Final

Phase I RCRA Facility Investigation Report

SWMU 42

Naval Activity Puerto Rico
EPA I.D. No. PR2170027203
Ceiba, Puerto Rico

Prepared for

Department of the Navy
Atlantic Division
Naval Facilities Engineering Command

Norfolk, Virginia

Contract No. N62470-02-D-3052
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Prepared by

CH2M HILL
Federal Group, Inc.

Baker
Environmental, Inc.

CDM
Federal Programs Corp.

FINAL

PHASE I RCRA FACILITY INVESTIGATION REPORT
SWMU 42 – WATER PURIFICATION PLANT LAGOONS

NAVAL ACTIVITY PUERTO RICO
EPA I.D. NO. PR2170027203
CEIBA, PUERTO RICO

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Prepared for:

DEPARTMENT OF THE NAVY
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Prepared by:

BAKER ENVIRONMENTAL, INC.
Moon Township, Pennsylvania

CH2M Hill
Herndon, Virginia

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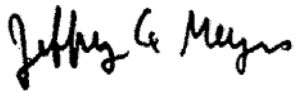
Signature 

Name: **Jeffrey G Meyers**

Title: **BRAC Env. Coordinator**

Date: **November 20, 2007**

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LIST OF ACRONYMS AND ABBREVIATIONS

AFWTF	Atlantic Fleet Weapons Training Facility
AOC	Areas of Concern
APA	Aerial Photography Analysis
AQUIRE	Aquatic Toxicity Information Retrieval
Baker	Baker Environmental, Inc.
bgs	below ground surface
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CLEAN	Comprehensive Long-Term Environmental Action Navy Program
CRQL	Contract Required Quantification Limit
COPC	Chemicals of Potential Concern
CSF	Cancer Slope Factor
CTO	Contract Task Order
DPT	Direct Push Technology
DRMO	Defense Reutilization and Marketing Office
DRO	Diesel Range Organics
Eco-SSL	Ecological Soil Screening Level
EC_{50}	median effective concentration
ECP	Environmental Condition of Property
F	Fahrenheit
FCV	Final Chronic Value
FID	Flame Ionization Detector
GPS	Global Positioning System
GRO	Gasoline Range Organics
HSWA	Hazardous and Solid Waste Amendments (to RCRA)
IAS	Initial Assessment Study
Inc.	Incorporated
IR	Installation Restoration
kg	Kilograms
LANTDIV	Department of the Navy, Atlantic Division
LC_{50}	medial lethal concentration
LNAPL	light, non-aqueous phase liquid
LOEC	lowest observable effects concentration
LOEL	lowest observable effects level
MATC	Maximum acceptable toxic concentration
MCL	Maximum Contaminant Level
mg	Milligrams
mgd	Million Gallons per Day
mg/l	Milligrams per Liter
MS/MSD	Matrix Spike/Matrix Spike Duplicate

LIST OF ACRONYMNS AND ABBREVIATIONS
(continued)

NAPR	Naval Activity Puerto Rico
NAVFAC	Naval Facilities Engineering Command Atlantic Division
NAWQC	National Ambient Water Quality Criteria
NEESA	Navel Energy and Environmental Support Activity
NOAA	National Oceanic and Atmospheric Administration
NOEC	No observed effect concentration
NSRR	Naval Station Roosevelt Roads
PAH	Polynuclear Aromatic Hydrocarbons
PCB	Polychlorinated Biphenyls
PID	Photoionization Detector
PI	Photo Identified
PRG	Preliminary Remediation Goal
QA/QC	Quality Assurance/Quality Control
RAG	Risk Assessment Guidelines
RCRA	Resource Conservation and Recovery Act
RfD	Reference Dose
RFI	RCRA Facility Investigation
SCV	Secondary chronic value
SDG	Sample Delivery Group
SQUIRT	Screening quick reference table
SVOC	Semi-Volatile Organic Compound
SWMU	Solid Waste Management Unit
USEPA	United States Environmental Protection Agency
UST	Underground Storage Tank
VOC	Volatile Organic Compound
VSI	Visual Site Inspection

1.0 INTRODUCTION

This document presents the results from the performance of a Phase I Resource Conservation Recovery Act (RCRA) Facility Investigation (RFI) at the Solid Waste Management Unit (SWMU) 42 - Water Purification Plant Lagoons located at Naval Activity Puerto Rico (NAPR), Ceiba, Puerto Rico.

This document was prepared by Baker Environmental, Inc. (Baker), for the Naval Facilities Engineering Command Atlantic Division (NAVFAC). This RFI Report is being developed under Contract Task Order (CTO) 121 under the NAVFAC Atlantic Division (LANTDIV) Comprehensive Long-Term Environmental Action Navy (CLEAN) Program, Contract Number N62470-02-D-3052.

1.1 Purpose

This report has been prepared to document the findings of the 2006 Phase I RFI field work. The recently collected data is compared against current evaluation criteria to identify chemicals of potential concern (COPC) and conducting preliminary screening of human health and ecological criteria.

1.2 Objectives

The objectives of the RFI are to determine if any contaminants are present from past operation of the water purification plant lagoons, to the extent practical, from the completion of field activities (surface soil, subsurface soil, sediment, and groundwater sampling) as described in the 2006 RFI Work Plan (Baker 2006a);

Specific elements of the 2006 field effort performed to support this RFI include:

- Surface soil sampling at three locations; one boring located north of the lagoons, one to the south of the lagoons and one to the west of the lagoons;
- Subsurface soil sampling collected at two depths from three locations; one boring located north of the lagoons, one to the south of the lagoons and one to the west of the lagoons;
- Sediment samples collected at four locations from the inside perimeter of the two lagoons;
- The installation of three temporary monitoring wells at the subsurface soil sampling locations; and
- Groundwater sampling at the three temporary monitoring wells.

1.3 Organization of the RFI Report

This report is organized into seven sections. Section 1.0 of this document discusses the purpose and objectives of this RFI. Section 2.0 provides a description of the current conditions of the site, including the history of SWMU 42, and a summary of previous investigations. Section 3.0 provides a description of the physical characteristics of the study area including climatology, topography, geology, hydrology, and hydrogeology. The scope of field investigation that was conducted in 2006 is provided in Section 4.0 (work plan summary) – this includes a surface and subsurface soil sampling and analysis program, a sediment sampling and analysis program, a

temporary monitoring well installation program, a groundwater sampling and analysis program, a quality assurance/quality control (QA/QC) sampling program, as well as other investigation considerations. The nature and extent of contamination as determined from the results is reported in Section 5.0. Section 6.0 presents the conclusions and recommendations from the RFI, while Section 7.0 lists relevant report references.

2.0 FACILITY BACKGROUND

This section provides the history and description of NAPR and SWMU 42, as well as the current conditions at SWMU 42.

2.1 NAPR Description and History

NAPR occupies over 8,890 acres of the northern portion of the east coast of Puerto Rico, along Vieques Passage with Vieques Island lying to the east about 10 miles off the harbor entrance, see Figure 2-1. NAPR also occupies the immediately adjacent islands of Piñeros and Cabeza de Perro. The northern entrance to NAPR is about 35 miles east along the coast road (Route 3) from San Juan. The property consists of 3,938 acres of upland (developable) property and 4,955 acres of environmentally sensitive areas including wetlands, mangrove, and wildlife habitat. The closest large town is Fajardo (population approximately 37,000), which is about 5 miles north of NAPR off Route 3. Ceiba (population approximately 17,000) adjoins the west boundary of NAPR.

The facility was commissioned in 1943 as a Naval Operations Base and re-designated Naval Station Roosevelt Roads (NSRR) in 1957. NSRR operated until March 31, 2004 when NSRR underwent operational closure. On April 1, 2004 NSRR was re-designated as NAPR. The current primary mission of NAPR is to protect the physical assets remaining, comply with environmental regulations, and sustain the value of the property until final disposal of the property.

On October 20, 1994, a Final RCRA Part B permit was issued by USEPA Region II to NSRR. This permit listed 52 SWMUs and 4 AOCs and contained requirements for RFI activities at 24 of these SWMUs and three of these AOCs. An additional 25 SWMUs and 2 AOCs were added to the program over the years. 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 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) to RCRA.

The USEPA issued a RCRA 7003 Administrative Order (EPA Docket No. RCRA-02-2007-7301), which became effective on January 29, 2007. SWMU 42 is identified as one of several SWMUs which had no further actions required under the November 1994 RCRA permit, but now warrant Phase I RFIs, because of the NAPR closure. Figure 2-2 shows all 77 SWMUs and 6 AOCs currently listed under the RCRA 7003 Administrative Order on Consent.

2.2 SWMU 42 Description and History

SWMU 42 consists of two clay lined lagoons used for disposal of sludge from the water purification plant located immediately adjacent to the lagoons to the southeast, see Figure 2-3. Originally the water from the lagoons discharged into the nearby creek until the late 1970s or early 1980s when the water was rerouted back to the reservoir. According to the 1988 RCRA Facility Assessment (RFA), the sludge consisted of river mud, and aluminum sulfate and lime utilized during the water treatment process. Around the 1995 to 1996 timeframe the water was routed to the Bundy WWTP due to the inability to meet the new trihalomethane rule. Periodically (approximately every 7 years), the sludge is removed and disposed of at the base landfill. There is no indication of hazardous wastes being managed at this SWMU, and no visual

evidence of releases of hazardous wastes or constituents. NAPR has verbally indicated it has no knowledge or evidence of systematic and routine releases of hazardous wastes or constituents from this unit.

2.3 Current Conditions/Site Usage

The Water Purification Plant Lagoons are utilized on a limited basis due to the decreased amount of water being treated and utilized at the facility since the operational closure of Naval Station Roosevelt Roads on March 31, 2004 and the transition of the facility into caretaker status. The two lagoons are contained within a fenced area and surrounded by grass as shown on Figure 2-3. Each of the lagoons is mounded above the existing grade. The general direction of the topography surrounding the lagoons is from a high point to the east and a low point to the west. The area to the north and west of the lagoons is classified as Palustrine Emergent Persistent wetland.

