 UJ	20 U	20 U
1,2-Dibromoethane	20 UJ	20 UJ	20 U	20 U
1,2-Dichloroethane	5 U	5 U	5 U	5 U
1,2-Dichloroethene (Total)	5 U	5 U	5 U	5 U
1,2-Dichloropropane	5 U	5 U	5 U	5 U
2-Butanone	10 UJ	10 UJ	10 U	10 U
2-Chloro-1,3-butadiene	100 U	100 U	100 U	100 U
2-Hexanone	10 UJ	10 UJ	10 U	10 U
3-Chloropropene	20 U	20 U	20 U	20 U
4-Methyl-2-pentanone	10 UJ	10 UJ	10 U	10 U
Acetone	10 UJ	10 UJ	10 U	10 UJ
Acetonitrile	100 UJ	100 UJ	100 U	100 U
Acrolein	500 UJ	500 UJ	500 U	500 U
Acrylonitrile	100 UJ	100 UJ	100 U	100 UJ
Benzene	5 U	5 U	5 U	5 U
Bromodichloromethane	5 U	5 U	5 U	5 U
Bromoform	5 U	5 U	5 U	5 U
Bromomethane	10 U	10 U	10 U	10 U
Carbon disulfide	5 U	5 U	5 U	5 UJ
Carbon tetrachloride	5 U	5 U	5 U	5 U
Chlorobenzene	5 U	5 U	5 U	5 U
Chloroethane	10 U	10 U	10 U	10 U
Chloroform	5 U	5 U	5 U	5 U
Chloromethane	10 U	10 U	10 U	10 U
cis-1,3-Dichloropropene	5 U	5 U	5 U	5 U
Dibromochloromethane	5 U	5 U	5 U	5 U
Dibromomethane	10 U	10 U	10 U	10 U

APPENDIX C. 5

SUMMARY OF ANALYTICAL RESULTS, GROUNDWATER - ORGANICS
BACKGROUND
NAVAL STATION ROOSEVELT ROADS, PUERTO RICO

Sample ID	BGMW01	BGMW02	BGMW03	BGMW04
Sample Date	04/27/96	04/27/96	04/16/96	04/27/96
VOLATILES (ug/l) (cont.)				
Dichlorodifluoromethane	20 U	20 U	20 UJ	20 U
Ethyl methacrylate	20 UJ	20 UJ	20 U	20 UJ
Ethylbenzene	5 U	5 U	5 U	5 U
Iodomethane	10 U	10 U	10 U	10 U
Isobutanol	2,000 R	2,000 R	2,000 R	2,000 R
Methacrylonitrile	20 UJ	20 UJ	20 U	20 U
Methyl methacrylate	20 UJ	20 UJ	20 U	20 U
Methylene chloride	5 U	5 U	5 U	5 U
Pentachloroethane	20 U	20 U	20 U	20 U
Propionitrile	50 R	50 R	50 R	50 R
Styrene	5 U	5 U	5 U	5 U
Tetrachloroethene	5 U	5 U	5 U	5 U
Toluene	5 U	5 U	5 U	5 U
trans-1,3-Dichloropropene	5 U	5 U	5 U	5 U
trans-1,4-Dichloro-2-butene	20 UJ	20 UJ	20 U	20 U
Trichloroethene	5 U	5 U	5 U	5 U
Trichlorofluoromethane	10 UJ	10 UJ	10 U	10 U
Vinyl Acetate	10 UJ	10 UJ	10 UJ	10 UJ
Vinyl chloride	10 U	10 U	10 U	10 U
Xylene (total)	5 U	5 U	5 U	5 U

APPENDIX C. 5

SUMMARY OF ANALYTICAL RESULTS, GROUNDWATER - ORGANICS
BACKGROUND
NAVAL STATION ROOSEVELT ROADS, PUERTO RICO

Sample ID	BGMW01	BGMW02	BGMW03	BGMW04
Sample Date	04/27/96	04/27/96	04/16/96	04/27/96
SEMIVOLATILES (ug/l)				
1,2,4,5-Tetrachlorobenzene	11 U	10 U	10 U	10 U
1,2,4-Trichlorobenzene	11 U	10 U	10 U	10 U
1,2-Dichlorobenzene	11 U	10 U	10 U	10 U
1,2-Diphenylhydrazine	11 U	10 U	10 U	10 U
1,3-Dichlorobenzene	11 U	10 U	10 U	10 U
1,4-Dichlorobenzene	11 U	10 U	10 U	10 U
1,4-Dioxane	22 R	21 R	21 U	19 UJ
1,4-Naphthoquinone	54 UJ	53 UJ	52 UJ	48 UJ
1-Naphthylamine	22 U	21 U	21 U	10 U
2,2'-Oxybis(1-Chloropropane)	11 U	10 U	10 U	10 U
2,3,4,6-Tetrachlorophenol	11 U	10 U	10 U	10 UJ
2,4,5-Trichlorophenol	54 U	53 U	52 U	48 U
2,4,6-Trichlorophenol	11 U	10 U	10 U	10 U
2,4-Dichlorophenol	11 U	10 U	10 U	10 U
2,4-Dimethylphenol	11 U	10 U	10 U	10 U
2,4-Dinitrophenol	54 U	53 U	52 R	48 U
2,4-Dinitrotoluene	11 U	10 U	10 U	10 UJ
2,6-Dichlorophenol	11 U	10 U	10 U	10 U
2,6-Dinitrotoluene	11 U	10 U	10 U	10 U
2-Acetylaminofluorene	22 U	21 U	21 U	19 U
2-Chloronaphthalene	11 U	10 U	10 U	10 U
2-Chlorophenol	11 U	10 U	10 U	10 U
2-Methylnaphthalene	11 U	10 U	10 U	10 U
2-Naphthylamine	27 U	26 U	26 U	10 U
2-Nitroaniline	54 U	53 U	52 U	48 U
2-Nitrophenol	11 U	10 U	10 U	10 U
2-Picoline	11 UJ	10 UJ	10 U	10 UJ
2-sec-butyl-4,6-dinitrophenol	22 UJ	21 UJ	21 U	19 UJ
3,3'-Dichlorobenzidine	22 U	21 U	21 U	19 U
3,3'-Dimethylbenzidine	54 U	53 U	52 R	19 U
3-Methylcholanthrene	11 U	10 U	10 U	10 UJ
3-Nitroaniline	54 U	53 U	52 U	48 U
4,6-Dinitro-2-methylphenol	54 U	53 U	52 UJ	48 U
4-Aminobiphenyl	22 U	21 U	21 U	10 U

APPENDIX C. 5

SUMMARY OF ANALYTICAL RESULTS, GROUNDWATER - ORGANICS
BACKGROUND
NAVAL STATION ROOSEVELT ROADS, PUERTO RICO

Sample ID	BGMW01	BGMW02	BGMW03	BGMW04
Sample Date	04/27/96	04/27/96	04/16/96	04/27/96
SEMIVOLATILES (ug/l) (cont.)				
4-Bromophenyl phenyl ether	11 U	10 U	10 U	10 U
4-Chloro-3-methylphenol	22 U	21 U	21 U	19 U
4-Chloroaniline	22 U	21 U	21 U	19 U
4-Chlorophenyl phenyl ether	11 U	10 U	10 U	10 U
4-Nitroaniline	54 U	53 U	52 U	48 U
4-Nitrophenol	54 U	53 U	52 UJ	48 U
4-Nitroquinoline-1-oxide	54 R	53 R	52 R	48 UJ
5-Nitro-o-toluidine	22 U	21 U	21 U	19 UJ
7,12-Dimethylbenz(a)anthracene	22 U	21 U	21 U	19 UJ
Acenaphthene	11 U	10 U	10 U	10 U
Acenaphthylene	11 U	10 U	10 U	10 U
Acetophenone	11 U	10 U	1 J	10 U
alpha, alpha-Dimethylphenethylamine	54 UJ	53 UJ	52 UJ	48 U
Aniline	54 U	53 U	52 UJ	48 U
Anthracene	11 U	10 U	10 U	10 UJ
Aramite	22 UJ	21 UJ	21 U	19 UJ
Benzidine	110 UJ	100 UJ	100 U	97 UJ
Benzo(a)anthracene	11 U	10 U	10 U	10 U
Benzo(a)pyrene	11 U	10 U	10 U	10 U
Benzo(b)fluoranthene	11 U	10 U	10 U	10 U
Benzo(g,h,i)perylene	11 U	10 U	10 U	10 U
Benzo(k)fluoranthene	11 U	10 U	10 U	10 U
Benzoic acid	54 U	53 U	52 U	48 U
Benzyl alcohol	11 U	10 U	10 UJ	10 UJ
Bis(2-chloroethoxy)methane	11 U	10 U	10 U	10 U
Bis(2-chloroethyl)ether	11 U	10 U	10 U	10 U
Bis(2-ethylhexyl)phthalate	11 U	10 U	7 J	10 U
Butylbenzylphthalate	11 U	10 U	10 U	10 U
Carbazole	11 U	10 U	10 U	10 U
Chlorobenzilate	11 U	10 U	10 U	10 UJ
Chrysene	11 U	10 U	10 U	10 U
Diallate	11 U	10 U	10 UJ	10 UJ
Dibenzo(a,h)anthracene	11 U	10 U	10 U	10 U
Dibenzofuran	11 U	10 U	10 U	10 U

APPENDIX C. 5

SUMMARY OF ANALYTICAL RESULTS, GROUNDWATER - ORGANICS
BACKGROUND
NAVAL STATION ROOSEVELT ROADS, PUERTO RICO

Sample ID	BGMW01	BGMW02	BGMW03	BGMW04
Sample Date	04/27/96	04/27/96	04/16/96	04/27/96
SEMIVOLATILES (ug/l) (cont.)				
Diethylphthalate	11 U	10 U	10 U	10 U
Dimethylphthalate	11 U	1 J	3 J	10 U
Di-n-butylphthalate	11 U	10 U	10 U	10 U
Di-n-octylphthalate	11 U	10 U	10 U	10 U
Diphenylamine	11 UJ	10 UJ	10 U	10 U
Ethyl methanesulfonate	11 U	10 U	10 U	10 U
Fluoranthene	11 U	10 U	10 U	10 U
Fluorene	11 U	10 U	10 U	10 U
Hexachlorobenzene	11 U	10 U	10 U	10 U
Hexachlorobutadiene	11 U	10 U	10 U	10 U
Hexachlorocyclopentadiene	11 U	10 U	10 U	10 U
Hexachloroethane	11 U	10 U	10 U	10 U
Hexachlorophene	110 U	100 U	100 UJ	97 R
Hexachloropropene	54 UJ	53 UJ	52 U	19 U
Indeno(1,2,3-cd)pyrene	11 U	10 U	10 U	10 U
Isophorone	11 U	10 U	10 U	10 U
Isosafrole	11 U	10 U	10 U	10 U
m&p Cresol	11 U	10 U	10 U	10 U
Meta-Dinitrobenzene	22 UJ	21 UJ	21 U	19 U
Methapyrilene	27 U	26 U	26 UJ	24 U
Methyl methanesulfonate	11 U	10 U	10 U	10 U
Naphthalene	11 U	10 U	10 U	10 U
Nitrobenzene	11 U	10 U	10 U	10 U
N-Nitrosodiethylamine	11 UJ	10 UJ	10 U	10 U
N-Nitrosodimethylamine	11 U	10 U	10 U	10 U
N-Nitroso-di-n-butylamine	11 UJ	10 UJ	10 U	10 UJ
N-Nitroso-di-n-propylamine	11 U	10 U	10 U	10 UJ
N-Nitrosodiphenylamine (1)	11 U	10 U	10 U	10 U
N-Nitrosomethylethylamine	11 U	10 U	10 U	10 U
N-Nitrosomorpholine	22 UJ	21 UJ	21 U	19 UJ
N-Nitrosopiperidine	11 U	10 U	10 U	10 U
N-Nitrosopyrrolidine	54 UJ	53 UJ	52 U	48 UJ
o-Cresol	11 U	10 U	10 U	10 U
o-Toluidine	11 U	10 U	10 UJ	10 U

APPENDIX C. 5

SUMMARY OF ANALYTICAL RESULTS, GROUNDWATER - ORGANICS
BACKGROUND
NAVAL STATION ROOSEVELT ROADS, PUERTO RICO

Sample ID	BGMW01	BGMW02	BGMW03	BGMW04
Sample Date	04/27/96	04/27/96	04/16/96	04/27/96
SEMIVOLATILES (ug/l) (cont.)				
p-Dimethylaminoazobenzene	22 U	21 U	21 U	19 U
Pentachlorobenzene	11 U	10 U	10 U	10 U
Pentachloronitrobenzene	11 UJ	10 UJ	10 U	10 U
Pentachlorophenol	54 U	53 U	52 U	48 U
Phenacetin	11 U	10 U	10 U	10 U
Phenanthrene	11 U	10 U	10 U	10 UJ
Phenol	11 U	10 U	10 U	10 U
p-Phenylenediamine	22 R	21 R	21 R	19 R
Pronamide	11 U	10 U	10 U	10 U
Pyrene	11 U	10 U	10 U	10 UJ
Pyridine	22 U	21 U	21 U	19 U
Safrole	11 U	10 U	10 U	10 U
sym-Trinitrobenzene	110 UJ	100 UJ	100 UJ	97 U

APPENDIX C. 5

SUMMARY OF ANALYTICAL RESULTS, GROUNDWATER - ORGANICS
BACKGROUND
NAVAL STATION ROOSEVELT ROADS, PUERTO RICO

Sample ID	BGMW01	BGMW02	BGMW03	BGMW04
Sample Date	04/27/96	04/27/96	04/16/96	04/27/96
PESTICIDES/PCBS (ug/l)				
4,4'-DDD	0.1 U	0.1 U	0.1 U	0.11 U
4,4'-DDE	0.1 U	0.1 U	0.1 U	0.11 U
4,4'-DDT	0.1 U	0.1 U	0.1 U	0.11 U
Aldrin	0.052 U	0.052 U	0.052 U	0.053 U
alpha-BHC	0.052 U	0.052 U	0.052 U	0.053 U
alpha-Chlordane	0.52 U	0.52 U	0.52 U	0.53 U
beta-BHC	0.052 U	0.052 U	0.052 U	0.053 U
delta-BHC	0.052 U	0.052 U	0.052 U	0.053 U
Dieldrin	0.1 U	0.1 U	0.1 U	0.11 U
Endosulfan I	0.052 U	0.052 U	0.052 U	0.053 U
Endosulfan II	0.1 U	0.1 U	0.1 U	0.11 U
Endosulfan sulfate	0.1 U	0.1 U	0.1 UJ	0.11 U
Endrin	0.1 U	0.1 U	0.1 U	0.11 U
Endrin aldehyde	0.1 U	0.1 U	0.1 U	0.11 U
gamma-BHC (Lindane)	0.052 U	0.052 U	0.052 U	0.053 U
gamma-Chlordane	0.52 U	0.52 U	0.52 U	0.53 U
Heptachlor	0.052 U	0.052 U	0.052 U	0.053 U
Heptachlor epoxide	0.052 U	0.052 U	0.052 U	0.053 U
Isodrin	0.052 U	0.052 U	0.052 U	0.053 U
Kepone	0.1 U	0.1 U	0.1 UJ	0.11 U
Methoxychlor	0.52 U	0.52 U	0.52 U	0.53 U
Toxaphene	1 U	1 U	1 U	1.1 U
Aroclor-1016	0.52 U	0.52 U	0.52 U	0.53 U
Aroclor-1221	0.52 U	0.52 U	0.52 U	0.53 U
Aroclor-1232	0.52 U	0.52 U	0.52 U	0.53 U
Aroclor-1242	0.52 U	0.52 U	0.52 U	0.53 U
Aroclor-1248	0.52 U	0.52 U	0.52 U	0.53 U
Aroclor-1254	1 U	1 U	1 U	1.1 U
Aroclor-1260	1 U	1 U	1 U	1.1 U

APPENDIX C. 5

SUMMARY OF ANALYTICAL RESULTS, GROUNDWATER - ORGANICS
BACKGROUND
NAVAL STATION ROOSEVELT ROADS, PUERTO RICO

Sample ID	BGMW01	BGMW02	BGMW03	BGMW04
Sample Date	04/27/96	04/27/96	04/16/96	04/27/96
HERBICIDES (ug/l)				
2,4-D	1.1 U	1.1 U	1.1 U	1.1 U
2,4,5-T	0.11 U	0.11 U	0.11 U	0.11 U
2,4,5-TP (Silvex)	0.11 U	0.11 U	0.11 U	0.11 U
O-PEST (ug/l)				
Dimethoate	2.1 UJ	2.1 UJ	2 UJ	2.2 UJ
Disulfoton	2.1 UJ	2.1 UJ	2 UJ	2.2 UJ
Famphur	2.1 UJ	2.1 UJ	2 UJ	2.2 UJ
Methyl parathion	2.1 UJ	2.1 UJ	2 UJ	2.2 UJ
O,O,O-Triethylphosphorothioate	2.1 UJ	2.1 UJ	2 UJ	2.2 UJ
Parathion	2.1 UJ	2.1 UJ	2 UJ	2.2 UJ
Phorate	2.1 UJ	2.1 UJ	2 UJ	2.2 UJ
Sulfotepp	2.1 UJ	2.1 UJ	2 UJ	2.2 UJ
Thionazin	2.1 UJ	2.1 UJ	2 UJ	2.2 UJ
DIOXINS (ug/l)				
2,3,7,8-TCDD	0.0018 U	0.0017 U	0.0014 U	0.0024 U
Total HxCDD	0.0018 U	0.002 U	0.0021 U	0.0032 U
Total HxCDF	0.0021 U	0.0019 U	0.0017 U	0.0021 U
Total PeCDD	0.0036 U	0.0034 U	0.0033 U	0.0041 U
Total PeCDF	0.0027 U	0.0023 U	0.0024 U	0.0024 U
Total TCDD	0.0018 U	0.0017 U	0.0014 U	0.0024 U
Total TCDF	0.002 U	0.0019 U	0.0014 U	0.0021 U
TPH (ug/l)				
Gasoline Range Organics	NA	NA	30 U	NA

APPENDIX C. 6 (continued)

SUMMARY OF ANALYTICAL RESULTS, GROUNDWATER - INORGANICS (DISSOLVED)
BACKGROUND
NAVAL STATION ROOSEVELT ROADS, PUERTO RICO

Sample ID	BGMW01	BGMW02	BGMW03	BGMW04
Sample Date	04/27/96	04/27/96	04/16/96	04/27/96
Inorganics, Dissolved (ug/l)				
Antimony	24.6 UJ	24.6 UJ	24.6 UJ	24.6 UJ
Arsenic	1.8 U	1.8 U	1.2 UJ	1.8 U
Barium	82	148	121	126
Beryllium	1.1 U	1.1 U	1.1 U	1.1 U
Cadmium	2.9 U	2.9 U	2.9 U	2.9 U
Chromium	2.6 U	2.6 U	3.7	2.6 U
Cobalt	59.4	44.4	11.5	3.9 U
Copper	32	2.2 U	2.2 U	2.2 U
Lead	0.9 UJ	0.9 UJ	1.2 U	0.9 UJ
Mercury	0.1 U	0.1 U	0.1 U	0.1 U
Nickel	34.1	35.6	11.1 U	11.1 U
Selenium	2.8 UJ	1.4 UJ	1.4 UJ	1.4 UJ
Silver	4 U	4 U	4 U	4 U
Thallium	1.6 U	1.6 U	1 U	1.6 U
Tin	13.5 U	13.5 U	13.5 U	13.5 U
Vanadium	2.6 U	2.6 U	2.6 U	8.1
Zinc	82.6	60.6	4.4 J	3.8

APPENDIX E
BLASLAND, BOUCK AND LEE UST SITE CHARACTERIZATION ANALYTICAL DATA

APPENDIX D. 1
BLASLAND, BOUCK AND LEE
UST SITE CHARACTERIZATION
SOIL ANALYTICAL RESULTS - ORGANIC COMPOUNDS
ROOSEVELT ROADS, CEIBA, PUERTO RICO

SAMP_ID	1983-SB3-04	1983-SB4-05	1983-SB6-03	1983-SB6-03D	1983-SB6-05	1983-SB7-06
SAMP_DATE	5/10/94	5/3/94	3/2/94	3/9/94	5/3/94	5/3/94
SAMP_DEPTH	6-8	8-10	4-6	4-6	8-10	10-12
BBL-VOC (ug/kg)						
1,1,1-Trichloroethane	5 U	5 U	1300 U	6.2 U	31 U	5 U
1,1,2,2-Tetrachloroethane	5 U	5 U	1300 U	6.2 U	31 U	5 U
1,1,2-Trichloroethane	5 U	5 U	1300 U	6.2 U	31 U	5 U
1,1-Dichloroethane	5 U	5 U	1300 U	6.2 U	31 U	5 U
1,1-Dichloroethylene	5 U	5 U	1300 U	6.2 U	31 U	5 U
1,2-Dichloroethane	5 U	5 U	1300 U	6.2 U	31 U	5 U
1,2-Dichloropropane	5 U	5 U	1300 U	6.2 U	31 U	5 U
2-Butanone (MEK)	50 U	50 U	13000 U	62 U	310 U	50 U
2-Chloroethylvinyl Ether	50 UJ	50 UJ	13000 U	62 U	310 UJ	50 UJ
2-Hexanone	50 U	50 U	13000 U	62 U	310 U	50 U
4-Methyl-2-Pentanone	50 U	50 U	13000 U	62 U	310 U	50 U
Acetone	50 U	50 U	13000 U	62 U	310 U	50 U
Benzene	5 U	5 U	1300 U	6.2 U	31 U	5 U
Bromodichloromethane	5 U	5 U	1300 U	6.2 U	31 U	5 U
Bromoform	5 U	5 U	1300 U	6.2 U	31 U	5 U
Bromomethane	10 U	10 U	2700 U	12 U	62 U	10 U
Carbon Disulfide	5 U	5 U	1300 U	6.2 U	31 U	5 U
Carbon Tetrachloride	5 U	5 U	1300 U	6.2 U	31 U	5 U
Chlorobenzene	5 U	5 U	1300 U	6.2 U	31 U	5 U
Chloroethane	10 U	10 U	2700 U	12 U	62 U	10 U
Chloroform	5 U	5 U	1300 U	6.2 U	31 U	5 U
Chloromethane	10 U	10 U	2700 U	12 U	62 U	10 U
Dibromochloromethane	5 U	5 U	1300 U	6.2 U	31 U	5 U
Ethylbenzene	5 U	5 U	1300 U	6.2 U	31 U	5 U
Methylene Chloride	5 U	5 U	1300 U	6.2 U	31 U	5 U
Styrene	5 U	5 U	1300 U	6.2 U	31 U	5 U
Tetrachloroethene	5 U	5 U	1300 U	6.2 U	31 U	5 U
Toluene	5 U	5 U	1300 U	6.2 U	31 U	5 U
Trichloroethylene	5 U	5 U	1300 U	6.2 U	31 U	5 U
Vinyl Acetate	10 U	10 U	2700 U	12 U	62 U	10 U
Vinyl Chloride	10 U	10 U	2700 U	12 U	62 U	10 U
Xylenes	5 U	5 U	1300 U	6.2 U	31 U	5 U
cis-1,3-Dichloropropene	5 U	5 U	1300 U	6.2 U	31 U	5 U
trans-1,2-Dichloroethylene	5 U	5 U	1300 U	6.2 U	31 U	5 U
trans-1,3-Dichloropropene	5 U	5 U	1300 U	6.2 U	31 U	5 U
BBL-SVOC (ug/kg)						
1,2,4-Trichlorobenzene	330 U	330 U	3300 U	330 U	NA	330 U
1,2-Dichlorobenzene	330 U	330 U	3300 U	330 U	NA	330 U
1,3-Dichlorobenzene	330 U	330 U	3300 U	330 U	NA	330 U
1,4-Dichlorobenzene	330 U	330 U	3300 U	330 U	NA	330 U

APPENDIX D. 1
BLASLAND, BOUCK AND LEE
UST SITE CHARACTERIZATION
SOIL ANALYTICAL RESULTS - ORGANIC COMPOUNDS
ROOSEVELT ROADS, CEIBA, PUERTO RICO

SAMP_ID	1983-SB3-04	1983-SB4-05	1983-SB6-03	1983-SB6-03D	1983-SB6-05	1983-SB7-06
SAMP_DATE	5/10/94	5/3/94	3/2/94	3/9/94	5/3/94	5/3/94
SAMP_DEPTH	6-8	8-10	4-6	4-6	8-10	10-12
2,4,5-Trichlorophenol	330 U	330 U	3300 U	330 U	NA	330 U
2,4,6-Trichlorophenol	330 U	330 U	3300 U	330 U	NA	330 U
2,4-Dichlorophenol	330 U	330 U	3300 U	330 U	NA	330 U
2,4-Dimethylphenol	330 U	330 U	3300 U	330 U	NA	330 U
2,4-Dinitrophenol	1700 U	1700 U	17000 U	1700 U	NA	1700 U
2,4-Dintrotoluene	330 U	330 U	3300 U	330 U	NA	330 U
2,6-Dinitrotoluene	330 U	330 U	3300 U	330 U	NA	330 U
2-Chloronaphthalene	330 U	330 U	3300 U	330 U	NA	330 U
2-Chlorophenol	330 U	330 U	3300 U	330 U	NA	330 U
2-Methyl-4,6-dinitrophenol	1700 U	1700 U	17000 U	1700 U	NA	1700 U
2-Methylnaphthalene	330 U	330 U	64000	330 U	NA	330 U
2-Nitroaniline	1700 U	1700 U	17000 U	1700 U	NA	1700 U
2-Nitrophenol	330 U	330 U	3300 U	330 U	NA	330 U
3,3-Dichlorobenzidine	660 U	660 U	6600 U	660 U	NA	660 U
3-Nitroaniline	1700 U	1700 U	17000 U	1700 U	NA	1700 U
4-Bromophenyl phenyl ether	330 U	330 U	3300 U	330 U	NA	330 U
4-Chloro-3-methylphenol	330 U	330 U	3300 U	330 U	NA	330 U
4-Chloroaniline	660 U	660 U	6600 U	660 U	NA	660 U
4-Chlorophenyl phenyl ether	330 U	330 U	3300 U	330 U	NA	330 U
4-Nitroaniline	1700 U	1700 U	17000 U	1700 U	NA	1700 U
4-Nitrophenol	1700 U	1700 U	17000 U	1700 U	NA	1700 U
Acenaphthene	330 U	330 U	3400	330 U	NA	330 U
Acenaphthylene	330 U	330 U	3300 U	330 U	NA	330 U
Anthracene	330 U	330 U	3300 U	330 U	NA	330 U
Benzidine	2700 U	2700 U	27000 U	2700 U	NA	2700 U
Benzo(a)anthracene	330 U	330 U	3300 U	330 U	NA	330 U
Benzo(a)pyrene	330 U	330 U	3300 U	330 U	NA	330 U
Benzo(b)fluoranthene	330 U	330 U	3300 U	330 U	NA	330 U
Benzo(g,h,i)perylene	330 U	330 U	3300 U	330 U	NA	330 U

APPENDIX D. 1
BLASLAND, BOUCK AND LEE
UST SITE CHARACTERIZATION
SOIL ANALYTICAL RESULTS - ORGANIC COMPOUNDS
ROOSEVELT ROADS, CEIBA, PUERTO RICO

SAMP_ID	1983-SB3-04	1983-SB4-05	1983-SB6-03	1983-SB6-03D	1983-SB6-05	1983-SB7-06
SAMP_DATE	5/10/94	5/3/94	3/2/94	3/9/94	5/3/94	5/3/94
SAMP_DEPTH	6-8	8-10	4-6	4-6	8-10	10-12
BBL-SVOC (ug/kg) (cont)						
Benzo(k)fluoranthene	330 U	330 U	3300 U	330 U	NA	330 U
Benzoic Acid	1700 U	1700 U	17000 U	1700 U	NA	1700 U
Benzyl alcohol	330 U	330 U	3300 U	330 U	NA	330 U
Bis(2-Chloroethoxy)methane	330 U	330 U	3300 U	330 U	NA	330 U
Bis(2-Chloroethyl)ether	330 U	330 U	3300 U	330 U	NA	330 U
Bis(2-Chloroisopropyl)ether	330 U	330 U	3300 U	330 U	NA	330 U
Bis(2-Ethylhexyl)phthalate	330 U	330 U	3300 U	330 U	NA	330 U
Butylbenzylphthalate	330 U	330 U	3300 U	330 U	NA	330 U
Chrysene	330 U	330 U	3300 U	330 U	NA	330 U
Di-n-butylphthalate	330 U	330 U	3300 U	330 U	NA	330 U
Di-n-octylphthalate	330 U	330 U	3300 U	330 U	NA	330 U
Dibenz(a,h)anthracene	330 U	330 U	3300 U	330 U	NA	330 U
Dibenzofuran	330 U	330 U	3300 U	330 U	NA	330 U
Diethylphthalate	330 U	330 U	3300 U	330 U	NA	330 U
Dimethylphthalate	330 U	330 U	3300 U	330 U	NA	330 U
Fluoranthene	330 U	330 U	3300 U	330 U	NA	330 U
Fluorene	330 U	330 U	3300 U	330 U	NA	330 U
Hexachlorobenzene	330 U	330 U	3300 U	330 U	NA	330 U
Hexachlorobutadiene	330 U	330 U	3300 U	330 U	NA	330 U
Hexachlorocyclopentadiene	330 U	330 U	3300 U	330 U	NA	330 U
Hexachloroethane	330 U	330 U	3300 U	330 U	NA	330 U
Indeno(1,2,3-cd)pyrene	330 U	330 U	3300 U	330 U	NA	330 U
Isophorone	330 U	330 U	3300 U	330 U	NA	330 U
N-Nitrosodi-N-Propylamine	330 U	330 U	3300 U	330 U	NA	330 U
N-Nitrosodimethylamine	330 U	330 U	3300 U	330 U	NA	330 U
N-Nitrosodiphenylamine/diphenyl	330 U	330 U	3600	330 U	NA	330 U
Naphthalene	330 U	330 U	26000	330 U	NA	330 U
Nitrobenzene	330 U	330 U	3300 U	330 U	NA	330 U
Pentachlorophenol	1700 U	1700 U	17000 U	1700 U	NA	1700 U
Phenanthrene	330 U	330 U	6900	330 U	NA	330 U
Phenol	330 U	330 U	3300 U	330 U	NA	330 U
Pyrene	330 U	330 U	3300 U	330 U	NA	330 U
4-Methylphenol (p-cresol)	330 U	330 U	3300 U	330 U	NA	330 U
2-Methylphenol (o-cresol)	330 U	330 U	3300 U	330 U	NA	330 U
BBL-PEST (ug/kg)						
4,4'-DDD	330 U	330 U	3300 U	330 U	NA	330 U
4,4'-DDE	330 U	330 U	3300 U	330 U	NA	330 U
4,4'-DDT	330 U	330 U	3300 U	330 U	NA	330 U
Aldrin	330 U	330 U	3300 U	330 U	NA	330 U

APPENDIX D. 1
BLASLAND, BOUCK AND LEE
UST SITE CHARACTERIZATION
SOIL ANALYTICAL RESULTS - ORGANIC COMPOUNDS
ROOSEVELT ROADS, CEIBA, PUERTO RICO

SAMP_ID	1983-SB3-04	1983-SB4-05	1983-SB6-03	1983-SB6-03D	1983-SB6-05	1983-SB7-06
SAMP_DATE	5/10/94	5/3/94	3/2/94	3/9/94	5/3/94	5/3/94
SAMP_DEPTH	6-8	8-10	4-6	4-6	8-10	10-12
Alpha-BHC	330 U	330 U	3300 U	330 U	NA	330 U
Beta-BHC	330 U	330 U	3300 U	330 U	NA	330 U
Chlordane	1700 U	1700 U	17000 U	1700 U	NA	1700 U
Delta-BHC	330 U	330 U	3300 U	330 U	NA	330 U
Dieldrin	330 U	330 U	3300 U	330 U	NA	330 U
Endosulfan I	660 U	660 U	6600 U	660 U	NA	660 U
Endosulfan II	660 U	660 U	6600 U	660 U	NA	660 U
Endosulfan sulfate	660 U	660 U	6600 U	660 U	NA	660 U
Endrin	660 U	660 U	6600 U	660 U	NA	660 U
Endrin Aldehyde	1700 U	1700 U	17000 U	1700 U	NA	1700 U
Gamma-BHC	330 U	330 U	3300 U	330 U	NA	330 U
Heptachlor	660 U	660 U	3300 U	660 U	NA	660 U
Heptachlor epoxide	660 U	660 U	6600 U	660 U	NA	660 U
Toxaphene	67000 U	67000 U	670000 U	67000 U	NA	67000 U
BBL-PCB (ug/kg)						
Aroclor-1016	17000 U	17000 U	17000 U	17000 U	NA	17000 U
Aroclor-1221	17000 U	17000 U	17000 U	17000 U	NA	17000 U
Aroclor-1232	17000 U	17000 U	17000 U	17000 U	NA	17000 U
Aroclor-1242	17000 U	17000 U	17000 U	17000 U	NA	17000 U
Aroclor-1248	17000 U	17000 U	17000 U	17000 U	NA	17000 U
Aroclor-1254	17000 U	17000 U	17000 U	17000 U	NA	17000 U
Aroclor-1260	17000 U	17000 U	17000 U	17000 U	NA	17000 U
BBL-PCB-2 in soil (ug/kg)						
Aroclor-1016	33 U	NA	33 U	33 U	33 U	NA
Aroclor-1221	67 U	NA	67 U	67 U	67 U	NA
Aroclor-1232	33 U	NA	33 U	33 U	33 U	NA
Aroclor-1242	33 U	NA	33 U	33 U	33 U	NA
Aroclor-1248	33 U	NA	33 U	33 U	33 U	NA
Aroclor-1254	33 U	NA	33 U	33 U	33 U	NA
Aroclor-1260	38	NA	80	39	130	NA

APPENDIX D. 2
BLASLAND, BOUCK AND LEE
UST SITE CHARACTERIZATION
SOIL ANALYTICAL RESULTS - INORGANIC COMPOUNDS
ROOSEVELT ROADS, CEIBA, PUERTO RICO

SAMP_ID	1983-SB3-04	1983-SB6-03	1983-SB6-03D	1983-SB6-05
SAMP_DATE	5/10/94	3/2/94	3/9/94	5/3/94
SAMP_DEPTH	6-8	4-6	4-6	8-10
BBL-TCLP (mg/l)				
Arsenic	0.2 U	0.2 U	0.2 U	0.2 U
Barium	1 U	1.2	3.6	1.2
Cadmium	0.01 U	0.01 U	0.01 U	0.01 U
Chromium	0.05 U	0.05 U	0.05 U	0.05 U
Lead	0.2 U	0.2 U	0.2 U	0.2 U
Mercury	0.02 U	0.02 U	0.02 U	0.02 U
Selenium	0.5 U	0.5 U	0.5 U	0.5 U
Silver	0.01	0.01 U	0.01 U	0.01 U

APPENDIX D. 3
BLASLAND, BOUCK AND LEE
UST SITE CHARACTERIZATION
GROUNDWATER ANALYTICAL RESULTS - ORGANIC COMPOUNDS
ROOSEVELT ROADS, CEIBA, PUERTO RICO

SAMP_ID	1983-DW1	1983-DW1D	1983-MW1	1983-MW2	1983-MW3	1983-MW4	1983-MW4
SAMP_DATE	5/26/94	5/26/94	5/14/94	5/14/94	5/14/94	5/26/94	6/10/94
BBL-VOC (ug/l)							
1,1,1-Trichloroethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1,2,2-Tetrachloroethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1,2-Trichloroethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1-Dichloroethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1-Dichloroethene	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dichlorobenzene	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dichloroethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dichloropropane	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,3-Dichlorobenzene	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,4-Dichlorobenzene	1 U	1 U	1 U	1 U	1 U	1 U	1 U
2-Chloroethylvinyl Ether	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ
Bromodichloromethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Bromoform	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Bromomethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Carbon Tetrachloride	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Chlorobenzene	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Chloroethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Chloroform	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Chloromethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U
cis-1,3-Dichloropropene	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Dibromochloromethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Dichlorodifluoromethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Methyl tert-butyl ether	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Methylene Chloride	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Tetrachloroethene	1 U	1 U	1 U	1 U	1 U	1 U	1 U
trans-1,2-Dichloroethylene	1 U	1 U	1 U	1 U	1 U	1 U	1 U
trans-1,3-Dichloropropene	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Trichloroethylene	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Trichlorofluoromethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Vinyl Chloride	1 U	1 U	1 U	1 U	1 U	1 U	1 U

APPENDIX D. 3
BLASLAND, BOUCK AND LEE
UST SITE CHARACTERIZATION
GROUNDWATER ANALYTICAL RESULTS - ORGANIC COMPOUNDS
ROOSEVELT ROADS, CEIBA, PUERTO RICO

SAMP_ID	1983-DW1	1983-DW1D	1983-MW1	1983-MW2	1983-MW3	1983-MW4	1983-MW4
SAMP_DATE	5/26/94	5/26/94	5/14/94	5/14/94	5/14/94	5/26/94	6/10/94
BBL-SVOC (ug/l)							
1,2,4-Trichlorobenzene	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,2-Dichlorobenzene	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,3-Dichlorobenzene	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,4-Dichlorobenzene	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2,4,6-Trichlorophenol	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2,4-Dichlorophenol	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2,4-Dimethylphenol	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2,4-Dinitrophenol	50 U	50 U	50 U	50 U	50 U	50 U	50 U
2,4-Dinitrotoluene	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2,6-Dinitrotoluene	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2-Chloronaphthalene	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2-Chlorophenol	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2-Methyl-4,6-dinitrophenol	50 U	50 U	50 U	50 U	50 U	50 U	50 U
2-Nitrophenol	10 U	10 U	10 U	10 U	10 U	10 U	10 U
3,3-Dichlorobenzidine	20 U	20 U	20 U	20 U	20 U	20 U	20 U
4-Bromophenyl phenyl ether	10 U	10 U	10 U	10 U	10 U	10 U	10 U
4-Chloro-3-methylphenol	10 U	10 U	10 U	10 U	10 U	10 U	10 U
4-Chlorophenyl phenyl ether	10 U	10 U	10 U	10 U	10 U	10 U	10 U
4-Nitrophenol	50 U	50 U	50 U	50 U	50 U	50 U	50 U
Acenaphthene	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Acenaphthylene	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Anthracene	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Benzo(a)anthracene	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Benzo(a)pyrene	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Benzo(b)fluoranthene	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Benzo(g,h,i)perylene	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Benzo(k)fluoranthene	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Benzyl butyl phthalate	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Bis (2-Chloroethyl) ether	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Bis(2-Chloroethoxy)methane	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Bis(2-Chloroisopropyl)ether	10 U	10 U	10 U	10 U	10 U	10 U	10 U
BBL-SVOC (ug/l) (cont)							
Bis(2-Ethylhexyl)phthalate	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Chrysene	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Di-n-butylphthalate	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Di-n-octylphthalate	10 U	10 U	10 U	10 U	10 U	10 U	10 U

APPENDIX D. 3
BLASLAND, BOUCK AND LEE
UST SITE CHARACTERIZATION
GROUNDWATER ANALYTICAL RESULTS - ORGANIC COMPOUNDS
ROOSEVELT ROADS, CEIBA, PUERTO RICO

SAMP_ID	1983-DW1	1983-DW1D	1983-MW1	1983-MW2	1983-MW3	1983-MW4	1983-MW4
SAMP_DATE	5/26/94	5/26/94	5/14/94	5/14/94	5/14/94	5/26/94	6/10/94
Dibenz(a,h)anthracene	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Diethylphthalate	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Dimethyl phthalate	10 U	10 U	27	10 U	13	10 U	10 U
Fluoranthene	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Fluorene	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Hexachlorobenzene	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Hexachlorobutadiene	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Hexachloroethane	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Indeno(1,2,3-cd)pyrene	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Isophorone	10 U	10 U	10 U	10 U	10 U	10 U	10 U
N-Nitrosodi-N-Propylamine	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Naphthalene	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Nitrobenzene	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Pentachlorophenol	50 U	50 U	50 U	50 U	50 U	50 U	50 U
Phenanthrene	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Phenol	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Pyrene	10 U	10 U	10 U	10 U	10 U	10 U	10 U

APPENDIX D. 3
BLASLAND, BOUCK AND LEE
UST SITE CHARACTERIZATION
GROUNDWATER ANALYTICAL RESULTS - ORGANIC COMPOUNDS
ROOSEVELT ROADS, CEIBA, PUERTO RICO