2.4 Previous Investigations

A Visual Site Inspection (VSI) was conducted in 1988, with a follow-up VSI occurring in June 1993. SWMU 42 was not included in the 1988 VSI but was evaluated in the June 1993 VSI. No visual evidence of releases of hazardous wastes or constituents was observed during the investigation. In addition, verbal indication was given by the permittee that no knowledge or evidence of systemic and routine releases of hazardous wastes was emitted from this site.

On September 15, 2006 the Phase I RFI Work Plans (Baker, 2006a) were developed and later approved by the USEPA on October 20, 2006. Mobilization for the RFI field activities occurred November 12, 2006 with demobilization on November 20, 2006.

3.0 PHYSICAL CHARACTERISTICS OF STUDY AREA

The physical setting of NAPR was documented in the 1984 IAS (NEESA, 1984). This information is summarized in the paragraphs that follow.

3.1 Climatology

The climate associated with NAPR 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 30° North, 30° 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 82.0° Fahrenheit (F) in January to 88.2° F in August. The mean annual minimum temperatures vary from 64.0° F in January to 73.2° F in June. The highest maximum temperature recorded was 95.0° F, while the lowest minimum was 59.0° F. 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 3 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 during the period. 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 mid-June through mid-September; maximum winds exceed 95 knots during severe hurricanes. An average of two tropical storms per year occurs in the study area, one of which usually reaches hurricane intensity.

3.2 Topography

The regional area of NAPR 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 60° are common.

In the immediate area of NAPR, elevations range from sea level to approximately 295 feet. Immediately to the north of the NAPR boundary, the hills rise abruptly to heights of 800 to 1,050 feet above sea level, with the tallest peak located within 2 kilometers of the NAPR boundary.

There is a series of three hilly areas on NAPR, 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 ridgelines not only separate sections of NAPR, but also dictate the degree of allowable development. The ridgeline south of the airfield provides an excellent barrier, which effectively decreases the aircraft-generated noise reaching the Unaccompanied Enlisted Personnel Housing areas to an acceptable level. Relief is low along the shoreline and lagoons and mangrove swamps are common.

3.3 Geology, Hydrology, and Hydrogeology

Subsections 3.3.1 through 3.3.4 below present descriptions of the geologic, hydrologic, and hydrogeologic conditions across NAPR. These are generally applicable, but may or may not be specifically applicable, to the SWMU 42 area.

3.3.1 Soils

The soil associations found at NAPR 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 NAPR.

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

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. Coral, shells, and marl at varying depths underlie them. 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 NAPR 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 that formed in residual material weathered from volcanic rocks. This association is represented at NAPR 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 NAPR 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 NAPR 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.

3.3.2 Regional Geology

The underlying geology of NAPR 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 limestone 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, unconsolidated alluvial and older deposits from the Quaternary period underlie the northwestern and western sectors of the base.

The primary geologic formations on and near NAPR are various beach deposits, alluvium, quartz diorite and granodiorite, quartz keratophyre, the Daguao Formation, and the Figuera Lava. The Peña Pobre fault zone traverses NAPR.

3.3.3 Regional Hydrology

The surface waters that flow across the northeastern plain of Puerto Rico, where NAPR is located, originate on the eastern slopes of the Sierra De Luquillo Mountains. Surface runoff is channeled into various rivers and streams that 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 NAPR and, in periods of heavy rain, flooding on NAPR 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 NAPR's northern boundary, has significantly increased the surface runoff reaching NAPR, 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 a new highway (Route 3) immediately outside the fence and the realignment of Boxer Drive both with attendant storm water management features.

In the low-lying shore areas, seawater flooding results from storms, wind, and abnormally high tides. The tidal ranges in the NAPR 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 NAPR.

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 that can easily erode soils from steep slopes, exposed areas and disturbed streambeds. Water from alluvial aquifers along the coast of NAPR 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 NAPR potable water treatment plant receives 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 NAPR boundary. A raw water reservoir is located at the water treatment plant and has a 45 million gallon capacity see Figure 2-3. Additionally, there are two fire protection storage reservoirs with a total capacity of 520,000 gallons.

NAPR 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.

3.3.4 Site-Specific Hydrogeology

Little information exists concerning the hydrogeology of NAPR. 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 site from these layers. Some wells had been developed upgradient of NAPR in Ceiba, some three kilometers from base headquarters, but were abandoned due to high levels of salinity.

In 2004, Baker conducted a Phase II ECP investigation involving 20 sites throughout NAPR (NAVFAC, 2004). Some consistent stratigraphic trends were observed during the ECP. The site-specific hydrogeology can be better understood in the context of NAPR regional geology. For the sake of simplicity, the NAPR regional geology can be divided into three regions:

- Upland areas
- Near-shore flat lands
- Inland flat lands

The upland areas of NAPR includes the hills encompassing the Tow Way Fuel Farm and hospital areas, and the hills encompassing the area behind the Exchange, the former Atlantic Fleet Weapons Training Facility (AFWTF) Command, and Fort Bundy area. These upland areas are underlain by bedrock (predominately Gabbro) and exhibit varying degrees of weathering. Typically, the bedrock is overlain be a relatively thin residual soil (i.e., residuum). Residuum is

unconsolidated soil, originating from weathered-in-place bedrock. This residuum generally consists of sand, silt, and clay.

The near-shore areas include the mangrove swamp areas as well as the shores of Ensenada Honda and Puerca Bay. The near-shore areas are typically underlain by marine sand layers (with coral and shell fragments), silt and clay layers, and occasional peat layers. In some near-shore areas, particularly by the harbor and Camp Moscrip in the southeastern portion of the base, fill material overlays the marine layers. The fill consists of rock fragments, debris (e.g., brick), sand, silt, and clay.

The inland flat land area generally encompasses the airfield and golf course areas. The inland flat land area is typically underlain by relatively thick residuum. The residuum generally consists predominately of clay. Fill material overlays the residuum in some areas, particularly the airfield, and generally consists of sand and gravel with lesser amounts of silt and clay.

SWMU 42 is located within the upland land area, just east of the golf course. An inconsistent stratigraphic sequence was observed during the 2006 RFI. At 42TW01, the stratigraphy consisted of fine to coarse sand fill material down to eight feet below ground surface (bgs), followed by a rock fragment layer to fourteen feet bgs, most likely fill material. Clay was observed below fourteen feet bgs. The other two borings, 42TW02, and 42TW03 were similar to each other with silt and clay to approximately 20 feet bgs.

Groundwater levels observed during the Phase I RFI investigation at SWMU 42 indicated a trend toward the northeast, with a low elevation observed at 42TW01, as shown in Figure 3-1. However, it is believed that this trend is incorrect, since the predominant regional groundwater flow would follow the topography and flow toward the west/northwest. Possible explanations for the observed localized groundwater table can be attributed to the course sand and rock fragments observed at 42TW01. This well may reflect the correct groundwater table, whereas the other two wells may reflect mounding and slow recharge due to the clay formations observed at these locations. In addition, a wet zone was observed in 42TW02 indicating the formation would recharge quicker, especially when compared to 42TW03 which did not identify wet zones during logging.

4.0 2006 RCRA FACILITY INVESTIGATION ACTIVITIES

The areas around the water purification plant lagoons were investigated at SWMU 42 during November 2006. Section 4.1 discusses soil boring advancement and temporary monitoring well installation. Section 4.2 discusses the sampling and analysis program and Section 4.3 presents a discussion of the soil, sediment, groundwater and QA/QC sampling programs involved with the 2006 RFI. Analytical results are discussed in detail in Section 5.0. Figure 4-1 depicts the sampling locations at SWMU 42. No deviations to the approved work plan were necessary for SWMU 42.

4.1 Soil Boring Advancement and Temporary Well Installation

Surface and subsurface soil samples were intended to be collected using direct-push technology (DPT) through the use of a Geoprobe® Macro Core Sampler in conjunction with a Geoprobe® 66DT track-mounted rig. However, in order to maintain the field schedule, surface soil samples were collected by hand and subsurface soil samples were collected using the DPT rig. GeoEnviroTech of San Juan, Puerto Rico was the DPT contractor. As presented in the Final RFI Work Plan (Baker, 2006a), a total of three soil borings (42SB01 through 42SB03) were advanced at SWMU 42 (Figure 4-1). One boring is located north of the lagoons, one to the south of the lagoons and one to the west of the lagoons. Each boring site was field located with a survey grade Global Positioning System (GPS) receiver. Subsurface soil sample collection was attempted to a maximum depth of 10 feet bgs to represent the potential exposure depth for risk assessment input and the borings were advanced deeper to investigate for the presence of groundwater and installation of monitoring wells. Soil boring logs have been produced and are provided in Appendix A.

Temporary monitoring wells were installed in the three borings. When the first temporary well (TW03) indicated a weak evidence of the presence of water, a field decision was made to use a 10-foot screen (deviating from the work plan specification of 5-foot screens), so that the groundwater yield could be increased. Consequently, to ensure that the groundwater was collected consistently from the same interval of the upper-most water-bearing zone at all locations of the site, a 10-foot screen interval was also installed at temporary wells TW01 and TW02. Temporary monitoring well materials were installed by hand by placing one inch diameter 10-feet long PVC screens threaded to an appropriate length of PVC casing. An elevation was obtained from the top of the PVC casing of the temporary wells for water level elevation calculations and a spot ground surface elevation. Temporary well details are also presented in Appendix A.

GeoEnviroTech personnel pulled the well materials from the bore holes upon completion of groundwater sampling. Spent well materials were decontaminated and subsequently disposed. Soil produced by drilling, that was not sampled, was placed back into the open boreholes following the removal of well materials. Because of the lack of an evidence of contamination (e.g., PID readings, visual/olfactory observations), it was deemed suitable to return the excess soil into the boreholes in accordance with Section 3.8.2 of the work plan. Therefore, no investigation-derived waste (IDW) was generated. The remaining borehole annulus was grouted to ground surface with bentonite grout.