SAMP_ID	1983-DW1	1983-DW1D	1983-MW1	1983-MW2	1983-MW3	1983-MW4	1983-MW4
SAMP_DATE	5/26/94	5/26/94	5/14/94	5/14/94	5/14/94	5/26/94	6/10/94
BBL-PESTICIDES/PCBs (ug/l)							
4,4'-DDD	10 U	10 U	10 U	10 U	10 U	10 U	10 U
4,4'-DDE	10 U	10 U	10 U	10 U	10 U	10 U	10 U
4,4'-DDT	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Aldrin	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Beta-BHC	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Chlordane	50 U	50 U	50 U	50 U	50 U	50 U	50 U
Delta-BHC	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Dieldrin	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Endosulfan sulfate	20 U	20 U	20 U	20 U	20 U	20 U	20 U
Endrin Aldehyde	50 U	50 U	50 U	50 U	50 U	50 U	50 U
Heptachlor	20 U	20 U	20 U	20 U	20 U	20 U	20 U
Heptachlor epoxide	20 U	20 U	20 U	20 U	20 U	20 U	20 U
Toxaphene	2000 U	2000 U	2000 U	2000 U	2000 U	2000 U	2000 U
Aroclor-1016	500 U	500 U	500 U	500 U	500 U	500 U	1 U
Aroclor-1221	500 U	500 U	500 U	500 U	500 U	500 U	2 U
Aroclor-1232	500 U	500 U	500 U	500 U	500 U	500 U	1 U
Aroclor-1242	500 U	500 U	500 U	500 U	500 U	500 U	1 U
Aroclor-1248	500 U	500 U	500 U	500 U	500 U	500 U	1 U
Aroclor-1254	500 U	500 U	500 U	500 U	500 U	500 U	1 U
Aroclor-1260	500 U	500 U	500 U	500 U	500 U	500 U	1 U
BBL-BTEX (ug/l)							
Benzene	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Ethylbenzene	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Toluene	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Xylenes	1 U	1 U	1 U	1 U	1 U	1 U	1 U

APPENDIX D. 4
BLASLAND, BOUCK AND LEE
UST SITE CHARACTERIZATION
MISCELLANEOUS GROUNDWATER ANALYTICAL RESULTS
ROOSEVELT ROADS, CEIBA, PUERTO RICO

SAMP_ID	1983-DW1	1983-DW1D	1983-MW1	1983-MW4	1983-MW4
SAMP_DATE	5/26/94	5/26/94	5/14/94	5/26/94	6/10/94
BBL-INO (mg/l)					
Lead	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
BBL-TDS (mg/l)					
Solids, Total Dissolved	2600	2200	2100	2200	2200

APPENDIX D. 5
BLASLAND, BOUCK AND LEE
UST SITE CHARACTERIZATION
SOIL ANALYTICAL RESULTS - LABORATORY TPH
ROOSEVELT ROADS, CEIBA, PUERTO RICO

SAMP_ID	1983-MW4-03	1983-MW4-05	1983-SB1-02	1983-SB1-03	1983-SB2-03	1983-SB3-03	1983-SB3-04	1983-SB3-05	1983-SB4-03	1
SAMP_DATE	5/11/94	5/11/94	5/10/94	2/28/94	3/1/94	5/10/94	5/10/94	5/10/94	3/1/94	
UNITS	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	
SAMP_DEPTH	4-6	8-10	2-4	4-6	4-6	4-6	6-8	8-10	4-6	
BBL-TPH (mg/kg)										
Total Petroleum Hydrocarbon	15	7.7	5 U	840	28	110	2400	260	13	

APPENDIX D. 5
BLASLAND, BOUCK AND LEE
UST SITE CHARACTERIZATION
SOIL ANALYTICAL RESULTS - LABORATORY TPH
ROOSEVELT ROADS, CEIBA, PUERTO RICO

SAMP_ID	1983-SB4-05	1983-SB5-04	1983-SB6-03	1983-SB6-05	1983-SB7-03	1983-SB7-03D	1983-SB7-06	1983-SB8-03	1
SAMP_DATE	5/3/94	3/2/94	3/2/94	5/3/94	5/3/94	5/3/94	5/3/94	5/4/94	
UNITS	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	
SAMP_DEPTH	8-10	6-8	4-6	8-10	4-6	4-6	10-12	4-6	
BBL-TPH (mg/kg)									
Total Petroleum Hydrocarbon	5 U	220	9800	2200	5 U	5 U	5 U	5 U	

APPENDIX D. 5
BLASLAND, BOUCK AND LEE
UST SITE CHARACTERIZATION
SOIL ANALYTICAL RESULTS - LABORATORY TPH
ROOSEVELT ROADS, CEIBA, PUERTO RICO

SAMP_ID	983-SB8-05	1983-SB9-03	1983 SB9-03ab	1983-SB9-05
SAMP_DATE	5/4/94	5/10/94	5/10/94	5/10/94
UNITS	mg/kg	mg/kg	mg/kg	mg/kg
SAMP_DEPTH	8-10	4-6	4-6	8-10
BBL-TPH (mg/kg)				
Total Petroleum Hydrocarbon	5 U	5 U	5 U	320

APPENDIX D. 6
BLASLAND, BOUCK AND LEE
UST SITE CHARACTERIZATION
SOIL ANALYTICAL RESULTS - LABORATORY BTEX
ROOSEVELT ROADS, CEIBA, PUERTO RICO

SAMP_ID	983 SB9-03ab	1983-MW4-03	1983-MW4-05	1983-SB1-02	1983-SB1-03	1983-SB2-03	1983-SB3-03	1983-SB3-04	1983-SB3-05	1983-SB4-03	1983-SB4-05	1983-SB5-04	1
SAMP_DATE	5/10/94	5/11/94	5/11/94	5/10/94	2/28/94	3/1/94	5/10/94	5/10/94	5/10/94	3/1/94	5/3/94	3/2/94	
SAMP_DEPTH	4-6	4-6	8-10	2-4	4-6	4-6	4-6	6-8	8-10	4-6	8-10	6-8	
BBL-BTEX (ug/kg)													
Benzene	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	
Ethylbenzene	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	
Toluene	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	
Xylenes	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	7.5	5 U	5 U	5 U	
Methyl tert-butyl ether	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	

APPENDIX D. 6
BLASLAND, BOUCK AND LEE
UST SITE CHARACTERIZATION
SOIL ANALYTICAL RESULTS - LABORATORY BTEX
ROOSEVELT ROADS, CEIBA, PUERTO RICO

SAMP_ID	1983-SB6-03	1983-SB6-05	1983-SB7-03	1983-SB7-03D	1983-SB8-03	1983-SB8-05	1983-SB9-03	1983-SB9-05
SAMP_DATE	3/2/94	5/3/94	5/3/94	5/3/94	5/4/94	5/4/94	5/10/94	5/10/94
SAMP_DEPTH	4-6	8-10	4-6	4-6	4-6	8-10	4-6	8-10
BBL-BTEX (ug/kg)								
Benzene	5 U	50 U	5 U	5 U	5 U	5 U	5 U	5 U
Ethylbenzene	5 U	50 U	5 U	5 U	5 U	5 U	5 U	5 U
Toluene	5 U	50 U	5 U	5 U	5 U	5 U	5 U	5 U
Xylenes	98	50 U	5 U	5 U	5 U	5 U	5 U	5 U
Methyl tert-butyl ether	50 U	500 U	50 U	50 U	50 U	50 U	50 U	50 U

APPENDIX D. 7
BLASLAND, BOUCK AND LEE
UST SITE CHARACTERIZATION
TRIP BLANK ANALYTICAL RESULTS - ORGANIC COMPOUNDS
ROOSEVELT ROADS, CEIBA, PUERTO RICO

SAMP_ID	1983-TB	
SAMP_DATE	5/14/94	
BBL-VOC (ug/l)		
1, 1, 1-Trichloroethane	1	U
1, 1, 2, 2-Tetrachloroethane	1	U
1, 1, 2-Trichloroethane	1	U
1, 1-Dichloroethane	1	U
1, 1-Dichloroethene	1	U
1, 2-Dichlorobenzene	1	U
1, 2-Dichloroethane	1	U
1, 2-Dichloropropane	1	U
1, 3-Dichlorobenzene	1	U
1, 4-Dichlorobenzene	1	U
2-Chloroethylvinyl Ether	10	UJ
Bromodichloromethane	1	U
Bromoform	5	U
Bromomethane	1	U
Carbon Tetrachloride	1	U
Chlorobenzene	1	U
Chloroethane	1	U
Chloroform	1	U
Chloromethane	1	U
Dibromochloromethane	1	U
Dichlorodifluoromethane	1	U
Methyl-Tert-Butyl-Ether	10	U
Methylene Chloride	1	U
Tetrachloroethene	1	U
Trans-1, 2-Dichloroethylene	1	U
Trichloroethylene	1	U
Trichlorofluoromethane	1	U
Vinyl Chloride	1	U
cis-1, 3-Dichloropropene	1	U
trans-1, 3-Dichloropropene	1	U
BBL-BTEX (ug/l)		
Benzene	1	U
Ethylbenzene	1	U
Toluene	1	U
Xylenes	1	U

APPENDIX D. 8
BLASLAND, BOUCK AND LEE
UST SITE CHARACTERIZATION
MISCELLANEOUS GROUNDWATER ANALYTICAL RESULTS - TPH
ROOSEVELT ROADS, CEIBA, PUERTO RICO

SAMP_ID	1983-DW1	1983-DW1D	1983-MW1	1983-MW2	1983-MW3	1983-MW4	1983-MW4
SAMP_DATE	5/26/94	5/26/94	5/14/94	5/14/94	5/14/94	5/26/94	6/10/94
BBL-TPH (mg/l)							
Total Petroleum Hydrocarbon	1 U	1 U	1 U	1 U	1 U	1 U	1 U

APPENDIX D. 9
BLASLAND, BOUCK AND LEE
UST SITE CHARACTERIZATION
EQUIPMENT BLANK ANALYTICAL RESULTS - ORGANIC COMPOUNDS
ROOSEVELT ROADS, CEIBA, PUERTO RICO

SAMP_ID	1983-EB	
SAMP_DATE	5/14/94	
BBL-VOC (ug/l)		
1, 1, 1-Trichloroethane	1	U
1, 1, 2, 2-Tetrachloroethane	1	U
1, 1, 2-Trichloroethane	1	U
1, 1-Dichloroethane	1	U
1, 1-Dichloroethene	1	U
1, 2-Dichlorobenzene	1	U
1, 2-Dichloroethane	1	U
1, 2-Dichloropropane	1	U
1, 3-Dichlorobenzene	1	U
1, 4-Dichlorobenzene	1	U
2-Chloroethylvinyl Ether	10	UJ
Bromodichloromethane	1	U
Bromoform	5	U
Bromomethane	1	U
Carbon Tetrachloride	1	U
Chlorobenzene	1	U
Chloroethane	1	U
Chloroform	1	U
Chloromethane	1	U
Dibromochloromethane	1	U
Dichlorodifluoromethane	1	U
Methyl-Tert-Butyl-Ether	10	U
Methylene Chloride	1	U
Tetrachloroethene	1	U
Trans-1, 2-Dichloroethylene	1	U
Trichloroethylene	1	U
Trichlorofluoromethane	1	U
Vinyl Chloride	1	U
cis-1, 3-Dichloropropene	1	U
trans-1, 3-Dichloropropene	1	U
BBL-BTEX (ug/l)		
Benzene	1	U
Ethylbenzene	1	U
Toluene	1	U
Xylenes	1	U

APPENDIX D. 10
BLASLAND, BOUCK AND LEE
UST SITE CHARACTERIZATION
FIELD BLANK ANALYTICAL RESULTS - ORGANIC COMPOUNDS
ROOSEVELT ROADS, CEIBA, PUERTO RICO

SAMP_ID	1983-FB	1983-FB
SAMP_DATE	5/14/94	6/10/94
BBL-VOC (ug/l)		
1, 1, 1-Trichloroethane	1 U	1 U
1, 1, 2, 2-Tetrachloroethane	1 U	1 U
1, 1, 2-Trichloroethane	1 U	1 U
1, 1-Dichloroethane	1 U	1 U
1, 1-Dichloroethene	1 U	1 U
1, 2-Dichlorobenzene	1 U	1 U
1, 2-Dichloroethane	1 U	1 U
1, 2-Dichloropropane	1 U	1 U
1, 3-Dichlorobenzene	1 U	1 U
1, 4-Dichlorobenzene	1 U	1 U
2-Chloroethylvinyl Ether	10 UJ	10 UJ
Bromodichloromethane	1 U	1 U
Bromoform	5 U	5 U
Bromomethane	1 U	1 U
Carbon Tetrachloride	1 U	1 U
Chlorobenzene	1 U	1 U
Chloroethane	1 U	1 U
Chloroform	1 U	1 U
Chloromethane	1 U	1 U
Dibromochloromethane	1 U	1 U
Dichlorodifluoromethane	1 U	1 U
Methyl-Tert-Butyl-Ether	10 U	10 U
Methylene Chloride	1 U	1 U
Tetrachloroethene	1 U	1 U
Trans-1, 2-Dichloroethylene	1 U	1 U
Trichloroethylene	1 U	1 U
Trichlorofluoromethane	1 U	1 U
Vinyl Chloride	1 U	1 U
cis-1, 3-Dichloropropene	1 U	1 U
trans-1, 3-Dichloropropene	1 U	1 U
BBL-BTEX (ug/l)		
Benzene	1 U	1 U
Ethylbenzene	1 U	1 U
Toluene	1 U	1 U
Xylenes	1 U	1 U

APPENDIX D. 11 (continued)
BLASLAND, BOUCK AND LEE
UST SITE CHARACTERIZATION
AUGER BLANK ANALYTICAL RESULTS - ORGANIC COMPOUNDS
ROOSEVELT ROADS, CEIBA, PUERTO RICO

SAMP_ID	983-AGR BLANK	
SAMP_DATE	5/14/94	
BBL-VOC (ug/l)		
1, 1, 1-Trichloroethane	1	U
1, 1, 2, 2-Tetrachloroethane	1	U
1, 1, 2-Trichloroethane	1	U
1, 1-Dichloroethane	1	U
1, 1-Dichloroethene	1	U
1, 2-Dichlorobenzene	1	U
1, 2-Dichloroethane	1	U
1, 2-Dichloropropane	1	U
1, 3-Dichlorobenzene	1	U
1, 4-Dichlorobenzene	1	U
2-Chloroethylvinyl Ether	10	UJ
Bromodichloromethane	1	U
Bromoform	5	U
Bromomethane	1	U
Carbon Tetrachloride	1	U
Chlorobenzene	1	U
Chloroethane	1	U
Chloroform	1	U
Chloromethane	1	U
Dibromochloromethane	1	U
Dichlorodifluoromethane	1	U
Methyl-Tert-Butyl-Ether	10	U
Methylene Chloride	1	U
Tetrachloroethene	1	U
Trans-1, 2-Dichloroethylene	1	U
Trichloroethylene	1	U
Trichlorofluoromethane	1	U
Vinyl Chloride	1	U
cis-1, 3-Dichloropropene	1	U
trans-1, 3-Dichloropropene	1	U
BBL-BTEX (ug/l)		
Benzene	1	U
Ethylbenzene	1	U
Toluene	1	U
Xylenes	1	U

APPENDIX D. 12
BLASLAND, BOUCK AND LEE
UST SITE CHARACTERIZATION
EQUIPMENT BLANK ANALYTICAL RESULTS
TPH
ROOSEVELT ROADS, CEIBA, PUERTO RICO

SAMP_ID	1983-EB
SAMP_DATE	5/14/94
BBL-TPH (mg/l)	
Total Petroleum Hydrocarbon	1 U

APPENDIX F
1995 PHASE I RFI ANALYTICAL DATA AND 1999 PHASE II RFI SOILS INVESTIGATION ANALYTICAL RESULTS

APPENDIX TABLE
ORGANIC COMPOUNDS
SURFACE SOIL
SWMU 30
NAVAL STATION ROOSEVELT ROADS, PUERTO RICO

SAMPLE ID	30SS01	30SS02	30SS03	30SS04	30SS05	30SS06	30-HP01-01	30-HP02-01	30-HP03-01
SAMPLE DATE	10/25/95	10/25/95	10/25/95	10/25/95	10/25/95	10/25/95	06/23/99	06/23/99	06/22/99
DEPTH RANGE	0.00-0.00	0.00-0.00	0.00-0.00	0.00-0.00	0.00-0.00	0.00-0.00	0.00-2.50	0.00-2.50	0.00-2.50
Volatiles (ug/kg)									
Chloromethane	12 U	11 U	12 U	11 U	11 U	12 U	NA	NA	NA
Bromomethane	12 U	11 U	12 U	11 U	11 U	12 U	NA	NA	NA
Vinyl chloride	12 U	11 U	12 U	11 U	11 U	12 U	NA	NA	NA
Chloroethane	12 U	11 U	12 U	11 U	11 U	12 U	NA	NA	NA
Methylene chloride	16 U	15 U	6 U	6 U	14 U	11 U	NA	NA	NA
Acetone	12 U	11 U	12 U	10 J	11 U	16 U	NA	NA	NA
Carbon disulfide	6 U	6 U	6 U	6 U	6 U	6 U	NA	NA	NA
1,1-Dichloroethene	6 U	6 U	6 U	6 U	6 U	6 U	NA	NA	NA
1,1-Dichloroethane	6 U	6 U	6 U	6 U	6 U	6 U	NA	NA	NA
1,2-Dichloroethene (Total)	6 U	6 U	6 U	6 U	6 U	6 U	NA	NA	NA
Chloroform	6 U	6 U	6 U	6 U	6 U	6 U	NA	NA	NA
1,2-Dichloroethane	6 U	6 U	6 U	6 U	6 U	6 U	NA	NA	NA
2-Butanone (MEK)	12 U	11 U	12 U	11 U	11 U	12 U	NA	NA	NA
1,1,1-Trichloroethane	6 U	6 UJ	6 U	6 U	6 U	6 UJ	NA	NA	NA
Carbon tetrachloride	6 U	6 UJ	6 U	6 U	6 U	6 UJ	NA	NA	NA
Vinyl Acetate	12 U	11 UJ	12 U	11 U	11 U	12 UJ	NA	NA	NA
Bromodichloromethane	6 U	6 UJ	6 U	6 U	6 U	6 UJ	NA	NA	NA
1,2-Dichloropropane	6 U	6 UJ	6 U	6 U	6 U	6 UJ	NA	NA	NA
cis-1,3-Dichloropropene	6 U	6 UJ	6 U	6 U	6 U	6 UJ	NA	NA	NA
Trichloroethene	6 U	6 UJ	6 U	6 U	6 U	6 UJ	NA	NA	NA
Dibromochloromethane	6 U	6 UJ	6 U	6 U	6 U	6 UJ	NA	NA	NA
1,1,2-Trichloroethane	6 U	6 UJ	6 U	6 U	6 U	6 UJ	NA	NA	NA
Benzene	6 U	6 UJ	6 U	6 U	6 U	6 UJ	NA	NA	NA
trans-1,3-Dichloropropene	6 U	6 UJ	6 U	6 U	6 U	6 UJ	NA	NA	NA
Bromoform	6 U	6 UJ	6 U	6 U	6 U	6 UJ	NA	NA	NA
4-Methyl-2-pentanone	12 U	11 UJ	12 U	11 U	11 U	12 UJ	NA	NA	NA
2-Hexanone	12 U	11 UJ	12 U	11 U	11 U	12 UJ	NA	NA	NA
Tetrachloroethene	6 U	6 UJ	6 U	6 U	6 U	6 UJ	NA	NA	NA
1,1,2,2-Tetrachloroethane	6 U	6 UJ	6 U	6 U	6 U	6 UJ	NA	NA	NA
Toluene	6 U	6 UJ	6 U	6 U	6 U	6 UJ	NA	NA	NA
Chlorobenzene	6 U	6 UJ	6 U	6 U	6 U	6 UJ	NA	NA	NA
Ethylbenzene	6 U	6 UJ	6 U	6 U	6 U	6 UJ	NA	NA	NA
Styrene	6 U	6 UJ	6 U	6 U	6 U	6 UJ	NA	NA	NA
Xylene (total)	3 J	3 J	6 U	6 U	1 J	6 UJ	NA	NA	NA
Acrolein	12 U	11 U	600 U	560 U	11 U	12 U	NA	NA	NA