4.2 Environmental Sampling and Analysis Program

Table 4-1 provides a summary of the soil, sediment, and groundwater sampling and analytical program performed for the 2006 RFI program at SWMU 42. In addition, this table shows information related to field duplicate and matrix spike/matrix spike duplicate (MS/MSD) samples

(since these are collected concurrent with the environmental samples). Other QA/QC samples (trip blanks, field blanks, and equipment rinsates) were collected and analyzed in accordance with Table 4-2. Also, analytical methods/descriptions, parameter lists, and Contract Required Quantification Levels (CRQL) are presented in Table 4-3. Field notes are presented in Appendix A.

4.2.1 Surface and Subsurface Soils

Surface soil samples were collected at soil borings 42SB01 through 42SB03 from a depth of 0 to 1.0-foot below ground surface (bgs). This is a deviation from the work plan, which had erroneously specified surface soil sampling depths of 0 to 0.5 foot bgs. Subsurface soil samples were collected at soil borings from two-foot intervals (e.g., 1 to 3 feet bgs, 3 to 5 feet bgs, etc) down to groundwater. Soil borings were advanced to a depth of 20 to 24-feet bgs.

Each of the surface and several of the subsurface soil samples were screened in the field using a PID; screening results were recorded in a field logbook. Soil samples for volatile organic compound (VOC) analysis were placed in pre-preserved vials (one containing methanol and two containing sodium bisulfate) consisting of TerraCore sampling kits.

Three surface soil samples and six subsurface soil primary environmental samples were submitted to Severn Trent Laboratory in Savannah, Georgia for analysis of Appendix IX VOCs, SVOCs, PCBs, and metals, as well as low level PAHs, sulfide and cyanide.

4.2.2 Sediment

Four sediment samples were collected from inside the perimeter of the SWMU 42 lagoons. Sample locations were slightly adjusted for the safety of sampling personnel because of the soft substrate. Samples were collected from a depth of 0 to 0.5 foot from the surface using a stainless steel spoon. The material was noted to be fine-grained, brown silt. Portions of the sample for analysis of VOCs were collected using Terra Core plugs, an 8-ounce wide-mouth glass jar was used for organics, and an 8-ounce wide-mouth polyethylene container was used for inorganics. The sediment samples were submitted to Severn Trent Laboratory in Savannah, Georgia for analysis of Appendix IX VOCs, SVOCs, PCBs, and metals, as well as low level PAHs, sulfide and cyanide.

4.2.3 Groundwater

Groundwater recharge rates at temporary wells 42TW02 and 42TW03 were slow and flow rates were inadequate for measurement of field parameters. Although the recharge rate at 42TW01 was higher, only a few of the field parameters could be measured and these are noted in the field log book. Because of the slow groundwater recharge rate, well development and low-flow purging procedures were not followed. Groundwater sampling was conducted at the rate limited by the recharge. Three groundwater samples were collected, one from each of the temporary monitoring wells installed. Groundwater samples were submitted to the analytical laboratory for Appendix IX VOCs, SVOCs, PCBs, and total and dissolved metals, as well as low level PAHs, and sulfide and cyanide.

4.2.4 Water Levels

First temporary monitoring wells were checked with an electronic interface probe to determine if free product hydrocarbons were present. Following the determination that free product was not present, water levels were collected using an electronic water level meter. Measurements were

taken following well completion and then typically the morning of each day following completion. Water level measurements and the corresponding water level elevations are presented on Table 4-4. Groundwater sampling activities typically began within the next day or two following completion, so the slow recovery at the temporary monitoring wells and especially 42TW01 resulted in not adequate time to stabilize. Water level elevations were calculated using the sampling event measurements and are presented on Figure 3-1. The predicted ground water flow direction would be toward the lowland areas to the west/southwest.

4.3 Quality Assurance/Quality Control Sampling and Analysis Program

4.3.1 Field Duplicates

A total of fourteen solid samples were collected as part of the 2006 RFI field sampling activity at SWMU 42. The RFI Work Plan specified one duplicate sample to be collected for every ten primary solid samples collected. Thus, one field duplicate samples (42SB03-00D) was collected concurrently. This sample was analyzed for Appendix IX VOCs, SVOCs, PCBs and total metals, as well as low level PAHs, and sulfide and cyanide. Two sediment duplicate samples were collected (42SD01D and 42SD03D). Sample 42SD01D was analyzed for Appendix IX VOCs. Sample 42SD03D was analyzed for Appendix IX SVOCs, PCBs and total metals, as well as low level PAHs, and sulfide and cyanide. One groundwater duplicate sample was collected at 42TW01D. Duplicate samples are useful in evaluating the field sampling methodology.

4.3.2 Trip Blanks

One trip blank sample accompanied each cooler containing the samples for Appendix IX VOC analysis. A total of three trip blank samples were prepared: 42TB01 was submitted on November 14, 2006; 42TB02 was submitted on November 15, 2006; 42TB03 was submitted on November 16, 2006. Samples 42TB01 and 42TB02 were submitted with the soil and sediment samples, and sample 42TB03 was submitted with the groundwater samples. Trip blank sample results are used to determine whether cross-contamination occurred during sampling and/or shipping.

4.3.3 Matrix Spike/Matrix Spike Duplicates

A total of fourteen solid samples were collected as part of the 2006 RFI field sampling activity. The RFI Work Plan specifies one matrix spike/matrix spike duplicate sample be collected for every 20 primary samples collected (for each matrix). Therefore, one QA/QC soil sample, 42SB03MS/MSD, was collected from the surface soil to evaluate the matrix effect upon the analytical methodology. Separate MS and MSD samples of groundwater were collected at sample location 42TW01.

4.3.4 Field Blanks

Field blank samples were collected from two different source waters encountered during this investigation. One field blank sample (2006FB01) was collected from lab grade deionized water used as the source water for the final rinse stage of the decontamination procedure. The other field blank sample (2006FB02) was from an NAPR potable water source used for soil and groundwater sample collection equipment washing. No store bought distilled water was purchased during this investigation, so a third field blank for store bought distilled water was not necessary.

Field blank samples are always analyzed for the same parameters as the related environmental samples. Therefore, both field blank samples were sent to the laboratory for analysis of

Appendix IX VOCs, SVOCs, PCBs and total metals, as well as low level PAHs, and sulfide and cyanide. Field blank testing is useful in determining if other water sources used in the cleaning/decontamination procedures associated with the sampling event are free of contamination.

4.3.5 Equipment Rinsates

Four equipment rinsate samples were collected, submitted, and analyzed as part of the QA/QC program. These corresponded to dedicated (disposable) sampling equipment only. No equipment required decontamination, therefore rinsates from decontaminated equipment were not generated. 2006ER01 is rinsate of the stainless steel spoon associated with the soil sampling activities. In addition, 2006ER02 is a rinsate from the Macrocore® Acetate liner used during sample collection. 2006ER03 is rinsate of the stainless steel spoon associated with the sediment sample collection. Finally, 2006ER04 is a rinsate from silicon/polyethylene tubing associated with groundwater sampling. Laboratory-supplied analyte-free water was used to generate the rinsates.

Equipment rinsate samples are always analyzed for the same parameters as the related environmental samples. Therefore, each equipment rinsate samples was analyzed for of Appendix IX VOCs, SVOCs, PCBs and total metals, as well as low level PAHs, and sulfide and cyanide. Results from equipment rinsate samples are useful in determining if the sampling equipment was contaminant-free during the field investigation.

5.0 NATURE AND EXTENT OF CONTAMINATION

This section discusses the nature of SWMU 42 contamination determined from chemical analysis of environmental samples from the November 2006 RFI. All of the laboratory analytical data went through a formal data validation process. Complete validated data tables for the 2006 RFI field effort are included in Appendix B; in addition, relevant portions of the data validation reports for the 2006 RFI Sample Delivery Groups (SDGs) are provided in Appendix C; a summary discussion of the necessary laboratory level data adjustments to the 2006 data is presented in Section 5.6.

The 2006 PID field screening results are presented on the Test Boring Records in Appendix A (not validated). While these readings were taken to protect the field team from excessive exposure and to assist with temporary well location selection, they also provide the reader with an initial insight into historical impacts and potential geographic "hot spots". PID readings during the SWMU 42 investigation were all below background levels, as noted on the boring logs provided in Appendix A.

5.1 Human Health and Ecological Screening Values

Detected results for surface soils, subsurface soils, sediment, and groundwater media are discussed in the following sections. Detected compounds for each media are compared to applicable regulatory and background criteria. These criteria, and the rationale for their usage for comparison to a specific media, are described in detail below.

5.1.1 Human Health

Applicable human health criteria for soils include USEPA Region IX Industrial PRGs and USEPA Region IX Residential PRGs (USEPA, 2004), and the upper limit of means background levels (inorganics only) (Baker, 2006a). Applicable human health criteria for groundwater are USEPA Region IX Tap Water PRGs (USEPA, 2004), Federal Drinking Water Maximum Contaminant Levels (MCLs), and any inorganic background levels present in the groundwater at NAPR (Baker, 2006b). Applicable human health criteria for sediment do not exist; therefore, the sediment data (from the water purification plant lagoons) were conservatively compared to USEPA Region IX Industrial and Residential PRGs.