APPENDIX TABLE
ORGANIC COMPOUNDS
SURFACE SOIL
SWMU 30
NAVAL STATION ROOSEVELT ROADS, PUERTO RICO

SAMPLE ID	30SS01	30SS02	30SS03	30SS04	30SS05	30SS06	30-HP01-01	30-HP02-01	30-HP03-01
SAMPLE DATE	10/25/95	10/25/95	10/25/95	10/25/95	10/25/95	10/25/95	06/23/99	06/23/99	06/22/99
DEPTH RANGE	0.00-0.00	0.00-0.00	0.00-0.00	0.00-0.00	0.00-0.00	0.00-0.00	0.00-2.50	0.00-2.50	0.00-2.50
Volatiles (ug/kg)									
Acrylonitrile	12 U	11 U	120 U	110 U	11 U	12 U	NA	NA	NA
Trichlorofluoromethane	6 U	6 U	12 U	11 U	6 U	6 U	NA	NA	NA
Dichlorodifluoromethane	12 U	11 U	24 U	22 U	11 U	12 U	NA	NA	NA
Acetonitrile	24 U	22 U	120 U	110 U	22 U	24 U	NA	NA	NA
Iodomethane	12 U	11 U	12 U	11 U	11 U	12 U	NA	NA	NA
PROPIONITRILE (ETHYL CYANIDE)	60 U	55 U	60 R	56 R	55 U	60 U	NA	NA	NA
3-Chloropropene	24 U	22 U	24 U	22 U	22 U	24 U	NA	NA	NA
Methacrylonitrile	24 U	22 U	24 U	22 U	22 U	24 U	NA	NA	NA
Dibromomethane	12 U	11 U	12 U	11 U	11 U	12 U	NA	NA	NA
Isobutyl alcohol	120 U	110 U	2400 R	2200 R	110 U	120 R	NA	NA	NA
1,2-Dibromoethane	24 U	22 U	24 U	22 U	22 U	24 U	NA	NA	NA
1,1,1,2-Tetrachloroethane	12 U	11 UJ	12 U	11 U	11 U	12 UJ	NA	NA	NA
1,2,3-Trichloropropane	12 U	11 U	12 U	11 U	11 U	12 U	NA	NA	NA
trans-1,4-Dichloro-2-butene	120 U	110 U	24 U	22 U	110 U	120 U	NA	NA	NA
1,2-Dibromo-3-chloropropane	24 U	22 U	24 U	22 U	22 U	24 U	NA	NA	NA
2-Chloro-1,3-butadiene	120 U	110 U	120 U	110 U	110 U	120 U	NA	NA	NA
Methyl methacrylate	400 U	370 U	24 U	22 U	1800 U	390 U	NA	NA	NA
Ethyl methacrylate	400 U	370 U	24 U	22 U	1800 U	390 U	NA	NA	NA
Semivolatiles (ug/kg)									
Phenol	400 U	370 U	400 U	360 U	1800 U	390 U	380 U	350 U	350 U
Bis(2-chloroethyl)ether	400 U	370 U	400 U	360 U	1800 U	390 U	380 U	350 U	350 U
2-Chlorophenol	400 U	370 U	400 U	360 U	1800 U	390 U	380 U	350 U	350 U
1,3-Dinitrobenzene	400 U	370 U	790 U	730 U	1800 U	390 U	380 U	350 U	350 U
1,4-Dichlorobenzene	400 U	370 U	400 U	360 U	1800 U	390 U	380 U	350 U	350 U
Benzyl alcohol	400 U	370 U	400 U	360 U	1800 U	390 U	380 U	350 U	350 U
1,2-Dichlorobenzene	400 U	370 U	400 U	360 U	1800 U	390 U	380 U	350 U	350 U
o-Cresol	400 U	370 U	400 U	360 U	1800 U	390 U	380 U	350 U	350 U
2,2'-Oxybis(1-Chloropropane)	400 U	370 U	400 U	360 U	1800 U	390 U	380 U	350 U	350 U
M,P-CRESOL	NA	NA	400 U	360 U	NA	NA	NA	NA	NA
m-Cresol	NA	NA	NA	NA	NA	NA	380 U	350 U	350 U
N-Nitroso-di-n-propylamine	400 U	370 U	400 U	360 U	1800 U	390 U	380 U	350 U	350 U
Hexachloroethane	400 U	370 U	400 U	360 U	1800 U	390 U	380 U	350 U	350 U
Nitrobenzene	400 U	370 U	400 U	360 U	1800 U	390 U	380 U	350 U	350 U
Isophorone	400 U	370 U	400 U	360 U	1800 U	390 U	380 U	350 U	350 U
2-Nitrophenol	400 U	370 U	400 U	360 U	1800 U	390 U	380 U	350 U	350 U

APPENDIX TABLE
ORGANIC COMPOUNDS
SURFACE SOIL
SWMU 30
NAVAL STATION ROOSEVELT ROADS, PUERTO RICO

SAMPLE ID	30SS01	30SS02	30SS03	30SS04	30SS05	30SS06	30-HP01-01	30-HP02-01	30-HP03-01
SAMPLE DATE	10/25/95	10/25/95	10/25/95	10/25/95	10/25/95	10/25/95	06/23/99	06/23/99	06/22/99
DEPTH RANGE	0.00-0.00	0.00-0.00	0.00-0.00	0.00-0.00	0.00-0.00	0.00-0.00	0.00-2.50	0.00-2.50	0.00-2.50
Semivolatiles (ug/kg) (cont)									
2,4-Dimethylphenol	400 U	370 U	400 U	360 U	1800 U	390 U	380 U	350 U	350 U
Benzoic acid	2000 U	1900 U	2000 U	1800 U	9100 U	2000 U	1900 U	1800 U	1800 U
Bis(2-chloroethoxy)methane	400 U	370 U	400 U	360 U	1800 U	390 U	380 U	350 U	350 U
2,4-Dichlorophenol	400 U	370 U	400 U	360 U	1800 U	390 U	380 U	350 U	350 U
1,2,4-Trichlorobenzene	400 U	370 U	400 U	360 U	1800 U	390 U	380 U	350 U	350 U
Naphthalene	400 U	370 U	400 U	360 U	1800 U	390 U	380 U	350 U	350 U
4-Chloroaniline	400 U	370 U	400 U	360 U	1800 U	390 U	750 U	700 U	700 U
Hexachlorobutadiene	400 U	370 U	400 U	360 U	1800 U	390 U	380 U	350 U	350 U
4-Chloro-3-methylphenol	400 U	370 U	400 U	360 U	1800 U	390 U	380 U	350 U	350 U
2-Methylnaphthalene	400 U	370 U	400 U	360 U	1800 U	390 U	380 U	350 U	350 U
Hexachlorocyclopentadiene	400 U	370 U	400 U	360 U	1800 U	390 U	380 U	350 U	350 U
2,4,6-Trichlorophenol	400 U	370 U	400 U	360 U	1800 U	390 U	380 U	350 U	350 U
2,4,5-Trichlorophenol	2000 U	1900 U	2000 U	1800 U	9100 U	2000 U	380 U	350 U	350 U
2-Chloronaphthalene	400 U	370 U	400 U	360 U	1800 U	390 U	380 U	350 U	350 U
2-Nitroaniline	2000 U	1900 U	2000 U	1800 U	9100 U	2000 U	1900 U	1800 U	1800 U
Dimethylphthalate	400 U	370 U	400 U	360 U	1800 U	390 U	380 U	350 U	350 U
Acenaphthylene	400 U	370 U	400 U	360 U	1800 U	390 U	380 U	350 U	350 U
2,6-Dinitrotoluene	400 U	370 U	400 U	360 U	1800 U	390 U	380 U	350 U	350 U
3-Nitroaniline	2000 U	1900 U	2000 U	1800 U	9100 U	2000 U	1900 U	1800 U	1800 U
Acenaphthene	400 U	370 U	400 U	360 U	1800 U	390 U	380 U	350 U	350 U
2,4-Dinitrophenol	2000 U	1900 U	2000 U	1800 U	9100 U	2000 U	1900 U	1800 U	1800 U
4-Nitrophenol	2000 U	1900 U	2000 U	1800 U	9100 U	2000 U	1900 U	1800 U	1800 U
Dibenzofuran	400 U	370 U	400 U	360 U	1800 U	390 U	380 U	350 U	350 U
2,4-Dinitrotoluene	400 U	370 U	400 U	360 U	1800 U	390 U	380 U	350 U	350 U
Diethylphthalate	400 U	370 U	400 U	360 U	1800 U	390 U	380 U	350 U	350 U
4-Chlorophenyl-phenylether	400 U	370 U	400 U	360 U	1800 U	390 U	380 U	350 U	350 U
Fluorene	400 U	370 U	400 U	360 U	1800 U	390 U	380 U	350 U	350 U
4-Nitroaniline	2000 U	1900 U	2000 U	1800 U	9100 U	2000 U	1900 U	1800 U	1800 U
4,6-Dinitro,2-methylphenol	2000 U	1900 U	2000 U	1800 U	9100 U	2000 U	1900 U	1800 U	1800 U
N-Nitrosodiphenylamine (1)	400 U	370 U	400 U	360 U	1800 U	390 U	NA	NA	NA
4-Bromophenyl phenyl ether	400 U	370 U	400 U	360 U	1800 U	390 U	380 U	350 U	350 U
Hexachlorobenzene	400 U	370 U	400 U	360 U	1800 U	390 U	380 U	350 U	350 U
Pentachlorophenol	2000 U	1900 U	2000 U	1800 U	9100 U	2000 U	1900 U	1800 U	1800 U
Phenanthrene	400 U	370 U	400 U	360 U	1800 U	390 U	380 U	350 U	350 U
Anthracene	400 U	370 U	400 U	360 U	1800 U	390 U	380 U	350 U	350 U

APPENDIX TABLE
ORGANIC COMPOUNDS
SURFACE SOIL
SWMU 30
NAVAL STATION ROOSEVELT ROADS, PUERTO RICO

SAMPLE ID	30SS01	30SS02	30SS03	30SS04	30SS05	30SS06	30-HP01-01	30-HP02-01	30-HP03-01
SAMPLE DATE	10/25/95	10/25/95	10/25/95	10/25/95	10/25/95	10/25/95	06/23/99	06/23/99	06/22/99
DEPTH RANGE	0.00-0.00	0.00-0.00	0.00-0.00	0.00-0.00	0.00-0.00	0.00-0.00	0.00-2.50	0.00-2.50	0.00-2.50
Semivolatiles (ug/kg) (cont)									
Di-n-butylphthalate	400 U	370 U	400 U	360 U	1800 U	390 U	380 U	350 U	350 U
Fluoranthene	400 U	370 U	400 U	360 U	1800 U	390 U	380 U	350 U	350 U
Pyrene	400 U	370 U	400 U	360 U	1800 U	390 U	380 U	350 U	350 U
Butylbenzylphthalate	400 U	370 U	400 U	360 U	1800 U	390 U	380 U	350 U	350 U
3,3'-Dichlorobenzidine	810 U	750 U	790 U	730 U	3600 U	790 U	750 U	700 U	700 U
Benzo(a)anthracene	400 U	370 U	400 U	360 U	1800 U	390 U	380 U	350 U	350 U
Chrysene	400 U	370 U	400 U	360 U	1800 U	390 U	380 U	350 U	350 U
Bis(2-ethylhexyl)phthalate	400 U	370 U	400 U	360 U	1800 U	390 U	380 U	350 U	350 U
Di-n-octyl phthalate	400 U	370 U	400 U	360 UJ	1800 U	390 U	380 U	350 U	350 U
Benzo(b)fluoranthene	400 U	370 U	400 U	360 UJ	1800 U	390 U	380 U	350 U	350 U
Benzo(k)fluoranthene	400 U	370 U	400 U	360 UJ	1800 U	390 U	380 U	350 U	350 U
Benzo(a)pyrene	400 U	370 U	400 U	360 UJ	1800 U	390 U	380 U	350 U	350 U
Indeno(1,2,3-cd)pyrene	400 U	370 U	400 U	360 UJ	1800 U	390 U	380 U	350 U	350 U
Dibenzo(a,h)anthracene	400 U	370 U	400 U	360 UJ	1800 U	390 U	380 U	350 U	350 U
Benzo(g,h,i)perylene	400 U	370 U	400 U	360 UJ	1800 U	390 U	380 U	350 U	350 U
1,4-Dioxane	400 U	370 U	1600 U	1500 U	1800 U	390 U	NA	NA	NA
Pyridine	400 U	370 U	790 U	730 U	1800 U	390 U	NA	NA	NA
N-Nitrosodimethylamine	400 U	370 U	400 U	360 U	1800 U	390 U	380 U	350 U	350 U
2-Picoline	400 U	370 U	400 U	360 U	1800 U	390 U	NA	NA	NA
N-Nitrosomethylethylamine	400 U	370 U	400 U	360 U	1800 U	390 U	NA	NA	NA
Methyl methanesulfonate	400 U	370 U	400 U	360 U	1800 U	390 U	NA	NA	NA
N-Nitrosodiethylamine	400 U	370 U	400 U	360 U	1800 U	390 U	NA	NA	NA
Ethyl methanesulfonate	400 U	370 U	400 U	360 U	1800 U	390 U	NA	NA	NA
Aniline	400 U	370 U	2000 U	1800 U	1800 U	390 U	NA	NA	NA
N-Nitrosopyrrolidine	400 U	370 U	2000 U	1800 U	1800 U	390 U	NA	NA	NA
Acetophenone	400 U	370 U	400 U	360 U	1800 U	390 U	NA	NA	NA
N-Nitrosomorpholine	400 U	370 U	790 U	730 U	1800 U	390 U	NA	NA	NA
o-Toluidine	400 U	370 U	400 U	360 U	1800 U	390 U	NA	NA	NA
N-Nitrosopiperidine	2000 U	1900 U	400 U	360 U	9100 U	2000 U	NA	NA	NA
A,A-DIMETHYLPHENETHYLAMINE	400 U	370 U	2000 U	1800 U	1800 U	390 U	NA	NA	NA
2,6-Dichlorophenol	400 U	370 U	400 U	360 U	1800 U	390 U	NA	NA	NA
Hexachloropropene	400 U	370 U	790 U	730 U	1800 U	390 U	NA	NA	NA
p-Phenylenediamine	400 U	370 U	790 U	730 U	1800 U	390 U	NA	NA	NA
N-Nitroso-di-n-butylamine	400 U	370 U	400 U	360 U	1800 U	390 U	NA	NA	NA
Safrole	400 U	370 U	400 U	360 U	1800 U	390 U	NA	NA	NA

APPENDIX TABLE
ORGANIC COMPOUNDS
SURFACE SOIL
SWMU 30
NAVAL STATION ROOSEVELT ROADS, PUERTO RICO

SAMPLE ID	30SS01	30SS02	30SS03	30SS04	30SS05	30SS06	30-HP01-01	30-HP02-01	30-HP03-01
SAMPLE DATE	10/25/95	10/25/95	10/25/95	10/25/95	10/25/95	10/25/95	06/23/99	06/23/99	06/22/99
DEPTH RANGE	0.00-0.00	0.00-0.00	0.00-0.00	0.00-0.00	0.00-0.00	0.00-0.00	0.00-2.50	0.00-2.50	0.00-2.50
Semivolatiles (ug/kg) (cont)									
1,2,4,5-Tetrachlorobenzene	400 U	370 U	400 U	360 U	1800 U	390 U	NA	NA	NA
Isosafrole	400 U	370 U	400 U	360 U	1800 U	390 U	NA	NA	NA
1,4-Naphthoquinone	400 U	370 U	2000 U	1800 U	1800 U	390 U	NA	NA	NA
1,3-Dichlorobenzene	400 U	370 U	400 U	360 U	1800 U	390 U	NA	NA	NA
Pentachlorobenzene	400 U	370 U	400 U	360 U	1800 U	390 U	NA	NA	NA
1-Naphthylamine	400 U	370 U	400 U	360 U	1800 U	390 U	NA	NA	NA
2-Naphthylamine	400 U	370 U	400 U	360 U	1800 U	390 U	NA	NA	NA
2,3,4,6-Tetrachlorophenol	400 U	370 U	400 U	360 U	1800 U	390 U	NA	NA	NA
1,3,5-Trinitrobenzene	400 U	370 U	4000 U	3600 U	1800 U	390 U	NA	NA	NA
Diallate	400 U	370 U	400 U	360 U	1800 U	390 U	NA	NA	NA
Phenacetin	400 U	370 U	400 U	360 U	1800 U	390 U	NA	NA	NA
Diphenylamine	400 U	370 U	400 U	360 U	1800 U	390 U	380 U	350 U	350 U
5-Nitro-o-toluidine	400 U	370 U	790 U	730 U	1800 U	390 U	NA	NA	NA
4-Aminobiphenyl	400 U	370 U	400 U	360 U	1800 U	390 U	NA	NA	NA
Pronamide	400 U	370 U	400 U	360 U	1800 U	390 U	NA	NA	NA
2-sec-butyl-4,6-dinitrophenol	2000 U	1900 U	790 U	730 U	9100 U	2000 U	NA	NA	NA
Pentachloronitrobenzene	2000 U	1900 U	400 U	360 U	9100 R	2000 U	NA	NA	NA
4-Nitroquinoline-1-oxide	810 U	750 U	2000 R	1800 U	3600 U	790 U	NA	NA	NA
Methapyrilene	400 U	370 U	990 U	910 U	1800 U	390 U	NA	NA	NA
Aramite	810 U	750 U	790 U	730 U	3600 U	790 U	NA	NA	NA
Chlorobenzilate	400 U	370 U	400 U	360 U	1800 U	390 U	NA	NA	NA
p-Dimethylaminoazobenzene	400 U	370 U	790 U	730 U	1800 U	390 U	NA	NA	NA
3,3'-Dimethylbenzidine	400 U	370 U	790 R	730 R	1800 U	390 U	NA	NA	NA
2-Acetylaminofluorene	400 U	370 U	790 U	730 U	1800 U	390 U	NA	NA	NA
7,12-Dimethybenz(a)anthracene	400 U	370 U	790 U	730 UJ	1800 U	390 U	NA	NA	NA
Hexachlorophene	3600 R	3400 R	4000 U	3600 U	16000 U	3500 r	NA	NA	NA
3-Methylcholanthrene	400 U	370 U	400 U	360 UJ	1800 U	390 U	NA	NA	NA
Carbazole	NA	NA	400 U	360 U	NA	NA	NA	NA	NA
Pentachloroethane	400 U	370 U	24 U	22 U	1800 U	390 U	NA	NA	NA
3-and/or 4-methylphenol	400 U	370 U	NA	NA	1800 U	390 U	NA	NA	NA
Benzidine	NA	NA	NA	NA	NA	NA	3100 U	2800 U	2900 U