The USEPA Region IX PRGs are tools for determining preliminary COPCs for human health risk assessments as part of evaluating and cleaning up contaminated sites. They are risk based concentrations derived from standardized equations (representing ingestion, dermal contact, and inhalation exposure pathways), combining exposure information assumptions and USEPA toxicity data. The PRGs contained in the Region IX PRG Table are generic; they are calculated without site-specific information. Region IX PRGs should be viewed as Agency guidelines, not legally enforceable standards. The PRGs for potentially carcinogenic chemicals are based on a target Incremental Lifetime Cancer Risk (ILCR) of $1x10^{-6}$. The PRGs for noncarcinogens are based on a target hazard quotient of 1.0. In order to account for cumulative risk from multiple chemicals in a medium, it is necessary to derive the PRGs based on a target hazard quotient of 0.1. Noncarcinogenic PRGs based on a target hazard quotient of 0.1 and the most recent toxicological criteria available, results in a set of values that can be used as screening criteria. In order to yield a hazard index (HI) of 0.1, the noncarcinogenic PRGs were divided by a factor of ten. For potential carcinogens, the toxicity criteria applicable to the derivation of PRG values are oral and inhalation Cancer Slope Factors (CSFs); for noncarcinogens, they are chronic oral and inhalation reference doses (RfDs). These toxicity criteria are subject to change as more updated information and results from the most recent toxicological/epidemiological studies become available. The PRG table is updated annually to reflect such changes. It should be noted that the most recent update was in October 2004 (USEPA, 2004).

Also, it should be noted that even though subsurface soil analytical results from below 10 feet would not be used in human health risk assessments due to the unlikely exposure route below that depth, all subsurface soil analytical results were screened against the PRGs for completeness.

The sediments were also screened against the surface soil PRGs for human health in the event that the lagoons are allowed to dry up during operation.

5.1.2 Ecological

5.1.2.1 Soil

USEPA ecological soil screening levels (Eco-SSLs) for terrestrial plants and invertebrates (available at http://www.epa.gov/ecotox/ecossl/) were preferentially used as soil screening values. For a given metal, if an Eco-SSL has been established for both terrestrial plants and invertebrates, the lowest value was selected as the soil screening value. For those chemicals lacking an Eco-SSL, the literature-based toxicological benchmarks listed below were used as soil screening values.

- Toxicological thresholds for earthworms and microorganisms (Efroymson et al., 1997a)
- Toxicological thresholds for plants (Efroymson et al., 1997b)

When more than one screening value was available from Efroymson et al. (1997a and 1997b), the lowest value was selected as the surface soil screening value. For those chemicals lacking an Eco-SSL or a toxicological threshold from Efroymson et al. (1997a and 1997b), the following literature-based values, listed in their order of decreasing preference, were used as soil screening values:

- Toxicity reference values for plants and invertebrates listed in USEPA, 1999.
- Soil standards developed by the Ministry of Housing, Spatial Planning and Environment (MHSPE, 2000), assuming a minimum default soil organic carbon content of 2.0 percent.
- Canadian soil quality guidelines (agricultural land use) developed by the Canadian Council of Ministers of the Environment (CCME, 2006).

CCME soil quality guidelines were given the lowest preference since they are background-based values that do not represent effect concentrations.

In addition, the upper limit of means background levels (inorganics only) (Baker, 2006) were used to compare the soil concentrations to those present at NAPR in unimpacted soil. Both surface soil background levels and subsurface soil background levels for a clay soil type (most prevalent soil type at SWMU 42) were used in screening.

As a general rule, screening of soil results for ecological purposes would include surface soil, as well as subsurface soil results from the 1 – 2 foot depth range. At SWMU 42, one sample was collected between 1- 2 feet (42SB03-01, see Table 4-1), and will be compared to the soil criteria.

5.1.2.2 Sediment

Sediment screening values are available for ecological risk assessments (ERA). However, the values used in previous reports by Baker (Final Additional Data Collection Report and Screening Level Ecological Risk Assessment and Step 3a of Baseline Ecological Risk Assessment at SWMUs 1 and 2 dated May 18, 2006) were developed for use at NAPR for marine sediments, and would not be applicable to the sediment located in the water purification lagoons. Because the lagoons are an active facility for the use of water purification, and routine draining and dredging occurs using an existing National Pollutant Discharge Elimination System (NPDES) permit, these lagoons are not likely to be ecologically sensitive. In the event that the lagoons are drained and allowed to dry up, the sediment would be considered as surface soil. Therefore, the surface soil screening values were used as noted above to screen the sediment analytical results.

5.1.2.3 Groundwater

Groundwater concentrations were compared to ecological surface water screening values in case of groundwater discharge to surface water. Chronic saltwater NAWQC (USEPA, 2006) were selected for use as surface water screening values. USEPA NAWQC for cadmium, copper, chromium, lead, mercury, selenium, and zinc are expressed as dissolved concentrations. As a measure of conservatism in this screening-level ERA, they were converted to total recoverable concentrations using the appropriate conversion factors (USEPA, 2006). For those chemicals lacking a saltwater NAWQC, surface water screening values were identified from the following information listed in their order of decreasing preference:

- Final Chronic Values (FCVs) for saltwater contained in Ecotox Thresholds (USEPA, 1996a)

- Chronic screening values for saltwater contained in Ecological Risk Assessment Bulletins – Supplement to Risk Assessment Guidelines (RAGS) (USEPA, 2001)

- Minimum chronic toxicity test endpoints (No Observed Effect Concentration [NOEC] and Maximum Acceptable Toxicant Concentration [MATC] values) for saltwater species reported in the ECOTOX Database System (Aquatic Toxicity Information Retrieval [AQUIRE] database) (USEPA, 2003)

- Chronic Lowest Observable Effect Levels (LOELs) for saltwater contained in National Oceanic and Atmospheric Administration (NOAA) Screening Quick Reference Tables (SQUIRTs) (Buchman, 1999)

The order of preference was selected based on their level of protection. For example, FCVs would be expected to offer a greater degree of protection than a single species NOEC, MATC, or LOEL since their derivation considers a larger toxicological database. In the absence of FCVs, USEPA Region IV chronic screening values, chronic test endpoints, and chronic LOELs, screening values were derived from the acute literature values listed below:

- Acute LOELs for saltwater contained in NOAA SQUIRTs (Buchman, 1999)

- Acute toxicity test endpoints (NOEC, Lowest Observed Effect Concentration [LOEC], median lethal concentration [LC_{50}], and median effective concentration [EC_{50}] values) for saltwater species contained in the ECOTOX Database System (AQUIRE database) (USEPA, 2003b).

- LC_{50} values for saltwater species contained in Superfund Chemical Matrix (USEPA, 1996b)

Chronic-based screening values were extrapolated from acute NOEC, LOEC, LOEL, LC_{50}, and EC_{50} values as follows:

- An uncertainty factor of 10 was used to convert an acute NOEC, LOEC, or LOEL to a chronic-based screening value.

- An uncertainty factor of 100 was used to convert an EC_{50} or LC_{50} to a chronic-based screening value.

When acute toxicity data were used to extrapolate a chronic screening value, NOECs were given preference over LOECs/LOELs, LOECs/LOELs were given preference over LC_{50} and EC_{50} values, and EC_{50} values were given preference over LC_{50} values. When more than one value was available from the literature for a given test endpoint (e.g., NOEC), the minimum value was conservatively used to extrapolate a chronic screening value. In some cases, chronic and acute LOELs for chemical classes (e.g., PAHs) were available from Buchman (1999). A LOEL based on a chemical class was used to derive a chronic screening value only if that chemical lacked literature-based benchmarks and/or toxicity test endpoints.

For those chemicals lacking saltwater toxicological thresholds and literature values, surface water screening values were identified or developed from freshwater values using the sources and procedures discussed in the preceding paragraphs with one exception. This exception involved the consideration of freshwater Secondary Chronic Values (SCVs) developed by the USEPA (1996a) and Suter II (1996).

NAPR basewide groundwater background criteria (inorganics only) were also used in the comparison (Baker, 2006), when available.

5.2 Surface Soils

Three surface soil samples were collected and analyzed during the 2006 Phase I RFI. All three surface soil samples were analyzed for Appendix IX VOCs, SVOCs, PCBs, and metals as well as low level PAHs, and sulfide and cyanide. A detected results table for the combined surface soil data set is presented in Table 5-1. Results are compared to USEPA Region IX Residential Soil PRGs, Industrial Soil PRGs, ecological surface soil screening values (see Section 5.1) and NAPR Basewide Background (metals only) criteria.

Four VOCs were detected in the surface soil, including acetone, benzene, methyl ethyl ketone, and styrene. With the exception of acetone, all were detected at low, estimated concentrations, and all were well below the listed criteria. Acetone, detected in all surface soil samples, is believed to be non-site related. No SVOCs or PCBs were detected in the surface soil. Pyrene was detected at a low, estimated concentration at 42SB03-00. Thirteen inorganic compounds were detected in the surface soil at SWMU 42, and, with the exception of antimony, all of them were found at all locations. Antimony was only found at 42SB03-00.

No organic parameters exceeded any screening criteria. Only seven inorganic parameters exceeded one or more of the criteria. They are:

- Arsenic

- Chromium
- Cobalt
- Copper
- Nickel
- Vanadium
- Zinc

Vanadium and arsenic exceeded the PRGs at all three locations, but they did not exceed their background screening levels at any location.

Chromium, cobalt, copper, vanadium, and zinc exceeded NAPR ecological surface soil screening values, but none of them exceeded their background surface soil screening value.

Nickel exceeded its background screening value but not its PRGs or NAPR ecological surface soil screening value.

It is unlikely that contamination at SWMU 42 is present in the surface soil due to Navy activities.

5.3 Subsurface Soils

A total of six subsurface soils samples were collected and analyzed as part of the Phase I RFI field activities. All six subsurface soil samples were analyzed for Appendix IX VOCs, SVOCs, PCBs, and metals, as well as low level PAHs, and sulfide and cyanide. A detected results table for the subsurface soil data set is presented in Table 5-2. Results are compared to USEPA Region IX Residential Soil PRGs, Industrial Soil PRGs, and NAPR Basewide Background (metals only) criteria. Sample results from 42SB03-01 were also screened against *surface soil* ecological screening values due to the fact that this soil was from the one foot bgs depth range.

Two VOCs were detected in the subsurface soil, and both were below the listed criteria. Acetone, detected in all subsurface soil samples, is believed to be non-site related. Methyl ethyl ketone is a common laboratory contaminant and was only detected in one sample. No SVOCs, PAHs, or PCBs were detected in the subsurface soil. Thirteen inorganic compounds were detected in the subsurface soil at SWMU 42, and most of these were found at all locations.

No organic parameters exceeded any screening criteria. Seven inorganic parameters exceeded one or more of the criteria. They are:

- Arsenic
- Chromium
- Cobalt
- Copper
- Lead
- Vanadium
- Zinc

Arsenic and vanadium exceeded the PRGs at all ten locations. However, neither exceeded its background screening level. Sample results from 42SB03-01 were also screened against *surface soil* ecological screening values due to the fact that this soil was from the one foot bgs depth range. Chromium, cobalt, copper, vanadium, and zinc all exceeded the surface soil ecological screening levels for these compounds at this location, but not their NAPR background screening

levels for those compounds in clay soil. Lead exceeded its background screening level at one location (two depths), but no human health or ecological screening values.

It is unlikely that contamination is present in the subsurface soils due to Navy activities.

5.4 Sediment

A total of four sediment samples were collected and analyzed as part of the 2006 RFI field activities at SWMU 42. All four sediment samples were analyzed for Appendix IX VOCs, SVOCs, PCBs, and metals, as well as low level PAHs, and sulfide and cyanide. A detected results table for the sediment data set is presented in Table 5-3. As noted above, the sediment is not believed to be ecologically sensitive as sediment due to the fact that it is located in an active facility subject to draining and dredging. However, if the lagoons were to dry up, then the lagoon sediment would be a potential pathway for human and ecological receptors. The analytical results for the sediment were compared to USEPA Region IX Residential Soil PRGs, Industrial Soil PRGs, surface soil ecological screening values, and NAPR Basewide Background (metals only) criteria for surface soil.

Six VOCs were detected in the sediment. These were:

- 1,1,2-Trichloroethane
- Acetone
- Acrolein
- Benzene
- Carbon disulfide
- Methyl Ethyl Ketone

Acrolein exceeded the residential and industrial PRGs. This compound is found in aquatic herbicides, and was likely applied to the lagoon in an attempt to reduce the weed growth in the water. None of the other VOCs exceeded any criteria.

No SVOCs, PAHs, or PCBs were detected in the sediment.

Eleven inorganic compounds were detected in the sediment at SWMU 42, and most of these were found at all locations. Six inorganic parameters exceeded one or more of the criteria. They are:

- Arsenic
- Barium
- Chromium
- Copper
- Vanadium
- Mercury

Arsenic, copper, and vanadium exceeded the PRGs at all locations, and of these, only copper exceeded its background screening level. Barium, chromium, and mercury all exceeded the NAPR background screening levels for those compounds in clay subsurface soil, but no human health screening values. Chromium, copper, and mercury all exceeded the ecological surface soil screening values and their respective background values.

Contamination may be present in the sediment due to Navy activities, but uncontrolled releases are not expected due to the permitting requirements for operation of the lagoons. No exposure to

the contamination is expected to human or ecological receptors at the present time due to the presence of water in the lagoons.

As stated above, there is currently no complete exposure pathway to human or ecological receptors to the lagoon sediment. However, in order to maintain a conservative approach it is assumed that the water purification plant may be taken out of service sometime in the future and the lagoons would dry out. As such, the exposure pathway to lagoon sediment would become complete. In order to evaluate potential human health risks from exposure to lagoon sediment, preliminary risk calculations were performed.

Preliminary risk calculations were conducted under future industrial worker and future trespasser exposure scenarios to evaluate human health risks resulting from potential exposure to the lagoon sediments containing acrolein, copper, and vanadium in concentrations exceeding Region IX PRG residential levels. As noted on Table 5-3, arsenic also was detected at a concentration exceeding its Region IX residential soil PRG (3.1J mg/kg in 42SD01). Therefore, arsenic was included in the risk calculations in order to conservatively evaluate all constituents that exceeded PRGs. The preliminary risk evaluation was based on potential exposure to sediment since available information indicates the Water Purification Plant will continue to provide water after property transfer and therefore, the two water purification plant lagoons will remain in operation. Given the small data set for sediment (4 environmental samples, 2 duplicates) and the small size of the area in which the lagoons are located, the maximum detected concentrations of acrolein, arsenic, copper, and vanadium were used as exposure point concentrations. Exposure parameters used in the preliminary risk calculations are presented in Appendix D, Table D-1.

The results of the preliminary risk calculations are presented in Appendix D, Table D-2 through Table D-4. As shown on Table D-2, the carcinogenic risk for the future industrial worker is 2.2×10^{-06}, and the hazard index is 0.67. As shown on Table D-3, the carcinogenic risk for the future adolescent trespasser is 2.3×10^{-07}, and the hazard index is 0.14. As shown on Table D-4, the carcinogenic risk for the future adult trespasser is 3.6×10^{-07}, and the hazard index is 0.07. As evidenced by Tables D-2 through D-4, there are no unacceptable carcinogenic or noncarcinogenic risks calculated from potential exposure to acrolein, arsenic, copper, and vanadium in lagoon sediment at SWMU 42.

5.5 Groundwater

A total of three groundwater samples were collected and analyzed as part of the 2006 RFI field activities. All samples were submitted to the analytical laboratory for Appendix IX VOCs, SVOCs, PCBs and total and dissolved metals, as well as low level PAHs, and sulfide and cyanide.

A detected results table for the groundwater data set is presented in Table 5-4. Results are compared to USEPA Region IX Tap Water PRGs, Federal Drinking Water MCLs, NAPR Surface Water Screening levels, and NAPR Basewide Background (metals only) criteria.

Two VOCs and one SVOC were detected in the groundwater at very low, estimated concentrations. None were above any criteria. No PAHs or PCBs were detected in the groundwater.

Twelve inorganic compounds were detected in the total inorganic analyses, and ten inorganic compounds were detected in the dissolved analyses. Six compounds exceeded one or more screening criteria:

- Arsenic
- Barium
- Cobalt
- Copper
- Lead
- Vanadium

However, none of these compounds exceeded any background screening levels for groundwater at NAPR, and they are unlikely to be present in the groundwater at SWUM 42 as a result of Navy activities.

Only arsenic and vanadium were present above PRGs in the dissolved analyses, and neither exceeded the background screening level for that particular compound. Dissolved copper also exceeded the surface water ecological screening value, but not the background groundwater concentration.

It is unlikely that contamination is present in the groundwater due to Navy activities.

5.6 Phase I RFI Laboratory Data Validation Summary

More specific data validation findings, as they relate to each SDG, are discussed in Sections 5.6.2 through 5.6.4 below. Data validation reports are included in Appendix C. In addition, the Puerto Rican Chemist Certification for each STL SDG is presented in Appendix C.

5.6.1 Summary of Detected Compounds in Field QA/QC Samples

Field generated QA/QC samples for the Phase I RFI field effort consisted of trip blanks, field blanks, equipment rinsates, and environmental duplicates. Trip blanks were only analyzed for VOCs. Other blanks were analyzed for all fractions requested in this investigation including

Appendix IX VOCs, SVOCs, PCBs, and total metals, as well as low level PAHs. Table 5-5 presents the detected compounds found in the trip blanks, equipment rinsates, and field blanks.

No VOCs were detected in the trip blanks for SWMU 42.

Detections in the field blanks included three VOCs (chlorodibromomethane, chloroform, and dibromochloromethane) in 2006FB02, two SVOCs (1,4-dichlorobenzene and diethyl phthalate) in 2006FB01, one PAH (fluoranthene), and two metals (copper and lead) in 2006FB02.

Analysis of the four equipment rinsate samples resulted in the detection of one VOC (toluene) two SVOCs (1,4-dichlorobenzene and diethyl phthalate), one PAH (naphthalene), and two metals (nickel and zinc). The detections of the two SVOCs detected in the equipment rinsate samples are at the same ranges as those detected in the lab grade deionized water (2006FB01) and are not considered equipment related.

5.6.2 STL Savannah SDG 22001-2

This SDG (22001-2) is relevant to the analytical findings associated with the 2006 soil and sediment sampling. Laboratory analyses were performed by Severn Trent Laboratories, (Savannah, Georgia). Validation services were provided by Environmental Data Services, Inc. (Williamsburg, Virginia). Validation conclusions are as follows:

<u>VOCs</u>

- All of the sediment samples (42SD01 - 42SD04) exhibited percent moisture values slightly higher than 90%, which resulted in qualifying all the detected results as estimated values and all of the non-detects as rejected values.

- Two volatile organic compounds (acrolein and isobutanol) had unacceptable relative response factor and percent relative standard deviation values during initial GC/MS calibration, which resulted in qualifying their non-detect results in the trip blank sample (42TB01) as rejected.

- A number of compounds had unacceptable percent difference and relative response factor values during continuing GC/MS calibration, which resulted in further qualifying their non-detect results as estimated values. The VOCs effected include: acrolein, iodomethane, chloroethane, 3-chloro-1-propene, 2-chloro-1,3-butadine, pentachloroethane, 4-methyl-2-pentanone, cis & trans-1,3-dichloropropene, chloromethane, and isobutanol.

<u>SVOCs</u>

- Two samples (42SB01-05RE and 42SB02-03RE) exceeded the 14 day holding time, which resulted in their results to be qualified as estimated. As a result, the validator indicated that the data from the original corresponding samples (42SB01-05 and 42SB02-03) be used in the analysis.

- The percent recovery and relative percent difference values in the MS/MSD sample resulted in qualifying the results for hexachlorobutadine in sample 42SB03-00 as an estimated value.

- The five sediment samples exhibited percent moisture results greater than 90%, which resulted in qualifying all the non-detected results as rejected. No SVOCs were detected at levels above their respective sample quantification limits in the sediment samples.