APPENDIX TABLE
ORGANIC COMPOUNDS
SURFACE SOIL
SWMU 30
NAVAL STATION ROOSEVELT ROADS, PUERTO RICO

SAMPLE ID	30SS01	30SS02	30SS03	30SS04	30SS05	30SS06	30-HP01-01	30-HP02-01	30-HP03-01
SAMPLE DATE	10/25/95	10/25/95	10/25/95	10/25/95	10/25/95	10/25/95	06/23/99	06/23/99	06/22/99
DEPTH RANGE	0.00-0.00	0.00-0.00	0.00-0.00	0.00-0.00	0.00-0.00	0.00-0.00	0.00-2.50	0.00-2.50	0.00-2.50
Pesticides/PCBs (ug/kg)									
alpha-BHC	NA	NA	24 U	22 U	NA	NA	NA	NA	NA
beta-BHC	NA	NA	24 U	22 U	NA	NA	NA	NA	NA
delta-BHC	NA	NA	24 U	22 U	NA	NA	NA	NA	NA
gamma-BHC (Lindane)	NA	NA	24 U	22 U	NA	NA	NA	NA	NA
Heptachlor	NA	NA	24 U	22 U	NA	NA	NA	NA	NA
Aldrin	NA	NA	24 U	22 U	NA	NA	NA	NA	NA
Heptachlor epoxide	NA	NA	24 U	22 U	NA	NA	NA	NA	NA
Endosulfan I	NA	NA	24 U	22 U	NA	NA	NA	NA	NA
Dieldrin	NA	NA	48 U	44 U	NA	NA	NA	NA	NA
4,4'-DDE	NA	NA	48 U	44 U	NA	NA	NA	NA	NA
Endrin	NA	NA	48 U	44 U	NA	NA	NA	NA	NA
Endosulfan II	NA	NA	48 U	44 U	NA	NA	NA	NA	NA
4,4'-DDD	NA	NA	48 U	44 U	NA	NA	NA	NA	NA
Endosulfan sulfate	NA	NA	48 U	44 U	NA	NA	NA	NA	NA
4,4'-DDT	NA	NA	48 U	44 U	NA	NA	NA	NA	NA
Methoxychlor	NA	NA	240 U	220 U	NA	NA	NA	NA	NA
Endrin aldehyde	NA	NA	48 U	44 U	NA	NA	NA	NA	NA
Isodrin	NA	NA	24 U	22 U	NA	NA	NA	NA	NA
Kepone	NA	NA	48 UJ	44 UJ	NA	NA	NA	NA	NA
alpha-Chlordane	NA	NA	240 U	220 U	NA	NA	NA	NA	NA
gamma-Chlordane	NA	NA	240 U	220 U	NA	NA	NA	NA	NA
Toxaphene	NA	NA	480 U	440 U	NA	NA	NA	NA	NA
Aroclor-1016	NA	NA	240 U	220 U	NA	NA	38 U	180 U	35 U
Aroclor-1221	NA	NA	240 U	220 U	NA	NA	76 U	360 U	72 U
Aroclor-1232	NA	NA	240 U	220 U	NA	NA	38 U	180 U	35 U
Aroclor-1242	NA	NA	240 U	220 U	NA	NA	38 U	180 U	35 U
Aroclor-1248	NA	NA	240 U	220 U	NA	NA	38 U	180 U	35 U
Aroclor-1254	NA	NA	480 U	440 U	NA	NA	38 U	180 U	35 U
Aroclor-1260	NA	NA	200	250	NA	NA	72	1200	35 U

APPENDIX TABLE
ORGANIC COMPOUNDS
SURFACE SOIL
SWMU 30
NAVAL STATION ROOSEVELT ROADS, PUERTO RICO

SAMPLE ID	30SS01	30SS02	30SS03	30SS04	30SS05	30SS06	30-HP01-01	30-HP02-01	30-HP03-01
SAMPLE DATE	10/25/95	10/25/95	10/25/95	10/25/95	10/25/95	10/25/95	06/23/99	06/23/99	06/22/99
DEPTH RANGE	0.00-0.00	0.00-0.00	0.00-0.00	0.00-0.00	0.00-0.00	0.00-0.00	0.00-2.50	0.00-2.50	0.00-2.50
Ortho Pesticides (ug/kg)									
O,O,O-Triethylphosphorothioate	NA	NA	80 U	73 U	NA	NA	NA	NA	NA
Phorate	NA	NA	80 U	73 U	NA	NA	NA	NA	NA
Thionazin	NA	NA	80 U	73 U	NA	NA	NA	NA	NA
Disulfoton	NA	NA	80 U	73 U	NA	NA	NA	NA	NA
SULFOTEP	NA	NA	80 U	73 U	NA	NA	NA	NA	NA
Dimethoate	NA	NA	80 U	73 U	NA	NA	NA	NA	NA
Methyl parathion	NA	NA	80 U	73 U	NA	NA	NA	NA	NA
Parathion	NA	NA	80 U	73 U	NA	NA	NA	NA	NA
Famphur	NA	NA	80 U	73 U	NA	NA	NA	NA	NA
Herbicides (ug/kg)									
2,4-D	NA	NA	400 U	360 U	NA	NA	NA	NA	NA
2,4,5-TP (Silvex)	NA	NA	80 U	72 U	NA	NA	NA	NA	NA
2,4,5-T	NA	NA	80 U	72 U	NA	NA	NA	NA	NA
Dioxins (ug/kg)									
2,3,7,8-TCDD	NA	NA	0.1 U	0.07 U	NA	NA	NA	NA	NA
Total TCDD	NA	NA	0.1 U	0.07 U	NA	NA	NA	NA	NA
Total PeCDD	NA	NA	0.12 U	0.1 U	NA	NA	NA	NA	NA
Total HxCDD	NA	NA	0.17 U	0.11 U	NA	NA	NA	NA	NA
Total TCDF	NA	NA	0.05 U	0.05 U	NA	NA	NA	NA	NA
Total PeCDF	NA	NA	0.08 U	0.07 U	NA	NA	NA	NA	NA
Total HxCDF	NA	NA	0.09 U	0.09 U	NA	NA	NA	NA	NA
Hydrocarbons (mg/kg)									
Hydrocarbons as GRO	NA	NA	NA	NA	NA	NA	0.28 U	0.26 U	0.27 U
Hydrocarbons as DRO	NA	NA	NA	NA	NA	NA	3.7 U	7.9	0.91 J
BTEX (ug/kg)									
Benzene	NA	NA	NA	NA	NA	NA	5.7 U	5.3 U	5.4 U
Ethylbenzene	NA	NA	NA	NA	NA	NA	5.7 U	5.3 U	5.4 U
Toluene	NA	NA	NA	NA	NA	NA	5.7 U	5.3 U	5.4 U
Xylene (total)	NA	NA	NA	NA	NA	NA	11 U	11 U	11 U

APPENDIX TABLE
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SURFACE SOIL
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NAVAL STATION ROOSEVELT ROADS, PUERTO RICO

SAMPLE ID	30-HP03-01D	30-HP04-01	30-HP04-01D	30-HP05-01
SAMPLE DATE	06/22/99	06/23/99	06/23/99	06/23/99
DEPTH RANGE	0.00-2.50	0.00-2.50	0.00-2.50	0.00-2.50
Volatiles (ug/kg)				
Chloromethane	NA	NA	NA	NA
Bromomethane	NA	NA	NA	NA
Vinyl chloride	NA	NA	NA	NA
Chloroethane	NA	NA	NA	NA
Methylene chloride	NA	NA	NA	NA
Acetone	NA	NA	NA	NA
Carbon disulfide	NA	NA	NA	NA
1,1-Dichloroethene	NA	NA	NA	NA
1,1-Dichloroethane	NA	NA	NA	NA
1,2-Dichloroethene (Total)	NA	NA	NA	NA
Chloroform	NA	NA	NA	NA
1,2-Dichloroethane	NA	NA	NA	NA
2-Butanone (MEK)	NA	NA	NA	NA
1,1,1-Trichloroethane	NA	NA	NA	NA
Carbon tetrachloride	NA	NA	NA	NA
Vinyl Acetate	NA	NA	NA	NA
Bromodichloromethane	NA	NA	NA	NA
1,2-Dichloropropane	NA	NA	NA	NA
cis-1,3-Dichloropropene	NA	NA	NA	NA
Trichloroethene	NA	NA	NA	NA
Dibromochloromethane	NA	NA	NA	NA
1,1,2-Trichloroethane	NA	NA	NA	NA
Benzene	NA	NA	NA	NA
trans-1,3-Dichloropropene	NA	NA	NA	NA
Bromoform	NA	NA	NA	NA
4-Methyl-2-pentanone	NA	NA	NA	NA
2-Hexanone	NA	NA	NA	NA
Tetrachloroethene	NA	NA	NA	NA
1,1,2,2-Tetrachloroethane	NA	NA	NA	NA
Toluene	NA	NA	NA	NA
Chlorobenzene	NA	NA	NA	NA
Ethylbenzene	NA	NA	NA	NA
Styrene	NA	NA	NA	NA
Xylene (total)	NA	NA	NA	NA
Acrolein	NA	NA	NA	NA

APPENDIX TABLE
ORGANIC COMPOUNDS
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SWMU 30
NAVAL STATION ROOSEVELT ROADS, PUERTO RICO

SAMPLE ID	30-HP03-01D	30-HP04-01	30-HP04-01D	30-HP05-01
SAMPLE DATE	06/22/99	06/23/99	06/23/99	06/23/99
DEPTH RANGE	0.00-2.50	0.00-2.50	0.00-2.50	0.00-2.50
Volatiles (ug/kg)				
Acrylonitrile	NA	NA	NA	NA
Trichlorofluoromethane	NA	NA	NA	NA
Dichlorodifluoromethane	NA	NA	NA	NA
Acetonitrile	NA	NA	NA	NA
Iodomethane	NA	NA	NA	NA
PROPIONITRILE (ETHYL CYANIDE)	NA	NA	NA	NA
3-Chloropropene	NA	NA	NA	NA
Methacrylonitrile	NA	NA	NA	NA
Dibromomethane	NA	NA	NA	NA
Isobutyl alcohol	NA	NA	NA	NA
1,2-Dibromoethane	NA	NA	NA	NA
1,1,1,2-Tetrachloroethane	NA	NA	NA	NA
1,2,3-Trichloropropane	NA	NA	NA	NA
trans-1,4-Dichloro-2-butene	NA	NA	NA	NA
1,2-Dibromo-3-chloropropane	NA	NA	NA	NA
2-Chloro-1,3-butadiene	NA	NA	NA	NA
Methyl methacrylate	NA	NA	NA	NA
Ethyl methacrylate	NA	NA	NA	NA
Semivolatiles (ug/kg)				
Phenol	360 U	350 U	340 U	350 U
Bis(2-chloroethyl)ether	360 U	350 U	340 U	350 U
2-Chlorophenol	360 U	350 U	340 U	350 U
1,3-Dinitrobenzene	360 U	350 U	340 U	350 U
1,4-Dichlorobenzene	360 U	350 U	340 U	350 U
Benzyl alcohol	360 U	350 U	340 U	350 U
1,2-Dichlorobenzene	360 U	350 U	340 U	350 U
o-Cresol	360 U	350 U	340 U	350 U
2,2'-Oxybis(1-Chloropropane)	360 U	350 U	340 U	350 U
M,P-CRESOL	NA	NA	NA	NA
m-Cresol	360 U	350 U	340 U	350 U
N-Nitroso-di-n-propylamine	360 U	350 U	340 U	350 U
Hexachloroethane	360 U	350 U	340 U	350 U
Nitrobenzene	360 U	350 U	340 U	350 U
Isophorone	360 U	350 U	340 U	350 U
2-Nitrophenol	360 U	350 U	340 U	350 U

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SWMU 30
NAVAL STATION ROOSEVELT ROADS, PUERTO RICO

SAMPLE ID	30-HP03-01D	30-HP04-01	30-HP04-01D	30-HP05-01
SAMPLE DATE	06/22/99	06/23/99	06/23/99	06/23/99
DEPTH RANGE	0.00-2.50	0.00-2.50	0.00-2.50	0.00-2.50
Semivolatiles (ug/kg) (cont)				
2,4-Dimethylphenol	360 U	350 U	340 U	350 U
Benzoic acid	1800 U	1800 U	1800 U	1800 U
Bis(2-chloroethoxy)methane	360 U	350 U	340 U	350 U
2,4-Dichlorophenol	360 U	350 U	340 U	350 U
1,2,4-Trichlorobenzene	360 U	350 U	340 U	350 U
Naphthalene	360 U	350 U	340 U	350 U
4-Chloroaniline	710 U	700 U	690 U	710 U
Hexachlorobutadiene	360 U	350 U	340 U	350 U
4-Chloro-3-methylphenol	360 U	350 U	340 U	350 U
2-Methylnaphthalene	360 U	350 U	340 U	350 U
Hexachlorocyclopentadiene	360 U	350 U	340 U	350 U
2,4,6-Trichlorophenol	360 U	350 U	340 U	350 U
2,4,5-Trichlorophenol	360 U	350 U	340 U	350 U
2-Chloronaphthalene	360 U	350 U	340 U	350 U
2-Nitroaniline	1800 U	1800 U	1800 U	1800 U
Dimethylphthalate	360 U	350 U	340 U	350 U
Acenaphthylene	360 U	350 U	340 U	350 U
2,6-Dinitrotoluene	360 U	350 U	340 U	350 U
3-Nitroaniline	1800 U	1800 U	1800 U	1800 U
Acenaphthene	360 U	350 U	340 U	350 U
2,4-Dinitrophenol	1800 U	1800 U	1800 U	1800 U
4-Nitrophenol	1800 U	1800 U	1800 U	1800 U
Dibenzofuran	360 U	350 U	340 U	350 U
2,4-Dinitrotoluene	360 U	350 U	340 U	350 U
Diethylphthalate	360 U	350 U	340 U	350 U
4-Chlorophenyl-phenylether	360 U	350 U	340 U	350 U
Fluorene	360 U	350 U	340 U	350 U
4-Nitroaniline	1800 U	1800 U	1800 U	1800 U
4,6-Dinitro,2-methylphenol	1800 U	1800 U	1800 U	1800 U
N-Nitrosodiphenylamine (1)	NA	NA	NA	NA
4-Bromophenyl phenyl ether	360 U	350 U	340 U	350 U
Hexachlorobenzene	360 U	350 U	340 U	350 U
Pentachlorophenol	1800 U	1800 U	1800 U	1800 U
Phenanthrene	360 U	350 U	340 U	350 U
Anthracene	360 U	350 U	340 U	350 U

APPENDIX TABLE
ORGANIC COMPOUNDS
SURFACE SOIL
SWMU 30
NAVAL STATION ROOSEVELT ROADS, PUERTO RICO

SAMPLE ID	30-HP03-01D	30-HP04-01	30-HP04-01D	30-HP05-01
SAMPLE DATE	06/22/99	06/23/99	06/23/99	06/23/99
DEPTH RANGE	0.00-2.50	0.00-2.50	0.00-2.50	0.00-2.50
Semivolatiles (ug/kg) (cont)				
Di-n-butylphthalate	360 U	350 U	340 U	350 U
Fluoranthene	360 U	350 U	260 J	350 U
Pyrene	360 U	350 U	240 J	350 U
Butylbenzylphthalate	360 U	350 U	340 U	350 U
3,3'-Dichlorobenzidine	710 U	700 U	690 U	710 U
Benzo(a)anthracene	360 U	350 U	230 J	350 U
Chrysene	360 U	350 U	390	350 U
Bis(2-ethylhexyl)phthalate	360 U	350 U	340 U	350 U
Di-n-octyl phthalate	360 U	350 U	340 U	350 U
Benzo(b)fluoranthene	360 U	350 U	280 J	350 U
Benzo(k)fluoranthene	360 U	350 U	240 J	350 U
Benzo(a)pyrene	360 U	350 U	200 J	350 U
Indeno(1,2,3-cd)pyrene	360 U	350 U	340 U	350 U
Dibenzo(a,h)anthracene	360 U	350 U	340 U	350 U
Benzo(g,h,i)perylene	360 U	350 U	340 U	350 U
1,4-Dioxane	NA	NA	NA	NA
Pyridine	NA	NA	NA	NA
N-Nitrosodimethylamine	360 U	350 U	340 U	350 U
2-Picoline	NA	NA	NA	NA
N-Nitrosomethylethylamine	NA	NA	NA	NA
Methyl methanesulfonate	NA	NA	NA	NA
N-Nitrosodiethylamine	NA	NA	NA	NA
Ethyl methanesulfonate	NA	NA	NA	NA
Aniline	NA	NA	NA	NA
N-Nitrosopyrrolidine	NA	NA	NA	NA
Acetophenone	NA	NA	NA	NA
N-Nitrosomorpholine	NA	NA	NA	NA
o-Toluidine	NA	NA	NA	NA
N-Nitrosopiperidine	NA	NA	NA	NA
A,A-DIMETHYLPHENETHYLAMINE	NA	NA	NA	NA
2,6-Dichlorophenol	NA	NA	NA	NA
Hexachloropropene	NA	NA	NA	NA
p-Phenylenediamine	NA	NA	NA	NA
N-Nitroso-di-n-butylamine	NA	NA	NA	NA
Safrole	NA	NA	NA	NA

APPENDIX TABLE
ORGANIC COMPOUNDS
SURFACE SOIL
SWMU 30
NAVAL STATION ROOSEVELT ROADS, PUERTO RICO

SAMPLE ID	30-HP03-01D	30-HP04-01	30-HP04-01D	30-HP05-01
SAMPLE DATE	06/22/99	06/23/99	06/23/99	06/23/99
DEPTH RANGE	0.00-2.50	0.00-2.50	0.00-2.50	0.00-2.50
Semivolatiles (ug/kg) (cont)				
1,2,4,5-Tetrachlorobenzene	NA	NA	NA	NA
Isosafrole	NA	NA	NA	NA
1,4-Naphthoquinone	NA	NA	NA	NA
1,3-Dichlorobenzene	NA	NA	NA	NA
Pentachlorobenzene	NA	NA	NA	NA
1-Naphthylamine	NA	NA	NA	NA
2-Naphthylamine	NA	NA	NA	NA
2,3,4,6-Tetrachlorophenol	NA	NA	NA	NA
1,3,5-Trinitrobenzene	NA	NA	NA	NA
Diallate	NA	NA	NA	NA
Phenacetin	NA	NA	NA	NA
Diphenylamine	360 U	350 U	340 U	350 U
5-Nitro-o-toluidine	NA	NA	NA	NA
4-Aminobiphenyl	NA	NA	NA	NA
Pronamide	NA	NA	NA	NA
2-sec-butyl-4,6-dinitrophenol	NA	NA	NA	NA
Pentachloronitrobenzene	NA	NA	NA	NA
4-Nitroquinoline-1-oxide	NA	NA	NA	NA
Methapyrilene	NA	NA	NA	NA
Aramite	NA	NA	NA	NA
Chlorobenzilate	NA	NA	NA	NA
p-Dimethylaminoazobenzene	NA	NA	NA	NA
3,3'-Dimethylbenzidine	NA	NA	NA	NA
2-Acetylaminofluorene	NA	NA	NA	NA
7,12-Dimethybenz(a)anthracene	NA	NA	NA	NA
Hexachlorophene	NA	NA	NA	NA
3-Methylcholanthrene	NA	NA	NA	NA
Carbazole	NA	NA	NA	NA
Pentachloroethane	NA	NA	NA	NA
3-and/or 4-methylphenol	NA	NA	NA	NA
Benzidine	2900 U	2900 U	2800 U	2900 U

APPENDIX TABLE
ORGANIC COMPOUNDS
SURFACE SOIL
SWMU 30
NAVAL STATION ROOSEVELT ROADS, PUERTO RICO

SAMPLE ID	30-HP03-01D	30-HP04-01	30-HP04-01D	30-HP05-01
SAMPLE DATE	06/22/99	06/23/99	06/23/99	06/23/99
DEPTH RANGE	0.00-2.50	0.00-2.50	0.00-2.50	0.00-2.50
Pesticides/PCBs (ug/kg)				
alpha-BHC	NA	NA	NA	NA
beta-BHC	NA	NA	NA	NA
delta-BHC	NA	NA	NA	NA
gamma-BHC (Lindane)	NA	NA	NA	NA
Heptachlor	NA	NA	NA	NA
Aldrin	NA	NA	NA	NA
Heptachlor epoxide	NA	NA	NA	NA
Endosulfan I	NA	NA	NA	NA
Dieldrin	NA	NA	NA	NA
4,4'-DDE	NA	NA	NA	NA
Endrin	NA	NA	NA	NA
Endosulfan II	NA	NA	NA	NA
4,4'-DDD	NA	NA	NA	NA
Endosulfan sulfate	NA	NA	NA	NA
4,4'-DDT	NA	NA	NA	NA
Methoxychlor	NA	NA	NA	NA
Endrin aldehyde	NA	NA	NA	NA
Isodrin	NA	NA	NA	NA
Kepone	NA	NA	NA	NA
alpha-Chlordane	NA	NA	NA	NA
gamma-Chlordane	NA	NA	NA	NA
Toxaphene	NA	NA	NA	NA
Aroclor-1016	36 U	35 U	35 U	180 U
Aroclor-1221	72 U	71 U	70 U	360 U
Aroclor-1232	36 U	35 U	35 U	180 U
Aroclor-1242	36 U	35 U	35 U	180 U
Aroclor-1248	36 U	35 U	35 U	180 U
Aroclor-1254	36 U	35 U	35 U	180 U
Aroclor-1260	36 U	25 J	64	1400