- One semi-volatile organic compound (4-nitroquinoline-1-oxide) had unacceptable relative response factor and percent relative standard deviation values during initial GC/MS calibration, which resulted in qualifying all of its results for this compound as either estimated or rejected. The non-detect results for 4-nitroquinoline-1-oxide in eight samples was rejected. The non-detect results in two additional soil samples were qualified as estimated. All of the results for 4-nitroquinoline-1-oxide in the sediment samples were already rejected due to high moisture content.

- A number of compounds had unacceptable percent difference and relative response factor values during continuing GC/MS calibration, which resulted in qualifying their results as estimated in various soil samples. The SVOC compounds effects include: 1,3,5-trinitrobenzene, hexachlorophene, 1,1-dimethylphenethylamine, methapyrilene, phorate, and dimethoate. None of these SVOCs were detected at levels above their respective sample quantification limits in this medium.

PAHs

- The field blank (2006FB02) was found to contain fluoranthene, which resulted in the compound to be considered a non-detect in sample 42SB03-002.

- The five sediment samples exhibited percent moisture results greater than 90%, which resulted in qualifying all the non-detects as rejected. No PAHs were detected at levels above their respective sample quantification limits in the sediment samples.

PCBs

- The five sediment samples exhibited percent moisture results greater than 90%, which resulted in qualifying all the non-detects as rejected. No PCBs were detected at levels above their respective sample quantification limits in the sediment samples.

Metals

- The CRDL standards exhibited high percent recovery for tin and low percent recovery for copper which resulted in qualifying their results as estimated. The detected concentration for copper in sample 42SB01-05 was qualified as an estimated value. All of the results for tin in both the soil and sediment samples were non-detects.

- The unacceptable percent recovery for the inductively coupled plasma interference check sample resulted in zinc and cadmium results in a number of samples to be considered estimated values. Zinc was detected in all of the soil and sediment samples, while all of the cadmium results were non-detects.

- The MS/MSD sample exhibited percent recovery and relative percent difference values outside acceptable limits for antimony, barium, copper, lead, nickel, chromium, and vanadium in a number of samples that resulted in the results to be considered estimated values. All of the results for antimony were non-detects. The results for all of the other metals were detects that were qualified as estimated.

- The inductively coupled plasma serial dilution sample exhibited unacceptable percent difference values for barium, and vanadium, in sample 42SB01-05 which resulted in the qualification of their detected results in this sample as estimated.

- The field blank contamination in 2006FB02 resulted in copper in all of the results to be considered estimated values. Copper was detected at levels above its sample quantification limits in all of the samples in this SDG.

- The percent solids in the five sediment samples resulted in both the non-detect and detected results to be qualified as estimated.

Data Validation Summary for SDG 22001-2

The most prevalent data validation issue for this SDG deals with the five sediment samples that exceeded the 90% moisture level standard. However, none of the sediment samples had moisture levels any higher than 94.7%. Based on this issue, all of the non-detect results for the VOC, SVOC, PAH, and PCB sediment analysis was rejected and all of the detected values were qualified as estimated. However, since no SVOCs, PAHs, or PCB compounds were detected in the sediment samples the impact of this validation measure was minimal and not expected to significantly compromise the data usability. The other potentially important data validation issue noted was the unacceptable relative response factor and percent relative standard deviation values during the initial GC/MS calibration that caused the rejection of non-detected results for two VOCs (acrolein and isobutanol) in trip blank sample 42TB01. But since these VOCs were also not detected in the other trip blanks (42TB02 and 42TB03), cross-contamination problems are not suspected. Based on this analysis, the data qualify objectives have been met and the data is considered usable for further consideration.

5.6.3 STL Savannah SDG 22012-3

This SDG (22012-3) is relevant to the analytical findings associated with the 2006 groundwater sampling. Laboratory analyses were performed by Severn Trent Laboratories, (Savannah, Georgia). Validation services were provided by Environmental Data Services, Inc. (Williamsburg, Virginia). Validation conclusions are as follows:

VOCs

- The MS/MSD sample exhibited percent recovery and relative percent difference values outside acceptable limits for dichlorodifluoromethane, which resulted in its non-detect result in sample 42TW01 to be qualified as estimated.

- Two volatile organic compounds (acrolein and isobutanol) had unacceptable relative response factor and percent relative standard deviation values during initial GC/MS calibration, which resulted in the additional qualification of the non-detect results for acrolein in all six groundwater samples as rejected. In addition, two of the six groundwater samples had non-detect results for isobutanol that were also rejected. Finally, four the groundwater samples that non-detect results for isobutanol that were further qualified as estimated.

SVOCs

- The semi-volatile organic compound, 4-nitroquinoline-1-oxide, was found to have unacceptable relative response factor and percent difference values during initial calibration which resulted in its non-detected results to be rejected in samples 42TW02 and 42TW03.

- The unacceptable relative response factor and percent difference values during continuing GC/MS calibration resulted in the qualification of the non-detected results as estimated values for the following semi-volatile organic compounds: 1,3,5-trinitrobenzene, hexachlorophene, dimethoate, 1,4-dioxane, 2,4-dinitrophenol, 0,0,0-triethylphosphorothioate, a,a-dimethylphenethylamine, 2-picoline, aramite (total), methapyrilene, phorate, and dimethoate.

PCBs

- The surrogate recoveries in two samples exceeded acceptable limits which resulted in the non-detects in sample 42TW02 to be further qualified as estimated results and the non-detects in sample 42TW03 to be rejected.

Metals

- The CRDL standards associated exhibited low percent recovery for tin and high percent recovery for mercury, which resulted in the detected value for mercury in sample 42TW01D to be qualified as estimated. In addition, the non-detected results for tin in eight groundwater samples were further qualified as estimated.

- The method and continuing calibration blanks exhibited contamination for nickel, and thallium, which resulted in the detected values for nickel in four samples (42TW01, 42TW01D, 42TW02, and 42TW03) and thallium in two samples (42TW01D, and TW02F) to be qualified as non-detects. Nickel was still detected in four filtered groundwater samples at levels above its respective sample quantification limits. However, after the validation qualifiers were applied, thallium was not detected in any of the groundwater samples.

- The percent recovery in the inductively coupled plasma interference check sample was outside acceptable limits which resulted in the detected values for zinc to be qualified as estimated in all of the groundwater samples analyzed.

- The inductively coupled plasma serial dilution sample exhibited unacceptable percent difference for cobalt in four samples, which resulted in the detected results to be qualified as estimated.

- The field blank sample (2006FB02) detected copper at levels, which resulted in the detected results in three samples to be qualified as estimated and the detected result in sample 42TW02 to be rejected.

Data Validation Summary for SDG 22012-3

The majority of the data validation measures for this SDG involved the qualification of non-detected results as estimated values primarily due to issues identified during initial and continuing GC/MS calibration. The only detected results that were rejected in this SDG were for copper in groundwater sample 42TW02, due to contamination found in a field blank sample (2006FB02). However, since tap water was used as the source of water for this field blank some residual copper contamination is not unexpected. The concentration of copper in 2006FB02 was 79 ug/L, while the highest detected concentration of copper in the groundwater samples was 97 ug/L (sample 42TW03). Since the health-based screening values for copper in groundwater are orders of magnitude greater than the concentrations detected in both the field blank and site groundwater, no additional data quality concerns are evident. Based on this analysis, the data qualify objectives have been met and the data is considered usable for further consideration.

6.0 CONCLUSIONS AND RECOMMENDATIONS

6.1 Conclusions

The objectives of the Phase I RFI were to:

- Determine if any contaminants are present from past and current operation of the water purification plant lagoon, to the extent practical, from the completion of field activities (surface soil, subsurface soil, sediment, and groundwater sampling) as described in the Phase I RFI Work Plan (Baker, 2006);

- Screen for potential human health risks posed by the site; and

- Screen for potential ecological risks posed by the site.

It is evident from the analyses of samples obtained during the Phase I RFI investigation that there has been very little impact on the environment due to Navy activities at SWMU 42. Only a few organic compounds were detected in any of the media, and most organic concentrations were well below any screening criteria for human health and ecological receptors.

When PRGs for inorganic compounds were exceeded, the concentrations of those compounds were all found to be below background screening levels for that media in the surface soil, subsurface soil, or groundwater. Therefore, it can be concluded that there is no contamination in these media at the SWMU due to Navy activities.

The sediment sample analytical results were compared to surface soil screening values due to the fact that the sediment is not likely to be ecologically sensitive as sediment. The water purification lagoons are part of an active facility, are lined, and are unlikely to support habitat. Should the lagoons be allowed to dry up due to their obsolescence, it is likely that the sediment would be excavated and removed as part of the final dredging activities. In that case, the sediment analyses performed for this investigation would be removed from the site characterization results since that media would be removed. As a conservative measure, comparison to surface soil criteria was done in the unlikely event that the soil would remain without dredging. In that case, there is likely to be chromium, copper, and mercury contamination present in the sediment in the lagoon bottom, due to the exceedances of background levels, human health PRGs (acrolein, arsenic, copper, and vanadium), and ecological surface soil screening values (chromium, copper, and mercury). However, under the current conditions there is no complete exposure pathway. In the unlikely event that the lagoons dry out and exposure occurs, preliminary human health risk calculations indicate that unacceptable risks to potential receptors (on-site workers and trespassers) do not exist.

6.2 Recommendations

Because very little impact on the environment was found during the Phase I RFI investigation at SWMU 42, no further action is warranted in order to assess environmental impact and/or remediate this site under current conditions of treatment plant operation. This site is recommended for Corrective Action Complete without Controls, with the stipulation that the sediment be removed and disposed of properly in the event that the plant ceases operation.

7.0 REFERENCES

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TABLES

TABLE 4-1

SUMMARY OF 2006 RFI SURFACE SOIL, SUBSURFACE SOIL, AND GROUNDWATER SAMPLING AND ANALYSIS
SWMU 42 - WATER PURIFICATION PLANT LAGOONS
RCRA FACILITY INVESTIGATION
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

					Analysis Requested								
Sample Media	Site ID	Sample ID	Sample Depth (ft bgs)	Field Screening (PID)	App. IX VOCs	App. IX SVOCs	App. IX PCBs	Low Level PAHs	App. IX Metals (Total)	App. IX Metals (Dissolved)	Sulfide	Cyanide	Comments
Surface Soil	42SB01	42SB01-00	0.0 - 1.0	X	X	X	X	X	X		X	X	
	42SB02	42SB02-00	0.0 - 1.0	X	X	X	X	X	X		X	X	
	42SB03	42SB03-00	0.0 - 1.0	X	X	X	X	X	X		X	X	
		42SB03-00D	0.0 - 1.0	X	X	X	X	X	X		X	X	Duplicate
		42SB03MS/MSD	0.0 - 1.0	X	X	X	X	X	X		X	X	Matrix Spike/Matrix Spike Duplicate
Subsurface Soil	42SB01	42SB01-03	5.0 - 7.0	X	X	X	X	X	X		X	X	
		42SB01-05	10.0 - 11.0	X	X	X	X	X	X		X	X	
	42SB02	42SB02-03	5.0 - 7.0	X	X	X	X	X	X		X	X	
		42SB02-05	9.0 - 11.0	X	X	X	X	X	X		X	X	
	42SB03	42SB03-01	1.0 - 3.0	X	X	X	X	X	X		X	X	
		42SB03-03	5.0 - 7.0	X	X	X	X	X	X		X	X	
Sediment	42SD01	42SD01	0.0 - 0.5	X	X	X	X	X	X		X	X	
		42SD01D	0.0 - 0.5	X	X								Duplicate
	42SD02	42SD02	0.0 - 0.5	X	X	X	X	X	X		X	X	
	42SD03	42SD03	0.0 - 0.5	X	X	X	X	X	X		X	X	
		42SD03D	0.0 - 0.5	X		X	X	X	X		X	X	Duplicate
	42SD04	42SD04	0.0 - 0.5	X	X	X	X	X	X		X	X	
Groundwater	42TW01	42TW01	NA	NA	X	X	X	X	X	X	X	X	
		42TW01D	NA	NA	X	X	X	X	X	X	X	X	Duplicate
		42TW01MS	NA	NA	X	X	X	X	X	X	X	X	Matrix Spike
		42TW01MSD	NA	NA	X	X	X	X	X	X	X	X	Matrix Spike Duplicate
	42TW02	42TW02	NA	NA	X	X	X	X	X	X	X	X	
	42TW03	42TW03	NA	NA	X	X	X	X	X	X	X	X	
				Totals	22	22	22	22	22	6	22	22	

Notes:
ft bgs - feet below ground surface
PID - Photoionization Detector
NA - Not Applicable.

TABLE 4-2

SUMMARY OF 2006 RFI QUALITY ASSURANCE / QUALITY CONTROL SAMPLING AND ANALYSIS
SWMU 42 - WATER PURIFICATION PLANT LAGOONS
RCRA FACILITY INVESTIGATION
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

	Analysis Requested					
Sample ID	App. IX VOCs	App. IX SVOCs	App. IX PCBs	Low Level PAHs	App. IX Metals (Total)	Comments
Trip Blank Samples						
42TB01	X					
42TB02	X					
42TB03	X					
Equipment Rinsate Samples						
2006ER01	X	X	X	X	X	Stainless Steel Spoon
2006ER02	X	X	X	X	X	Geoprobe Acetate Liner
2006ER03	X	X	X	X	X	Stainless Steel Spoon
2006ER04	X	X	X	X	X	Silicon/Polyethylene Tubing
Field Blank Samples						
2006FB01	X	X	X	X	X	Lab Grade Deionized Water
2006FB02	X	X	X	X	X	NAPR Potable Water
Totals	9	6	6	6	6	

TABLE 4-3

PARAMETER LISTS AND CONTRACT REQUIRED QUANTITATION LIMITS (CRQL)
SWMU 42 - WATER PURIFICATION PLANT LAGOONS
RCRA FACILITY INVESTIGATION
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Appendix IX - VOCs	Quantitation Limits*		Method Number (Description)
	Water (µg/L)	Low Soil (µg/kg)	
Acetone	25	50	8260B (5030)(low level)
Acetonitrile	40	200	8260B (5030)(low level)
Acrolein	20	100	8260B (5030)(low level)
Acrylonitrile	20	100	8260B (5030)(low level)
Benzene	1.0	5.0	8260B (5030)(low level)
Bromodichloromethane	1.0	5.0	8260B (5030)(low level)
Bromoform	1.0	5.0	8260B (5030)(low level)
Bromomethane	1.0	10	8260B (5030)(low level)
Carbon Disulfide	1.0	5.0	8260B (5030)(low level)
Carbon Tetrachloride	1.0	5.0	8260B (5030)(low level)
Chlorobenzene	1.0	5.0	8260B (5030)(low level)
Chloroethane	1.0	10	8260B (5030)(low level)
Chloroform	1.0	5.0	8260B (5030)(low level)
Chloromethane	1.0	10	8260B (5030)(low level)
Chloroprene	1.0	5.0	8260B (5030)(low level)
3-Chloro-1-propene	1.0	5.0	8260B (5030)(low level)
1,2-Dibromo-3-chloropropane	1.0	10	8260B (5030)(low level)
Dibromochloromethane	1.0	5.0	8260B (5030)(low level)
1,2-Dibromoethane	1.0	5.0	8260B (5030)(low level)
Dibromomethane	1.0	5.0	8260B (5030)(low level)
trans-1,4-Dichloro-2-butene	2.0	10	8260B (5030)(low level)
Dichlorodifluoromethane	1.0	5.0	8260B (5030)(low level)
1,1-Dichloroethane	1.0	5.0	8260B (5030)(low level)
1,2-Dichloroethane	1.0	5.0	8260B (5030)(low level)
trans-1,2-dichloroethene	1.0	5.0	8260B (5030)(low level)
1,1-Dichloroethene	1.0	5.0	8260B (5030)(low level)
Methylene Chloride	5.0	5.0	8260B (5030)(low level)
1,2-Dichloropropane	1.0	5.0	8260B (5030)(low level)
cis-1,3-Dichloropropene	1.0	5.0	8260B (5030)(low level)
trans-1,3-Dichloropropene	1.0	5.0	8260B (5030)(low level)
Ethyl benzene	1.0	5.0	8260B (5030)(low level)
Ethyl methacrylate	1.0	5.0	8260B (5030)(low level)
2-Hexanone	10	25	8260B (5030)(low level)

TABLE 4-3

PARAMETER LISTS AND CONTRACT REQUIRED QUANTITATION LIMITS (CRQL)
SWMU 42 - WATER PURIFICATION PLANT LAGOONS
RCRA FACILITY INVESTIGATION
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Appendix IX - VOCs (Cont.)	Quantitation Limits*		Method Number (Description)
	Water (µg/L)	Low Soil (µg/kg)	
Iodomethane	5.0	5.0	8260B (5030)(low level)
Isobutanol	40	200	8260B (5030)(low level)
Methacrylonitrile	20	100	8260B (5030)(low level)
2-Butanone	10	25	8260B (5030)(low level)
Methyl methacrylate	1.0	5.0	8260B (5030)(low level)
4-Methyl-2-pentanone	10	25	8260B (5030)(low level)
Pentachloroethane	5.0	25	8260B (5030)(low level)
Propionitrile	20	100	8260B (5030)(low level)
Stryene	1.0	5.0	8260B (5030)(low level)
1,1,1,2-Tetrachloroethane	1.0	5.0	8260B (5030)(low level)
1,1,2,2-Tetrachloroethane	1.0	5.0	8260B (5030)(low level)
Tetrachloroethene	1.0	5.0	8260B (5030)(low level)
Toluene	1.0	5.0	8260B (5030)(low level)
1,1,1-Trichloroethane	1.0	5.0	8260B (5030)(low level)
1,1,2-Trichloroethane	1.0	5.0	8260B (5030)(low level)
Trichloroethene	1.0	5.0	8260B (5030)(low level)
Trichlorofluoromethane	1.0	5.0	8260B (5030)(low level)
1,2,3-Trichloropropane	1.0	5.0	8260B (5030)(low level)
Vinyl Acetate	2.0	10	8260B (5030)(low level)
Vinyl Chloride	1.0	10	8260B (5030)(low level)
Xylene	2.0	10	8260B (5030)(low level)
Appendix IX - SVOCs	**Quantitation Limits***		**Method Number (Description)**
	Water (µg/L)	**Low Soil (µg/kg)**	
Acenaphthene	10	330	8270C
Acenaphthylene	10	330	8270C
Acetophenone	10	330	8270C
2-Acetylaminofluorene	10	330	8270C
4-Aminobiphenyl	20	330	8270C
Aniline	20	660	8270C
Anthracene	10	330	8270C
Aramite	10	330	8270C
Benzo(a)anthracene	10	330	8270C