APPENDIX TABLE
ORGANIC COMPOUNDS
SURFACE SOIL
SWMU 30
NAVAL STATION ROOSEVELT ROADS, PUERTO RICO

SAMPLE ID	30-HP03-01D	30-HP04-01	30-HP04-01D	30-HP05-01
SAMPLE DATE	06/22/99	06/23/99	06/23/99	06/23/99
DEPTH RANGE	0.00-2.50	0.00-2.50	0.00-2.50	0.00-2.50
Ortho Pesticides (ug/kg)				
O,O,O-Triethylphosphorothioate	NA	NA	NA	NA
Phorate	NA	NA	NA	NA
Thionazin	NA	NA	NA	NA
Disulfoton	NA	NA	NA	NA
SULFOTEP	NA	NA	NA	NA
Dimethoate	NA	NA	NA	NA
Methyl parathion	NA	NA	NA	NA
Parathion	NA	NA	NA	NA
Famphur	NA	NA	NA	NA
Herbicides (ug/kg)				
2,4-D	NA	NA	NA	NA
2,4,5-TP (Silvex)	NA	NA	NA	NA
2,4,5-T	NA	NA	NA	NA
Dioxins (ug/kg)				
2,3,7,8-TCDD	NA	NA	NA	NA
Total TCDD	NA	NA	NA	NA
Total PeCDD	NA	NA	NA	NA
Total HxCDD	NA	NA	NA	NA
Total TCDF	NA	NA	NA	NA
Total PeCDF	NA	NA	NA	NA
Total HxCDF	NA	NA	NA	NA
Hydrocarbons (mg/kg)				
Hydrocarbons as GRO	0.27 U	0.27 U	0.26 U	0.16 J
Hydrocarbons as DRO	0.98 J	1.3 J	3 J	3.7
BTEX (ug/kg)				
Benzene	5.4 U	5.3 U	5.4 U	5.3 U
Ethylbenzene	5.4 U	5.3 U	5.4 U	5.3 U
Toluene	5.4 U	5.3 U	5.4 U	5.3 U
Xylene (total)	11 U	10 U	11 U	10 U

APPENDIX TABLE
INORGANIC COMPOUNDS
SURFACE SOIL
SWMU 30
NAVAL STATION ROOSEVELT ROADS, PUERTO RICO

SAMPLE ID	30SS01	30SS02	30SS03	30SS04	30SS05	30SS06	30-HP01-01	30-HP02-01
SAMPLE DATE	10/25/95	10/25/95	10/25/95	10/25/95	10/25/95	10/25/95	06/23/99	06/23/99
DEPTH RANGE	0.00-0.00	0.00-0.00	0.00-0.00	0.00-0.00	0.00-0.00	0.00-0.00	0.00-2.50	0.00-2.50
Inorganics (mg/kg)								
Antimony	NA	NA	1.9 UJ	2.4 UJ	NA	NA	0.31 J	0.29 J
Arsenic	0.58 J	1.5 J	1.5	0.79 J	0.45 J	1.6 J	NA	NA
Barium	103	36.5	34.2	59.7	93.7	24.3	NA	NA
Beryllium	NA	NA	0.14	0.15	NA	NA	NA	NA
Cadmium	0.42 UJ	0.38 UJ	1 J	0.24 J	0.38 UJ	0.4 UJ	NA	NA
Chromium	11.2 J	6.8 J	9.3 J	16.6 J	6.9 J	4.7 J	NA	NA
Cobalt	NA	NA	6.2	9	NA	NA	NA	NA
Copper	NA	NA	53	68.3	NA	NA	NA	NA
Lead	55.6 J	53.5	101	20.9	6.9 J	19.4	NA	NA
Mercury	0.06 R	0.06 R	0.06 U	0.46	0.14 R	0.06 R	NA	NA
Nickel	NA	NA	6.1	7.5	NA	NA	NA	NA
Selenium	0.33 J	0.2 J	1.1 U	0.89 U	0.15 UJ	0.95 J	NA	NA
Silver	1	0.49 U	0.23 U	0.3 U	0.49 U	0.52 U	NA	NA
Thallium	NA	NA	0.12 UJ	0.1 UJ	NA	NA	NA	NA
Tin	NA	NA	1.5 UJ	1.9 UJ	NA	NA	NA	NA
Vanadium	NA	NA	43.1 J	65.8 J	NA	NA	NA	NA
Zinc	NA	NA	79.6 J	46.5 J	NA	NA	NA	NA
Cyanide	NA	NA	0.61 U	0.55 U	NA	NA	NA	NA
Sulfide	NA	NA	27.1 U	27 U	NA	NA	NA	NA

APPENDIX TABLE
INORGANIC COMPOUNDS
SURFACE SOIL
SWMU 30
NAVAL STATION ROOSEVELT ROADS, PUERTO RICO

SAMPLE ID	30-HP03-01	30-HP03-01D	30-HP04-01	30-HP04-01D	30-HP05-01
SAMPLE DATE	06/22/99	06/22/99	06/23/99	06/23/99	06/23/99
DEPTH RANGE	0.00-2.50	0.00-2.50	0.00-2.50	0.00-2.50	0.00-2.50
Inorganics (mg/kg)					
Antimony	0.56 J	0.43 J	0.29 J	0.31 J	0.29 J
Arsenic	NA	NA	NA	NA	NA
Barium	NA	NA	NA	NA	NA
Beryllium	NA	NA	NA	NA	NA
Cadmium	NA	NA	NA	NA	NA
Chromium	NA	NA	NA	NA	NA
Cobalt	NA	NA	NA	NA	NA
Copper	NA	NA	NA	NA	NA
Lead	NA	NA	NA	NA	NA
Mercury	NA	NA	NA	NA	NA
Nickel	NA	NA	NA	NA	NA
Selenium	NA	NA	NA	NA	NA
Silver	NA	NA	NA	NA	NA
Thallium	NA	NA	NA	NA	NA
Tin	NA	NA	NA	NA	NA
Vanadium	NA	NA	NA	NA	NA
Zinc	NA	NA	NA	NA	NA
Cyanide	NA	NA	NA	NA	NA
Sulfide	NA	NA	NA	NA	NA

APPENDIX TABLE
ORGANIC COMPOUNDS
SUBSURFACE SOIL
SWMU 30
NAVAL STATION ROOSEVELT ROADS, PUERTO RICO

SAMPLE ID	30-HP01-02	30-HP01-03	30-HP02-02	30-HP02-03	30-HP03-02	30-HP03-03	30-HP04-02	30-HP04-03	30-HP05-02	30-HP05-03
SAMPLE DATE	06/23/99	06/23/99	06/23/99	06/23/99	06/22/99	06/22/99	06/23/99	06/23/99	06/23/99	06/23/99
DEPTH RANGE	6.00-7.00	8.00-9.00	6.00-7.00	8.00-9.00	5.00-6.00	8.00-9.00	6.00-7.00	8.00-9.00	6.00-7.00	8.00-9.00
BTEX (ug/kg)										
Benzene	6 U	5.4 U	5.3 U	5.6 U	5.3 U	6 U	4.9	5.1 U	5.6 U	5.4
Ethylbenzene	6 U	5.4 U	5.3 U	5.6 U	5.3 U	6 U	4.9 U	5.1 U	5.6 U	5.4
Toluene	6 U	5.4 U	5.3 U	5.6 U	5.3 U	6 U	4.9	5.1 U	5.6 U	5.4
Xylene (total)	12 U	11 U	10 U	11 U	11 U	12 U	9.8 U	10 U	11 U	11
Hydrocarbons (mg/kg)										
Hydrocarbons as GRO	0.12 J	0.89 J	0.72 J	2.4	0.26 U	0.31 U	0.26 U	0.24 J	0.28 U	5.7
Hydrocarbons as DRO	3.5 U	97	4.6	21	3.5 U	4.1 U	47	1800	3.7 U	3.6
Semivolatiles (ug/kg)										
Phenol	350 U	350 U	350 U	370 U	350 U	410 U	340 U	1400 U	370 U	350
Bis(2-chloroethyl)ether	350 U	350 U	350 U	370 U	350 U	410 U	340 U	1400 U	370 U	350
2-Chlorophenol	350 U	350 U	350 U	370 U	350 U	410 U	340 U	1400 U	370 U	350
1,3-Dichlorobenzene	350 U	350 U	350 U	370 U	350 U	410 U	340 U	1400 U	370 U	350
1,4-Dichlorobenzene	350 U	350 U	350 U	370 U	350 U	410 U	340 U	1400 U	370 U	350
Benzyl alcohol	350 U	350 U	350 U	370 U	350 U	410 U	340 U	1400 U	370 U	350
1,2-Dichlorobenzene	350 U	350 U	350 U	370 U	350 U	410 U	340 U	1400 U	370 U	350
2,2'-Oxybis(1-Chloropropane)	350 U	350 U	350 U	370 U	350 U	410 U	340 U	1400 U	370 U	350
N-Nitroso-di-n-propylamine	350 U	350 U	350 U	370 U	350 U	410 U	340 U	1400 U	370 U	350
Hexachloroethane	350 U	350 U	350 U	370 U	350 U	410 U	340 U	1400 U	370 U	350
Nitrobenzene	350 U	350 U	350 U	370 U	350 U	410 U	340 U	1400 U	370 U	350
Isophorone	350 U	350 U	350 U	370 U	350 U	410 U	340 U	1400 U	370 U	350
2-Nitrophenol	350 U	350 U	350 U	370 U	350 U	410 U	340 U	1400 U	370 U	350
2,4-Dimethylphenol	350 U	350 U	350 U	370 U	350 U	410 U	340 U	1400 U	370 U	350
Bis(2-chloroethoxy)methane	350 U	350 U	350 U	370 U	350 U	410 U	340 U	1400 U	370 U	350
Benzoic acid	1800 U	1800 U	1800 U	1900 U	1800 U	2100 U	1700 U	7400 U	1900 U	1800
2,4-Dichlorophenol	350 U	350 U	350 U	370 U	350 U	410 U	340 U	1400 U	370 U	350
1,2,4-Trichlorobenzene	350 U	350 U	350 U	370 U	350 U	410 U	340 U	1400 U	370 U	350
Naphthalene	350 U	350 U	350 U	370 U	350 U	410 U	340 U	1300 J	370 U	350
4-Chloroaniline	710 U	710 U	690 U	740 U	690 U	810 U	670 U	2900 U	740 U	710
Hexachlorobutadiene	350 U	350 U	350 U	370 U	350 U	410 U	340 U	1400 U	370 U	350
4-Chloro-3-methylphenol	350 U	350 U	350 U	370 U	350 U	410 U	340 U	1400 U	370 U	350

APPENDIX TABLE
ORGANIC COMPOUNDS
SUBSURFACE SOIL
SWMU 30
NAVAL STATION ROOSEVELT ROADS, PUERTO RICO

SAMPLE ID	30-HP01-02	30-HP01-03	30-HP02-02	30-HP02-03	30-HP03-02	30-HP03-03	30-HP04-02	30-HP04-03	30-HP05-02	30-HP05-03
SAMPLE DATE	06/23/99	06/23/99	06/23/99	06/23/99	06/22/99	06/22/99	06/23/99	06/23/99	06/23/99	06/23/99
DEPTH RANGE	6.00-7.00	8.00-9.00	6.00-7.00	8.00-9.00	5.00-6.00	8.00-9.00	6.00-7.00	8.00-9.00	6.00-7.00	8.00-9.00
Semivolatiles (ug/kg) (cont)										
2-Methylnaphthalene	350 U	350 U	350 U	370 U	350 U	410 U	340 U	6100	370 U	350
Hexachlorocyclopentadiene	350 U	350 U	350 U	370 U	350 U	410 U	340 U	1400 U	370 U	350
2,4,6-Trichlorophenol	350 U	350 U	350 U	370 U	350 U	410 U	340 U	1400 U	370 U	350
2,4,5-Trichlorophenol	350 U	350 U	350 U	370 U	350 U	410 U	340 U	1400 U	370 U	350
2-Chloronaphthalene	350 U	350 U	350 U	370 U	350 U	410 U	340 U	1400 U	370 U	350
2-Nitroaniline	1800 U	1800 U	1800 U	1900 U	1800 U	2100 U	1700 U	7400 U	1900 U	1800
Acenaphthylene	350 U	350 U	350 U	370 U	350 U	410 U	340 U	1400 U	370 U	350
2,6-Dinitrotoluene	350 U	350 U	350 U	370 U	350 U	410 U	340 U	1400 U	370 U	350
3-Nitroaniline	1800 U	1800 U	1800 U	1900 U	1800 U	2100 U	1700 U	7400 U	1900 U	1800
Acenaphthene	350 U	350 U	350 U	370 U	350 U	410 U	340 U	1400 U	370 U	350
2,4-Dinitrophenol	1800 U	1800 U	1800 U	1900 U	1800 U	2100 U	1700 U	7400 U	1900 U	1800
Dibenzofuran	350 U	350 U	350 U	370 U	350 U	410 U	340 U	240 J	370 U	350
4-Nitrophenol	1800 U	1800 U	1800 U	1900 U	1800 U	2100 U	1700 U	7400 U	1900 U	1800
2,4-Dinitrotoluene	350 U	350 U	350 U	370 U	350 U	410 U	340 U	1400 U	370 U	350
Fluorene	350 U	350 U	350 U	370 U	350 U	410 U	340 U	1400 U	370 U	350
Dimethylphthalate	350 U	350 U	350 U	370 U	350 U	410 U	340 U	1400 U	370 U	350
Diethylphthalate	350 U	350 U	350 U	370 U	350 U	410 U	340 U	1400 U	370 U	350
4-Chlorophenyl phenyl ether	350 U	350 U	350 U	370 U	350 U	410 U	340 U	1400 U	370 U	350
4-Nitroaniline	1800 U	1800 U	1800 U	1900 U	1800 U	2100 U	1700 U	7400 U	1900 U	1800
4,6-Dinitro-2-methylphenol	1800 U	1800 U	1800 U	1900 U	1800 U	2100 U	1700 U	7400 U	1900 U	1800
4-Bromophenyl phenyl ether	350 U	350 U	350 U	370 U	350 U	410 U	340 U	1400 U	370 U	350
Hexachlorobenzene	350 U	350 U	350 U	370 U	350 U	410 U	340 U	1400 U	370 U	350
Pentachlorophenol	1800 U	1800 U	1800 U	1900 U	1800 U	2100 U	1700 U	7400 U	1900 U	1800
Phenanthrene	350 U	350 U	350 U	370 U	350 U	410 U	340 U	820 J	370 U	350
Anthracene	350 U	350 U	350 U	370 U	350 U	410 U	340 U	1400 U	370 U	350
Di-n-butylphthalate	350 U	350 U	350 U	370 U	350 U	410 U	340 U	1400 U	370 U	350
Fluoranthene	350 U	350 U	350 U	370 U	350 U	410 U	340 U	1400 U	370 U	350
Benzidine	2900 U	2900 U	2800 U	3000 U	2800 U	3300 U	2700 U	12000 U	3000 U	2900
Pyrene	350 U	350 U	350 U	370 U	350 U	410 U	340 U	190 J	370 U	350
Butylbenzylphthalate	350 U	350 U	350 U	370 U	350 U	410 U	340 U	1400 U	370 U	350
Benzo(a)anthracene	350 U	350 U	350 U	370 U	350 U	410 U	340 U	1400 U	370 U	350
3,3'-Dichlorobenzidine	710 U	710 U	690 U	740 U	690 U	810 U	670 U	2900 U	740 U	710
Chrysene	350 U	350 U	350 U	370 U	350 U	410 U	340 U	1400 U	370 U	350

APPENDIX TABLE
ORGANIC COMPOUNDS
SUBSURFACE SOIL
SWMU 30
NAVAL STATION ROOSEVELT ROADS, PUERTO RICO

SAMPLE ID	30-HP01-02	30-HP01-03	30-HP02-02	30-HP02-03	30-HP03-02	30-HP03-03	30-HP04-02	30-HP04-03	30-HP05-02	30-HP05-03
SAMPLE DATE	06/23/99	06/23/99	06/23/99	06/23/99	06/22/99	06/22/99	06/23/99	06/23/99	06/23/99	06/23/99
DEPTH RANGE	6.00-7.00	8.00-9.00	6.00-7.00	8.00-9.00	5.00-6.00	8.00-9.00	6.00-7.00	8.00-9.00	6.00-7.00	8.00-9.00
Semivolatiles (ug/kg) (cont)										
Bis(2-ethylhexyl)phthalate	350 U	350 U	350 U	370 U	350 U	220 J	340 U	320 J	370 U	350
Di-n-octylphthalate	350 U	350 U	350 U	370 U	350 U	410 U	340 U	1400 U	370 U	350
Benzo(b)fluoranthene	350 U	350 U	350 U	370 U	350 U	410 U	340 U	1400 U	370 U	350
Benzo(k)fluoranthene	350 U	350 U	350 U	370 U	350 U	410 U	340 U	1400 U	370 U	350
Benzo(a)pyrene	350 U	350 U	350 U	370 U	350 U	410 U	340 U	1400 U	370 U	350
Indeno(1,2,3-cd)pyrene	350 U	350 U	350 U	370 U	350 U	410 U	340 U	1400 U	370 U	350
Dibenzo(a,h)anthracene	350 U	350 U	350 U	370 U	350 U	410 U	340 U	1400 U	370 U	350
Benzo(g,h,i)perylene	350 U	350 U	350 U	370 U	350 U	410 U	340 U	1400 U	370 U	350
N-Nitrosodimethylamine	350 U	350 U	350 U	370 U	350 U	410 U	340 U	1400 U	370 U	350
Diphenylamine	350 U	350 U	350 U	370 U	350 U	410 U	340 U	1400 J	370 U	350
m-Cresol	350 U	350 U	350 U	370 U	350 U	410 U	340 U	1400 U	370 U	350
o-Cresol	350 U	350 U	350 U	370 U	350 U	410 U	340 U	1400 U	370 U	350
PCBs (ug/kg)										
Aroclor-1260	160	190	96	160	35 U	41 U	1600	26 J	56	2000
Aroclor-1254	36 U	35 U	34 U	37 U	35 U	41 U	170 U	36 UJ	37 U	180
Aroclor-1221	72 U	72 U	70 U	75 U	71 U	83 U	340 U	73 UJ	75 U	360
Aroclor-1232	36 U	35 U	34 U	37 U	35 U	41 U	170 U	36 UJ	37 U	180
Aroclor-1248	36 U	35 U	34 U	37 U	35 U	41 U	170 U	36 UJ	37 U	180
Aroclor-1016	36 U	35 U	34 U	37 U	35 U	41 U	170 U	36 UJ	37 U	180
Aroclor-1242	36 U	35 U	34 U	37 U	35 U	41 U	170 U	36 UJ	37 U	180

APPENDIX TABLE
ORGANIC COMPOUNDS
SUBSURFACE SOIL
SWMU 30
NAVAL STATION ROOSEVELT ROADS, PUERTO RICO

SAMPLE ID		30-HP06-01	30-HP06-02	30-HP07-01	30-HP11-01	30-HP12-01	30-HP13-01	30-HP13-02	30-HP14-01	30-HP15-01
SAMPLE DATE		06/22/99	06/22/99	06/22/99	6/24/99	06/23/99	06/22/99	06/22/99	06/27/99	6/24/99
DEPTH RANGE		5.00-6.00	8.00-10.00	5.00-6.00	5.00-6.00	5.00-6.00	5.00-7.00	8.00-12.00	5.00-6.00	5.00-6.00
BTEX (ug/kg)										
Benzene	U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ethylbenzene	U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Toluene	U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Xylene (total)	U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Hydrocarbons (mg/kg)										
Hydrocarbons as GRO		0.28 U	0.28 U	0.27 U	0.27 U	0.27 U	0.3 U	0.31 U	0.27 U	0.29 U
Hydrocarbons as DRO		2 J	11	18	1.1 J	3 J	14	1.8 J	4	0.97 J
Semivolatiles (ug/kg)										
Phenol	U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bis(2-chloroethyl)ether	U	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Chlorophenol	U	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,3-Dichlorobenzene	U	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,4-Dichlorobenzene	U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzyl alcohol	U	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dichlorobenzene	U	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,2'-Oxybis(1-Chloropropane)	U	NA	NA	NA	NA	NA	NA	NA	NA	NA
N-Nitroso-di-n-propylamine	U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Hexachloroethane	U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nitrobenzene	U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Isophorone	U	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Nitrophenol	U	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,4-Dimethylphenol	U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bis(2-chloroethoxy)methane	U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzoic acid	U	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,4-Dichlorophenol	U	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2,4-Trichlorobenzene	U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Naphthalene	U	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Chloroaniline	U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Hexachlorobutadiene	U	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Chloro-3-methylphenol	U	NA	NA	NA	NA	NA	NA	NA	NA	NA

APPENDIX TABLE
ORGANIC COMPOUNDS
SUBSURFACE SOIL
SWMU 30
NAVAL STATION ROOSEVELT ROADS, PUERTO RICO

SAMPLE ID		30-HP06-01	30-HP06-02	30-HP07-01	30-HP11-01	30-HP12-01	30-HP13-01	30-HP13-02	30-HP14-01	30-HP15-01
SAMPLE DATE		06/22/99	06/22/99	06/22/99	6/24/99	06/23/99	06/22/99	06/22/99	06/27/99	6/24/99
DEPTH RANGE		5.00-6.00	8.00-10.00	5.00-6.00	5.00-6.00	5.00-6.00	5.00-7.00	8.00-12.00	5.00-6.00	5.00-6.00
Semivolatiles (ug/kg) (cont)										
2-Methylnaphthalene	U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Hexachlorocyclopentadiene	U	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,4,6-Trichlorophenol	U	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,4,5-Trichlorophenol	U	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Chloronaphthalene	U	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Nitroaniline	U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Acenaphthylene	U	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,6-Dinitrotoluene	U	NA	NA	NA	NA	NA	NA	NA	NA	NA
3-Nitroaniline	U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Acenaphthene	U	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,4-Dinitrophenol	U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dibenzofuran	U	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Nitrophenol	U	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,4-Dinitrotoluene	U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fluorene	U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dimethylphthalate	U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Diethylphthalate	U	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Chlorophenyl phenyl ether	U	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Nitroaniline	U	NA	NA	NA	NA	NA	NA	NA	NA	NA
4,6-Dinitro-2-methylphenol	U	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Bromophenyl phenyl ether	U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Hexachlorobenzene	U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pentachlorophenol	U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Phenanthrene	U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Anthracene	U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Di-n-butylphthalate	U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fluoranthene	U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzidine	U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pyrene	U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Butylbenzylphthalate	U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)anthracene	U	NA	NA	NA	NA	NA	NA	NA	NA	NA
3,3'-Dichlorobenzidine	U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chrysene	U	NA	NA	NA	NA	NA	NA	NA	NA	NA

APPENDIX TABLE
ORGANIC COMPOUNDS
SUBSURFACE SOIL
SWMU 30
NAVAL STATION ROOSEVELT ROADS, PUERTO RICO

SAMPLE ID		30-HP06-01	30-HP06-02	30-HP07-01	30-HP11-01	30-HP12-01	30-HP13-01	30-HP13-02	30-HP14-01	30-HP15-01
SAMPLE DATE		06/22/99	06/22/99	06/22/99	6/24/99	06/23/99	06/22/99	06/22/99	06/27/99	6/24/99
DEPTH RANGE		5.00-6.00	8.00-10.00	5.00-6.00	5.00-6.00	5.00-6.00	5.00-7.00	8.00-12.00	5.00-6.00	5.00-6.00
Semivolatiles (ug/kg) (cont)										
Bis(2-ethylhexyl)phthalate	U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Di-n-octylphthalate	U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(b)fluoranthene	U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)pyrene	U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dibenzo(a,h)anthracene	U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(g,h,i)perylene	U	NA	NA	NA	NA	NA	NA	NA	NA	NA
N-Nitrosodimethylamine	U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Diphenylamine	U	NA	NA	NA	NA	NA	NA	NA	NA	NA
m-Cresol	U	NA	NA	NA	NA	NA	NA	NA	NA	NA
o-Cresol	U	NA	NA	NA	NA	NA	NA	NA	NA	NA
PCBs (ug/kg)										
Aroclor-1260		NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor-1254	U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor-1221	U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor-1232	U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor-1248	U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor-1016	U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor-1242	U	NA	NA	NA	NA	NA	NA	NA	NA	NA

APPENDIX TABLE
INORGANIC COMPOUNDS
SUBSURFACE SOIL
SWMU 30
NAVAL STATION ROOSEVELT ROADS, PUERTO RICO

SAMPLE ID	30-HP01-02	30-HP01-03	30-HP02-02	30-HP02-03	30-HP03-02	30-HP03-03	30-HP04-02	30-HP04-03	30-HP05-02	30-HP05-03
SAMPLE DATE	06/23/99	06/23/99	06/23/99	06/23/99	06/22/99	06/22/99	06/23/99	06/23/99	06/23/99	06/23/99
DEPTH RANGE	6.00-7.00	8.00-9.00	6.00-7.00	8.00-9.00	5.00-6.00	8.00-9.00	6.00-7.00	8.00-9.00	6.00-7.00	8.00-9.00
Inorganics (mg/kg)										
Antimony	0.29 J	0.29 J	0.28 J	0.51 J	0.71 J	0.34 J	0.28 J	0.29 J	0.3 J	0.33 J

APPENDIX TABLE
ORGANIC COMPOUNDS
GROUNDWATER
SWMU 30
NAVAL STATION ROOSEVELT ROADS, PUERTO RICO

SAMPLE ID	1983-DW1	1983-DW1D	1983-MW3
SAMPLE DATE	10/25/95	10/25/95	10/25/95
VOLATILES (ug/l)			
Chloromethane	10 U	NA	10 U
Bromomethane	10 U	NA	10 U
Vinyl chloride	10 U	NA	10 U
Chloroethane	10 U	NA	10 U
Methylene chloride	5 U	NA	5 U
Acetone	10 U	NA	10 U
Carbon disulfide	5 U	NA	5 U
1,1-Dichloroethene	5 U	NA	5 U
1,1-Dichloroethane	5 U	NA	5 U
1,2-Dichloroethene (Total)	5 U	NA	5 U
Chloroform	5 U	NA	5 U
1,2-Dichloroethane	5 U	NA	5 U
2-Butanone (MEK)	10 U	NA	10 U
1,1,1-Trichloroethane	5 U	NA	5 U
Carbon tetrachloride	5 R	NA	5 R
Vinyl Acetate	10 U	NA	10 U
Bromodichloromethane	5 U	NA	5 U
1,2-Dichloropropane	5 U	NA	5 U
cis-1,3-Dichloropropene	5 U	NA	5 U
Trichloroethene	5 U	NA	5 U
Dibromochloromethane	5 U	NA	5 U
1,1,2-Trichloroethane	5 U	NA	5 U
Benzene	5 U	NA	5 U
trans-1,3-Dichloropropene	5 U	NA	5 U
Bromoform	5 U	NA	5 U
4-Methyl-2-pentanone	10 U	NA	10 U
2-Hexanone	10 U	NA	10 U
Tetrachloroethene	5 U	NA	5 U
1,1,2,2-Tetrachloroethane	5 U	NA	5 U
Toluene	5 U	NA	5 U
Chlorobenzene	5 U	NA	5 U
Ethylbenzene	5 U	NA	5 U
Styrene	5 U	NA	5 U
Xylene (total)	5 U	NA	5 U
Acrolein	500 U	NA	500 U
Acrylonitrile	100 U	NA	100 U
Trichlorofluoromethane	10 U	NA	10 U

APPENDIX TABLE
ORGANIC COMPOUNDS
GROUNDWATER
SWMU 30
NAVAL STATION ROOSEVELT ROADS, PUERTO RICO

SAMPLE ID	1983-DW1	1983-DW1D	1983-MW3
SAMPLE DATE	10/25/95	10/25/95	10/25/95
VOLATILES (ug/l)			
Dichlorodifluoromethane	20 U	NA	20 U
Acetonitrile	100 U	NA	100 U
Iodomethane	10 U	NA	10 U
PROPIONITRILE (ETHYL CYANIDE)	50 R	NA	50 R
3-Chloropropene	20 U	NA	20 U
Methacrylonitrile	20 U	NA	20 U
Dibromomethane	10 U	NA	10 U
Isobutyl alcohol	2000 U	NA	2000 U
1,2-Dibromoethane	20 U	NA	20 U
1,1,1,2-Tetrachloroethane	10 U	NA	10 U
1,2,3-Trichloropropane	10 U	NA	10 U
trans-1,4-Dichloro-2-butene	20 U	NA	20 U
1,2-Dibromo-3-chloropropane	20 U	NA	20 U
2-Chloro-1,3-butadiene	100 U	NA	100 U
Methyl methacrylate	20 U	NA	20 U
Ethyl methanesulfonate	10 U	NA	10 U
Semivolatiles (ug/l)			
Phenol	10 U	NA	10 U
Bis(2-chloroethyl)ether	10 U	NA	10 U
2-Chlorophenol	10 U	NA	10 U
1,3-Dinitrobenzene	20 U	NA	20 U
1,4-Dichlorobenzene	10 U	NA	10 U
Benzyl alcohol	10 U	NA	10 U
1,2-Dichlorobenzene	10 U	NA	10 U
o-Cresol	10 U	NA	10 U
2,2'-Oxybis(1-Chloropropane)	10 U	NA	10 U
M,P-CRESOL	10 U	NA	10 U
N-Nitroso-di-n-propylamine	10 U	NA	10 U
Hexachloroethane	10 U	NA	10 U
Nitrobenzene	10 U	NA	10 U
Isophorone	10 U	NA	10 U
2-Nitrophenol	10 U	NA	10 U
2,4-Dimethylphenol	10 U	NA	10 U
Benzoic acid	50 U	NA	50 U
Bis(2-chloroethoxy)methane	10 U	NA	10 U
2,4-Dichlorophenol	10 U	NA	10 U
1,2,4-Trichlorobenzene	10 U	NA	10 U

APPENDIX TABLE
ORGANIC COMPOUNDS
GROUNDWATER
SWMU 30
NAVAL STATION ROOSEVELT ROADS, PUERTO RICO

SAMPLE ID	1983-DW1	1983-DW1D	1983-MW3
SAMPLE DATE	10/25/95	10/25/95	10/25/95
Semivolatiles (ug/l)			
Naphthalene	10 U	NA	10 U
4-Chloroaniline	10 U	NA	10 U
Hexachlorobutadiene	10 U	NA	10 U
4-Chloro-3-methylphenol	10 U	NA	10 U
2-Methylnaphthalene	10 U	NA	10 U
Hexachlorocyclopentadiene	10 U	NA	10 U
2,4,6-Trichlorophenol	10 U	NA	10 U
2,4,5-Trichlorophenol	50 U	NA	50 U
2-Chloronaphthalene	10 U	NA	10 U
2-Nitroaniline	50 U	NA	50 U
Dimethylphthalate	10 U	NA	10 U
Acenaphthylene	10 U	NA	10 U
2,6-Dinitrotoluene	10 U	NA	10 U
3-Nitroaniline	50 U	NA	50 U
Acenaphthene	10 U	NA	10 U
2,4-Dinitrophenol	50 U	NA	50 U
4-Nitrophenol	50 U	NA	50 U
Dibenzofuran	10 U	NA	10 U
2,4-Dinitrotoluene	10 U	NA	10 U
Diethylphthalate	10 U	NA	10 U
4-Chlorophenyl-phenylether	10 U	NA	10 U
Fluorene	10 U	NA	10 U
4-Nitroaniline	50 U	NA	50 U
4,6-Dinitro,2-methylphenol	50 U	NA	50 U
N-Nitrosodiphenylamine (1)	10 U	NA	10 U
4-Bromophenyl phenyl ether	10 U	NA	10 U
Hexachlorobenzene	10 U	NA	10 U
Pentachlorophenol	50 U	NA	50 U
Phenanthrene	10 U	NA	10 U
Anthracene	10 U	NA	10 U
Di-n-butylphthalate	10 U	NA	10 U
Fluoranthene	10 U	NA	10 U
Pyrene	10 U	NA	10 U
Butylbenzylphthalate	10 U	NA	10 U
3,3'-Dichlorobenzidine	20 R	NA	20 R
Benzo(a)anthracene	10 U	NA	10 U
Chrysene	10 U	NA	10 U

APPENDIX TABLE
ORGANIC COMPOUNDS
GROUNDWATER
SWMU 30
NAVAL STATION ROOSEVELT ROADS, PUERTO RICO

SAMPLE ID	1983-DW1	1983-DW1D	1983-MW3
SAMPLE DATE	10/25/95	10/25/95	10/25/95
Semivolatiles (ug/l)			
Bis(2-ethylhexyl)phthalate	10 U	NA	2 U
Di-n-octyl phthalate	10 U	NA	10 U
Benzo(b)fluoranthene	10 U	NA	10 U
Benzo(k)fluoranthene	10 U	NA	10 U
Benzo(a)pyrene	10 U	NA	10 U
Indeno(1,2,3-cd)pyrene	10 U	NA	10 U
Dibenzo(a,h)anthracene	10 U	NA	10 U
Benzo(g,h,i)perylene	10 U	NA	10 U
1,4-Dioxane	20 U	NA	20 U
Pyridine	20 U	NA	20 U
N-Nitrosodimethylamine	10 U	NA	10 U
2-Picoline	10 U	NA	10 U
N-Nitrosomethylethylamine	10 U	NA	10 U
Methyl methanesulfonate	10 U	NA	10 U
N-Nitrosodiethylamine	10 U	NA	10 U
Aniline	50 U	NA	50 U
N-Nitrosopyrrolidine	50 U	NA	50 U
Acetophenone	10 U	NA	10 U
N-Nitrosomorpholine	20 U	NA	20 U
o-Toluidine	10 U	NA	10 U
N-Nitrosopiperidine	10 U	NA	10 U
A,A-DIMETHYLPHENETHYLAMINE	50 U	NA	50 U
2,6-Dichlorophenol	10 U	NA	10 U
Hexachloropropene	20 U	NA	20 U
p-Phenylenediamine	20 U	NA	20 U
N-Nitroso-di-n-butylamine	10 U	NA	10 U
Safrole	10 U	NA	10 U
1,2,4,5-Tetrachlorobenzene	10 U	NA	10 U
Isosafrole	10 U	NA	10 U
1,4-Naphthoquinone	50 U	NA	50 U
1,3-Dichlorobenzene	10 U	NA	10 U
Pentachlorobenzene	10 U	NA	10 U
1-Naphthylamine	10 U	NA	10 U
2-Naphthylamine	10 U	NA	10 U
2,3,4,6-Tetrachlorophenol	10 U	NA	10 U
1,3,5-Trinitrobenzene	100 U	NA	100 U
Diallate	10 U	NA	10 U

APPENDIX TABLE
ORGANIC COMPOUNDS
GROUNDWATER
SWMU 30
NAVAL STATION ROOSEVELT ROADS, PUERTO RICO

SAMPLE ID	1983-DW1	1983-DW1D	1983-MW3
SAMPLE DATE	10/25/95	10/25/95	10/25/95
Semivolatiles (ug/l)			
Phenacetin	10 U	NA	10 U
Diphenylamine	10 U	NA	10 U
5-Nitro-o-toluidine	20 U	NA	20 U
4-Aminobiphenyl	10 U	NA	10 U
Pronamide	10 U	NA	10 U
2-sec-butyl-4,6-dinitrophenol	20 U	NA	20 U
Pentachloronitrobenzene	10 U	NA	10 U
4-Nitroquinoline-1-oxide	50 U	NA	50 U
Methapyrilene	25 U	NA	25 U
Aramite	20 U	NA	20 U
Chlorobenzilate	10 U	NA	10 U
p-Dimethylaminoazobenzene	20 U	NA	20 U
3,3'-Dimethylbenzidine	20 U	NA	20 U
2-Acetylaminofluorene	20 U	NA	20 U
7,12-Dimethybenz(a)anthracene	20 U	NA	20 U
Hexachlorophene	100 R	NA	100 R
3-Methylcholanthrene	10 U	NA	10 U
Carbazole	10 U	NA	10 U
Pentachloroethane	20 U	NA	20 U
ETHYLMETHACRYLATE	20 U	NA	20 U

APPENDIX TABLE
ORGANIC COMPOUNDS
GROUNDWATER
SWMU 30
NAVAL STATION ROOSEVELT ROADS, PUERTO RICO

SAMPLE ID	1983-DW1	1983-DW1D	1983-MW3
SAMPLE DATE	10/25/95	10/25/95	10/25/95
Pesticides/PCBs (ug/l)			
alpha-BHC	0.05 U	NA	0.05 U
beta-BHC	0.05 U	NA	0.05 U
delta-BHC	0.05 U	NA	0.05 U
gamma-BHC (Lindane)	0.05 U	NA	0.05 U
Heptachlor	0.05 U	NA	0.05 U
Aldrin	0.05 U	NA	0.05 U
Heptachlor epoxide	0.05 U	NA	0.05 U
Endosulfan I	0.05 U	NA	0.05 U
Dieldrin	0.1 U	NA	0.1 U
4,4'-DDE	0.1 U	NA	0.1 U
Endrin	0.1 U	NA	0.1 U
Endosulfan II	0.1 U	NA	0.1 U
4,4'-DDD	0.1 U	NA	0.1 U
Endosulfan sulfate	0.1 U	NA	0.1 U
4,4'-DDT	0.1 U	NA	0.1 U
Methoxychlor	0.5 U	NA	0.5 U
Endrin aldehyde	0.1 U	NA	0.1 U
Isodrin	0.05 UJ	NA	0.05 UJ
Kepone	0.1 UJ	NA	0.1 UJ
alpha-Chlordane	0.5 U	NA	0.5 U
gamma-Chlordane	0.5 U	NA	0.5 U
Toxaphene	1 U	NA	1 U
Aroclor-1016	0.5 U	NA	0.5 U
Aroclor-1221	0.5 U	NA	0.5 U
Aroclor-1232	0.5 U	NA	0.5 U
Aroclor-1242	0.5 U	NA	0.5 U
Aroclor-1248	0.5 U	NA	0.5 U
Aroclor-1254	1 U	NA	1 U
Aroclor-1260	1 U	NA	1 U

APPENDIX TABLE
ORGANIC COMPOUNDS
GROUNDWATER
SWMU 30
NAVAL STATION ROOSEVELT ROADS, PUERTO RICO

SAMPLE ID	1983-DW1	1983-DW1D	1983-MW3
SAMPLE DATE	10/25/95	10/25/95	10/25/95
Ortho Pesticides (ug/l)			
O,O,O-Triethylphosphorothioate	2 U	NA	1.8 U
Phorate	2 U	NA	1.8 U
Thionazin	2 U	NA	1.8 U
Disulfoton	2 U	NA	1.8 U
SULFOTEP	2 U	NA	1.8 U
Dimethoate	2 U	NA	1.8 U
Methyl parathion	2 U	NA	1.8 U
Parathion	2 U	NA	1.8 U
Famphur	2 U	NA	1.8 U
Herbicides (ug/l)			
2,4-D	1.1 U	1 U	1.1 U
2,4,5-TP (Silvex)	0.22 U	0.21 U	0.22 U
2,4,5-T	0.22 U	0.21 U	0.22 U

APPENDIX TABLE
INORGANIC (TOTAL) COMPOUNDS
GROUNDWATER
SWMU 30
NAVAL STATION ROOSEVELT ROADS, PUERTO RICO

SAMPLE ID	1983-DW1	1983-MW3
SAMPLE DATE	10/25/95	10/25/95
Total Inorganics (ug/l)		
Antimony	16.2	31.5
Arsenic	1.6 U	4.4
Barium	51.2	173
Beryllium	0.3 U	0.3 U
Cadmium	4.2 U	4.2 U
Chromium	4.6 U	6.6
Cobalt	2.5	5.9
Copper	10	28.2
Cyanide, total	10 U	10 U
Lead	0.8 UJ	1.5 J
Mercury	0.23 J	0.1 U
Nickel	3.7 U	4.2
Selenium	1.5 UJ	1.5 UJ
Silver	3.2 U	3.2 U
Sulfide	1000 U	1000 U
Thallium	1.3 U	1.3 U
Tin	11.3 U	11.3 U
Vanadium	17.8	208
Zinc	72000	20.4

APPENDIX TABLE
INORGANIC (DISSOLVED) COMPOUNDS
GROUNDWATER
SWMU 30
NAVAL STATION ROOSEVELT ROADS, PUERTO RICO

SAMPLE ID	1983-DW1		1983-MW3	
SAMPLE DATE	10/25/95		10/25/95	
Dissolved Inorganics (ug/l)				
Antimony	23.3		12.3	U
Arsenic	1.6	U	3	
Barium	47.3		108	
Beryllium	0.3	U	0.3	U
Cadmium	4.2	U	4.2	U
Chromium	4.6	U	4.6	U
Cobalt	3.4		4.2	
Copper	3.1		2.1	
Lead	0.8	UJ	0.8	UJ
Mercury	0.18	J	0.1	U
Nickel	3.7	U	3.7	U
Selenium	1.5	UJ	1.5	UJ
Silver	3.2	U	3.2	U
Thallium	1.3	U	1.3	U
Tin	11.3	U	11.3	U
Vanadium	16.9		177	
Zinc	27.6		4.4	

APPENDIX G
1999 PHASE II RFI SOILS INVESTIGATION
ANALYTICAL RESULTS FOR QA/QC SAMPLES

APPENDIX TABLE
VOLATILE ORGANIC COMPOUNDS
QA/QC SAMPLES
SWMU 30
NAVAL STATION ROOSEVELT ROADS, PUERTO RICO

SAMPLE ID	99FB01	99FB02	30-TB01	99-ER01	99-ER02
SAMPLE DATE	6/30/99	6/30/99	6/24/99	6/30/99	6/30/99
VOLATILES (ug/l)					
Chloromethane	10 U	10 U	10 U	10 U	10 U
Vinyl chloride	10 U	10 U	10 U	10 U	10 U
Bromomethane (Methyl bromide)	10 U	10 U	10 U	10 U	10 U
Chloroethane	10 U	10 U	10 U	10 U	10 U
1,1-Dichloroethene	5 U	5 U	5 U	5 U	5 U
Methylene Chloride	5 U	5 U	5 U	5 U	5 U
trans-1,2-Dichloroethene	5 U	5 U	5 U	5 U	5 U
1,1-Dichloroethane	5 U	5 U	5 U	5 U	5 U
cis-1,2-Dichloroethene	5 U	5 U	5 U	5 U	5 U
Chloroform	5 U	84	5 U	5 U	5 U
1,1,1-Trichloroethane	5 U	5 U	5 U	5 U	5 U
Carbon Tetrachloride	5 U	5 U	5 U	5 U	5 U
Benzene	5 U	5 U	5 U	5 U	5 U
1,2-Dichloroethane	5 U	5 U	5 U	5 U	5 U
Trichloroethene	5 U	5 U	5 U	5 U	5 U
1,2-Dichloropropane	5 U	5 U	5 U	5 U	5 U
Bromodichloromethane	5 U	14	5 U	5 U	5 U
Toluene	5 U	5 U	5 U	5 U	5 U
1,1,2-Trichloroethane	5 U	5 U	5 U	5 U	5 U
Tetrachloroethene	5 U	5 U	5 U	5 U	5 U
Dibromochloromethane	5 U	5 U	5 U	5 U	5 U
Chlorobenzene	5 U	5 U	5 U	5 U	5 U
Ethylbenzene	5 U	5 U	5 U	5 U	5 U
Styrene	5 U	5 U	5 U	5 U	5 U
Bromoform	5 U	5 U	5 U	5 U	5 U
1,1,2,2-Tetrachloroethane	5 U	5 U	5 U	5 U	5 U
Acetone	50 U	50 U	50 U	50 U	50 U
Carbon disulfide	5 U	5 U	5 U	5 U	5 U
2-Butanone (MEK)	25 U	25 U	25 U	25 U	25 U
4-Methyl-2-pentanone (MIBK)	25 U	25 U	25 U	25 U	25 U
cis-1,3-Dichloropropene	5 U	5 U	5 U	5 U	5 U
trans-1,3-Dichloropropene	5 U	5 U	5 U	5 U	5 U
2-Hexanone	25 U	25 U	25 U	25 U	25 U
Xylenes (total)	10 U	10 U	10 U	10 U	10 U

APPENDIX TABLE
SEMIVOLATILE ORGANIC COMPOUNDS
QA/QC SAMPLES
SWMU 30
NAVAL STATION ROOSEVELT ROADS, PUERTO RICO

SAMPLE ID	99FB01	99FB02	99-ER01	99-ER02
SAMPLE DATE	6/30/99	6/30/99	6/30/99	6/30/99
SEMIVOLATILES (ug/l)				
Phenol	10 U	10 U	10 U	10 U
bis(2-Chloroethyl)ether	10 U	10 U	10 U	10 U
2-Chlorophenol	10 U	10 U	10 U	10 U
1,3-Dichlorobenzene	10 U	10 U	10 U	10 U
1,4-Dichlorobenzene	10 U	10 U	10 U	10 U
Benzyl alcohol	10 U	10 U	10 U	10 U
1,2-Dichlorobenzene	10 U	10 U	10 U	10 U
2-Methylphenol (o-cresol)	10 U	10 U	10 U	10 U
2,2'-Oxybis(1-chloropropane)[bis(2-	10 U	10 U	10 U	10 U
n-Nitrosodi-n-propylamine	10 U	10 U	10 U	10 U
3-Methylphenol/4-Methylphenol(m&	10 U	10 U	10 U	10 U
Hexachloroethane	10 U	10 U	10 U	10 U
Nitrobenzene	10 U	10 U	10 U	10 U
Isophorone	10 U	10 U	10 U	10 U
2-Nitrophenol	10 U	10 U	10 U	10 U
2,4-Dimethylphenol	10 U	10 U	10 U	10 U
bis(2-Chloroethoxy)methane	10 U	10 U	10 U	10 U
Benzoic acid	50 U	50 U	50 U	50 U
2,4-Dichlorophenol	10 U	10 U	10 U	10 U
1,2,4-Trichlorobenzene	10 U	10 U	10 U	10 U
Naphthalene	10 U	10 U	10 U	10 U
4-Chloroaniline	20 U	20 U	20 U	20 U
Hexachlorobutadiene	10 U	10 U	10 U	10 U
4-Chloro-3-methylphenol	10 U	10 U	10 U	10 U
2-Methylnaphthalene	10 U	10 U	10 U	10 U
Hexachlorocyclopentadiene	10 U	10 U	10 U	10 U
2,4,6-Trichlorophenol	10 U	10 U	10 U	10 U
2,4,5-Trichlorophenol	10 U	10 U	10 U	10 U
2-Chloronaphthalene	10 U	10 U	10 U	10 U
2-Nitroaniline	50 U	50 U	50 U	50 U
Acenaphthylene	10 U	10 U	10 U	10 U
2,6-Dinitrotoluene	10 U	10 U	10 U	10 U
3-Nitroaniline	50 U	50 U	50 U	50 U
Acenaphthene	10 U	10 U	10 U	10 U
2,4-Dinitrophenol	50 U	50 U	50 U	50 U
Dibenzofuran	10 U	10 U	10 U	10 U
4-Nitrophenol	50 U	50 U	50 U	50 U
2,4-Dinitrotoluene	10 U	10 U	10 U	10 U

APPENDIX TABLE
SEMIVOLATILE ORGANIC COMPOUNDS
QA/QC SAMPLES
SWMU 30
NAVAL STATION ROOSEVELT ROADS, PUERTO RICO

SAMPLE ID	99FB01	99FB02	99-ER01	99-ER02
SAMPLE DATE	6/30/99	6/30/99	6/30/99	6/30/99
SEMIVOLATILES (ug/l)				
Fluorene	10 U	10 U	10 U	10 U
Dimethylphthalate	10 U	10 U	10 U	10 U
Diethylphthalate	10 U	10 U	10 U	10 U
4-Chlorophenylphenyl ether	10 U	10 U	10 U	10 U
4-Nitroaniline	50 U	50 U	50 U	50 U
4,6-Dinitro-o-cresol (4,6-Dinitro-2-r	50 U	50 U	50 U	50 U
N-Nitrosodiphenylamine/Diphenyla	10 U	10 U	10 U	10 U
4-Bromophenylphenyl ether	10 U	10 U	10 U	10 U
Hexachlorobenzene	10 U	10 U	10 U	10 U
Pentachlorophenol	50 U	50 U	50 U	50 U
Phenanthrene	10 U	10 U	10 U	10 U
Anthracene	10 U	10 U	10 U	10 U
Di-n-butylphthalate	10 U	10 U	10 U	10 U
Fluoranthene	10 U	10 U	10 U	10 U
Benzidine	80 U	80 U	80 U	80 U
Pyrene	10 U	10 U	10 U	10 U
Butylbenzylphthalate	10 U	10 U	10 U	10 U
Benzo(a)anthracene	10 U	10 U	10 U	10 U
3,3'-Dichlorobenzidine	20 U	20 U	20 U	20 U
Chrysene	10 U	10 U	10 U	10 U
bis(2-Ethylhexyl)phthalate	10 U	10 U	10 U	10 U
Di-n-octylphthalate	10 U	10 U	10 U	10 U
Benzo(b)fluoranthene	10 U	10 U	10 U	10 U
Benzo(k)fluoranthene	10 U	10 U	10 U	10 U
Benzo(a)pyrene	10 U	10 U	10 U	10 U
Indeno(1,2,3-cd)pyrene	10 U	10 U	10 U	10 U
Dibenzo(a,h)anthracene	10 U	10 U	10 U	10 U
Benzo(g,h,i)perylene	10 U	10 U	10 U	10 U
N-Nitrosodimethylamine	10 U	10 U	10 U	10 U

APPENDIX TABLE
PCB ORGANIC COMPOUNDS
QA/QC SAMPLES
SWMU 30
NAVAL STATION ROOSEVELT ROADS, PUERTO RICO

SAMPLE ID	99FB01	99FB02	99-ER01
SAMPLE DATE	6/30/99	6/30/99	6/30/99
PCBs (ug/l)			
Aroclor-1016	1 U	1 U	1 U
Aroclor-1221	2 U	2 U	2 U
Aroclor-1232	1 U	1 U	1 U
Aroclor-1242	1 U	1 U	1 U
Aroclor-1248	1 U	1 U	1 U
Aroclor-1254	1 U	1 U	1 U
Aroclor-1260	1 U	1 U	1 U

APPENDIX TABLE
TOTAL INORGANIC COMPOUNDS
QA/QC SAMPLES
SWMU 30
NAVAL STATION ROOSEVELT ROADS, PUERTO RICO

SAMPLE ID	99FB01	99FB02	99-ER01	99-ER02
SAMPLE DATE	6/30/99	6/30/99	6/30/99	6/30/99
TOTAL METALS (ug/l)				
Antimony	2.7 U	2.7 U	2.7 U	2.7 U
Arsenic	1.3 U	1.4 J	1.3 U	1.3 U
Barium	0.4 U	8.9 J	0.4 U	0.4 U
Beryllium	0.1 U	0.1 U	0.1 U	0.1 U
Cadmium	0.5 U	0.5 U	0.5 U	0.5 U
Chromium	0.8 U	0.8 U	0.8 U	0.8 U
Cobalt	0.6 U	0.6 U	0.6 U	0.6 U
Copper	0.81 J	10.6 J	0.92 J	0.8 U
Lead	0.9 U	0.9 U	0.9 U	1.2 J
Mercury	0.1 U	0.1 U	0.1 U	0.1 U
Nickel	0.8 U	0.8 U	0.8 U	0.8 U
Selenium	1.7 U	137 U	1.7 U	1.7 U
Silver	0.6 U	0.6 U	0.6 U	0.6 U
Thallium	1.8 U	1.8 U	1.8 U	1.8 U
Tin	1.7 U	1.7 U	1.7 U	1.7 U
Vanadium	0.6 U	0.74 J	0.6 U	0.6 U
Zinc	2.4 J	63.3	0.8 U	0.8 U

APPENDIX TABLE
TOTAL CYANIDE, SULFIDE and HYDROCARBONS
QA/QC SAMPLES
SWMU 30
NAVAL STATION ROOSEVELT ROADS, PUERTO RICO

SAMPLE ID	30-TB01	30-TB-04	99FB01	99FB02	99-ER01	99-ER02
SAMPLE DATE	6/24/99	6/28/99	6/30/99	6/30/99	6/30/99	6/30/99
UNITS	mg/l	mg/kg	mg/l	mg/l	mg/l	mg/l
Cyanide, Total	NA	NA	NA	NA	0.01 U	0.01 U
Sulfide	NA	NA	NA	NA	0.1 U	0.1 U
Hydrocarbons as DRO	NA	NA	0.1 U	0.1 U	0.1 U	0.1 U
Hydrocarbons as GRO	0.25 U	0.25 U	0.05 U	0.05 U	0.05 U	0.05 U

APPENDIX TABLE
DIOXIN COMPOUNDS
QA/QC SAMPLES
SWMU 30
NAVAL STATION ROOSEVELT ROADS, PUERTO RICO

SAMPLE ID	99FB01	99FB02	99-ER01	99-ER02
SAMPLE DATE	6/27/99	6/27/99	6/27/99	6/27/99
DIOXIN (pg/l)				
2,3,7,8-TCDD	1.7 U	3.3 U	3.5 U	2.6 U
TOTAL TCDD	1.7 U	3.3 U	3.5 U	2.6 U
1,2,3,7,8-PECDD	1.2 U	2.1 U	1.6 U	1.8 U
TOTAL PECDD	1.2 U	2.1 U	1.6 U	1.8 U
1,2,3,4,7,8-HXCDD	1.8 U	3 U	4.2 U	1.9 U
1,2,3,6,7,8-HXCDD	1.5 U	2.6 U	3.5 U	1.6 U
1,2,3,7,8,9-HXCDD	1.4 U	2.5 U	3.3 U	1.5 U
TOTAL HXCDD	1.8 U	3 U	4.2 U	1.9 U
1,2,3,4,6,7,8-HPCDD	3 U	3.7 U	5.8 U	2 U
TOTAL HPCDD	3 U	3.7 U	5.8 U	2 U
OCDD	10 U	9.7 U	9.8 U	8.4 U
2,3,7,8-TCDF	2.8 U	3.7 U	2.4 U	2.4 U
TOTAL TCDF	2.8 U	3.7 U	2.4 U	2.4 U
1,2,3,7,8-PECDF	3.1 U	3.2 U	2.4 U	2.5 U
2,3,4,7,8-PECDF	2.4 U	2.5 U	1.9 U	1.9 U
TOTAL PECDF	3.1 U	3.2 U	2.4 U	2.5 U
1,2,3,4,7,8-HXCDF	0.86 U	1 U	1.2 U	1.1 U
1,2,3,6,7,8-HXCDF	0.85 U	1 U	1.4 U	1.2 U
2,3,4,6,7,8-HXCDF	0.86 U	1 U	1.3 U	1.2 U
1,2,3,7,8,9-HXCDF	0.9 U	0.97 U	1.3 U	1.2 U
TOTAL HXCDF	0.9 U	1 U	1.4 U	1.2 U
1,2,3,4,6,7,8-HPCDF	1.4 U	1.3 U	1.2 U	0.79 U
1,2,3,4,7,8,9-HPCDF	1.8 U	1.7 U	1.5 U	0.94 U
TOTAL HPCDF	1.8 U	1.7 U	1.5 U	0.94 U
OCDF	4.8 U	6.7 U	5.6 U	5 U

APPENDIX H
PERSONAL CORRESPONDENCE ASSOCIATED WITH THE USE OF 2 X AVERAGE DETECTED BACKGROUND CONCENTRATIONS

Phone Call Report

Baker

Project/Location:	Phase II RCRA Facility Investigation Report SWMU 30- Former Incinerator Cieba, Puerto Rico	S.O. No.:	26007-099-0000-SRN
		Date:	1/20/00
		Contract No.:	N62470-95-D-6007
To:	Gina Ferreira	From:	Melissa M Fredrick
Repres.:	USEPA Region II	Repres.:	Baker Environmental
Phone No.:	212-637-4431	Phone No.:	412-269-2007

According to Gina Ferreira, USEPA Region II, there is no formal policy on comparing inorganic background concentrations in soil to site concentrations. However, she explained to me that Region II's in house policy is to compare 2 times the average background inorganic concentration to the maximum site concentration. If the maximum concentration detected on-site is less than 2 times the average background, that inorganic chemical can be eliminated from further quantitative analysis in a human or ecological risk assessment.

From: Melissa Fredrick
To: Kimes, Mark
Date: 2/1/00 7:37PM
Subject: Tiered Approach 3°

A tiered screening approach was used to identify Chemical of Potential Concern (COPCs) for SWMU 30. A tiered screening is simply a step-wise approach of identifying and focusing on the dominant contaminants and media of potential concern. There is not a guidance document that directs the Risk Assessor as to what step should be first. However, there is guidance on what the steps for elimination of minor chemicals can be taken. Per USEPA Risk Assessment Guidelines (RAGS A) there are several approaches that can be considered to reduce the number of chemicals that are carried through a risk assessment, including comparing to background concentrations and comparing to health based criteria (USEPA 1989). For SWMU, Baker Environmental chose to eliminate those chemicals that compare to background first, and then compare those chemicals exceeding background to health based criteria developed by Region III (USEPA, 1999).

USEPA. (1989). Risk Assessment Guidance for Superfund Volume I. Human Health Evaluation Manual (Part A) Interim Final. Washington, D.C: Office of Solid Waste and Emergency Response. December 1989. EPA/540/1-89-002.

USEPA. (1999). Region III Risk-Based Concentration Summary Table Revised October 1999. Philadelphia, Pennsylvania: Hazardous Waste Management Division Office of Superfund Programs.

CC: Malinowski, John

From: GINA FERREIRA <FERREIRA.GINA@EPAMAIL.EPA.GOV>
To: <GORDON.TIMOTHY@EPAMAIL.EPA.GOV>
Date: 2/7/00 6:59AM
Subject: Background standards for inorganic constituents -Reply

Region II's informal unwritten policy for the selection of inorganic COCs in the human health risk assessment is to compare the average media concentration to 2 times the average background concentration. The inorganic chemical is considered a COC if the average media concentration is equal to or greater than 2 times the average background concentration.

>>> TIMOTHY GORDON 01/28/00 01:14pm >>>
Please advise whether or not the attached accurately reflects your position. If so, can you cite specific Region 2 guidance (letter, memo, etc.) that we can refer to? Please advise. Call me on 4167 if questions. Thanks.

From: Rich Hoff
To: Kimes, Mark
Date: 2/15/00 1:18PM
Subject: Re: Fwd: Background standards for inorganic constituents -Reply

Mark,

We are currently comparing 2x the average background concentration to individual site - inorganic sample results or maximum values. If the maximum site value exceeds twice the average background value - we keep the chemical as a COPC. This is a more conservative approach because we can't overlook a hot-spot that way.

We can use their interpretation, but I believe that we would have to identify with some level of confidence the underlying distribution of the data before we used this interpretation - and given the number of samples we generally take at any site, this is a difficult and often ambiguous task.

Despite the conservatism, I think we want to use our approach because we can do so without exception and without calling into question the number of samples taken at a point in the process where we would be hard pressed to respond - other than to take more samples.

A good example is:

we obtain 10 site samples for arsenic. The results in mg/Kg are:

1.7, 2.2, 1.5, <1.0, 5.4, 1.4, 1.8, 22.4, 1.7, 1.1

The average is: 3.97 with a st. dev of 6.61. The proffered approach of 2 times the average is 7.94.

Now let's say background results are:

12.1, 10.2, 8.3

the average is 10.2 with a st. dev of 1.9

2 times the average background is 20.4, so according to EPA, we're below background. Clearly using any statistical evaluation (i.e., 95% UCLs or assumption of log-normality) we're not. Using our method (and it's a crude one) we can't miss the potential hot-spot which in this case would be the 22.4 value. In this case I don't think their interpretation would fly and we may be in the position of having to possibly acquire more data to address the issue - a more costly proposition (possibly) than making Arsenic a COPC in the first place.

I think in this case, we continue to use our process because it makes better statistical sense but I use this term referentially. EPA is in the process of putting together a document on statistical use of background which will be out before June (or so I am told). I'm betting no one will be happy with it because it's very difficult to describe our samples with any real statistical integrity. Nature of the beast - so to speak.

In any respect, I'd like to continue with our approach at least until the background document surfaces later this year.

From: Mark KIMES
To: Gordon, Tim
Date: 2/15/00 1:42PM
Subject: Re: Fwd: Background standards for inorganic constituents -Reply

Tim,

Attached is an e-mail from Rich Hoff discussing the differences between comparing the maximum site concentration versus the average site concentration against 2x the average detected background. The use of the maximum site concentration is a more conservative approach which can not overlook a hot spot which may be present at the site. The Navy has opted to utilize the more conservative approach as discussed in the attached e-mail. I will include this correspondence on this issue as an Appendix to the SWMU 30 RFI Report.

Please feel free to contact me with any questions or comments concerning this matter.

Thank you,

Mark

CC: Hoff, Rich; Pennyct@efdtant.navfac.navy.mil