TABLE 4-3

PARAMETER LISTS AND CONTRACT REQUIRED QUANTITATION LIMITS (CRQL)
SWMU 42 - WATER PURIFICATION PLANT LAGOONS
RCRA FACILITY INVESTIGATION
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Appendix IX - SVOCs (Cont.)	Quantitation Limits*		Method Number (Description)
	Water (µg/L)	Low Soil (µg/kg)	
Benzo(b)fluoranthene	10	330	8270C
Benzo(k)fluoranthene	10	330	8270C
Benzo(g,h,i)perylene	10	330	8270C
Benzo(a)pyrene	10	330	8270C
Benzyl alcohol	10	330	8270C
Bis(2-chloroethoxyl)methane	10	330	8270C
Bis(2-chloroethyl)ether	10	330	8270C
Bis(2-ethylhexyl)phthalate	10	330	8270C
4-Bromophenyl phenyl ether	10	330	8270C
Butylbenzylphthalate	10	330	8270C
4-Chloroaniline	20	660	8270C
4-Chloro-3-methylphenol	10	330	8270C
2-Chloronaphthalene	10	330	8270C
2-Chlorophenol	10	330	8270C
4-Chlorophenyl phenyl ether	10	330	8270C
Chrysene	10	330	8270C
3&4 Methylphenol	10	330	8270C
2-Methylphenol	10	330	8270C
Diallate	10	330	8270C
Dibenzofuran	10	330	8270C
Di-n-butyl phthalate	10	330	8270C
Dibenzo(a,h)anthracene	10	330	8270C
o-Dichlorobenzene	10	330	8270C
m-Dichlorobenzene	10	330	8270C
p-Dichlorobenzene	10	330	8270C
3,3'-Dichlorobenzidine	20	660	8270C
2,4-Dichlorophenol	10	330	8270C
2,6-Dichlorophenol	10	330	8270C
Diethylphthalate	10	330	8270C
p-(Dimethylamino)azobenzene	10	330	8270C
7,12-Dimethyl benz(a)anthracene	10	330	8270C
3,3-Dimethyl benzidine	20	1,700	8270C
2,4-Dimethylphenol	10	330	8270C

TABLE 4-3

PARAMETER LISTS AND CONTRACT REQUIRED QUANTITATION LIMITS (CRQL)
SWMU 42 - WATER PURIFICATION PLANT LAGOONS
RCRA FACILITY INVESTIGATION
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Appendix IX - SVOCs (Cont.)	Quantitation Limits*		Method Number (Description)
	Water (µg/L)	Low Soil (µg/kg)	
alpha, alpha-Dimethylphenethylamine	2,000	67,000	8270C
Dimethyl phthalate	10	330	8270C
m-Dinitrobenzene	10	330	8270C
4,6-Dinitro-2-methylphenol	50	1,700	8270C
2,4-Dinitrophenol	50	1,700	8270C
2,4-Dinitrotoluene	10	330	8270C
2,6-Dinitrotoluene	10	330	8270C
Di-n-octylphthalate	10	330	8270C
1,4-Dioxane	10	330	8270C
Dinoseb	10	330	8270C
Ethylmethanesulfonate	10	330	8270C
Fluoranthene	10	330	8270C
Fluorene	10	330	8270C
Hexachlorobenzene	10	330	8270C
Hexachlorobutadiene	10	330	8270C
Hexachlorocyclopentadiene	10	330	8270C
Hexachloroethane	10	330	8270C
Hexachlorophene	5,000	170,000	8270C
Hexachloropropene	10	330	8270C
Indeno(1,2,3-cd)pyrene	10	330	8270C
Isophorone	10	330	8270C
Isosafrole	10	330	8270C
Methapyrilene	2,000	67,000	8270C
3-Methylcholanthrene	10	330	8270C
Methyl methanesulfonate	10	330	8270C
2-Methylnaphthalene	10	330	8270C
Naphthalene	10	330	8270C
1,4-Naphthoquinone	10	330	8270C
1-Naphthylamine	10	330	8270C
2-Naphthylamine	10	330	8270C
2-Nitroaniline	50	1,700	8270C
3-Nitroaniline	50	1,700	8270C
4-Nitroaniline	50	1,700	8270C

TABLE 4-3

PARAMETER LISTS AND CONTRACT REQUIRED QUANTITATION LIMITS (CRQL)
SWMU 42 - WATER PURIFICATION PLANT LAGOONS
RCRA FACILITY INVESTIGATION
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Appendix IX - SVOCs (Cont.)	Quantitation Limits*		Method Number (Description)
	Water (µg/L)	Low Soil (µg/kg)	
Nitrobenzene	10	330	8270C
2-Nitrophenol	10	330	8270C
4-Nitrophenol	50	1,700	8270C
4-Nitroquinoline-1-oxide	20	3,300	8270C
n-Nitrosodi-n-butylamine	10	330	8270C
n-Nitrosodiethylamine	10	330	8270C
n-Nitrosodimethylamine	10	330	8270C
n-Nitrosodiphenylamine	10	330	8270C
n-Nitrosodi-n-propylamine	10	330	8270C
n-Nitrosomethylethylamine	10	330	8270C
n-Nitrosomorpholine	10	330	8270C
n-Nitrosopiperidine	10	330	8270C
n-Nitrosopyrrolidine	10	330	8270C
5-Nitro-o-toluidine	10	330	8270C
bis-(2-chloroisopropyl)ether	10	330	8270C
Pentachlorobenzene	10	330	8270C
Pentachloronitrobenzene	10	330	8270C
Pentachlorophenol	50	1,700	8270C
Phenacetin	10	330	8270C
Phenanthrene	10	330	8270C
Phenol	10	330	8270C
1,4-Phenylenediamine	2,000	1,700	8270C
2-Picolin	10	330	8270C
Pronamide	10	330	8270C
Pyrene	10	330	8270C
Pyridine	50	330	8270C
Safrole	10	330	8270C
1,2,4,5-Tetrachlorobenzene	10	330	8270C
2,3,4,6-Tetrachlorophenol	10	330	8270C
o-Toluidine	20	330	8270C
1,2,4-Trichlorobenzene	10	330	8270C
2,4,5-Trichlorophenol	10	330	8270C
2,4,6-Trichlorophenol	10	330	8270C
1,3,5-Trinitrobenzene	10	330	8270C

TABLE 4-3

PARAMETER LISTS AND CONTRACT REQUIRED QUANTITATION LIMITS (CRQL)
SWMU 42 - WATER PURIFICATION PLANT LAGOONS
RCRA FACILITY INVESTIGATION
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Low Level PAHs	Quantitation Limits*		Method Number (Description)
	Water (µg/L)	Low Soil (µg/kg)	
Acenaphthene	0.2	6.7	8270C
Acenaphthylene	0.2	6.7	8270C
Anthracene	0.2	6.7	8270C
Benzo(a)anthracene	0.2	6.7	8270C
Benzo(b)fluoranthene	0.2	6.7	8270C
Benzo(k)fluoranthene	0.2	6.7	8270C
Benzo(g,h,i)perylene	0.2	6.7	8270C
Benzo(a)pyrene	0.2	6.7	8270C
Chrysene	0.2	6.7	8270C
Dibenzo(a,h)anthracene	0.2	6.7	8270C
Fluoranthene	0.2	6.7	8270C
Fluorene	0.2	6.7	8270C
Indeno(1,2,3-cd)pyrene	0.2	6.7	8270C
1-Methylnaphthalene	0.2	6.7	8270C
2-Methylnaphthalene	0.2	6.7	8270C
Naphthalene	0.2	6.7	8270C
Phenanthrene	0.2	6.7	8270C
Pyrene	0.2	6.7	8270C
Appendix IX - PCBs	**Quantitation Limits***		**Method Number (Description)**
	Water (µg/L)	**Low Soil (µg/kg)**	
Aroclor-1016	1.0	33	8082
Aroclor-1221	2.0	67	8082
Aroclor-1232	1.0	33	8082
Aroclor-1242	1.0	33	8082
Aroclor-1248	1.0	33	8082
Aroclor-1254	1.0	33	8082
Aroclor-1260	1.0	33	8082

TABLE 4-3

PARAMETER LISTS AND CONTRACT REQUIRED QUANTITATION LIMITS (CRQL)
SWMU 42 - WATER PURIFICATION PLANT LAGOONS
RCRA FACILITY INVESTIGATION
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Appendix IX - Metals (Total)	Quantitation Limits*		Method Number (Description)
	Water (µg/L)	Low Soil (mg/kg)	
Antimony	20	2.0	6010 (Inductively Coupled Plasma)
Arsenic	10	1.0	6010 (Inductively Coupled Plasma)
Barium	10	1.0	6010 (Inductively Coupled Plasma)
Beryllium	4.0	0.4	6010 (Inductively Coupled Plasma)
Cadmium	5.0	0.5	6010 (Inductively Coupled Plasma)
Chromium	10	1.0	6010 (Inductively Coupled Plasma)
Cobalt	10	1.0	6010 (Inductively Coupled Plasma)
Copper	20	2.0	6010 (Inductively Coupled Plasma)
Lead	5.0	0.5	6010 (Inductively Coupled Plasma)
Mercury	0.2	0.02	7470/7471 (Cold Vapor AA)
Nickel	40	4.0	6010 (Inductively Coupled Plasma)
Selenium	10	1.0	6010 (Inductively Coupled Plasma)
Silver	10	1.0	6010 (Inductively Coupled Plasma)
Thallium	10	1.0	6010 (Inductively Coupled Plasma)
Tin	10	5.0	6010 (Inductively Coupled Plasma)
Vanadium	10	1.0	6010 (Inductively Coupled Plasma)
Cyanide	0.010	1.0	9012 (Colorimetric)
Sulfide	1.0	25	9030 (Titrimetric, Iodine)
Zinc	20	2.0	6010 (Inductively Coupled Plasma)

* 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.

µg/L - micrograms per liter
µg/kg - micrograms per kilogram
mg/kg - milligrams per kilogram
NA - Not Applicable

TABLE 4-4

GROUNDWATER ELEVATION SUMMARY
SWMU 42 - WATER PURIFICATION PLANT LAGOONS
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Well Identification	Northing	Easting	Elevation (msl) Ground Surface	Elevation (msl) Top of PVC	Total Well Depth (ft)	Date of Water Level Measurement	Depth to Groundwater (ft)	Groundwater Elevation (msl)
SWMU 42								
42-TW01	798902.3649	926066.3591	116.82	117.78	20.0	11/18/06	12.26	105.52
42-TW02	798697.0993	926021.7063	118.01	119.37	24.0	11/18/06	11.11	108.26
42-TW03	798647.9256	926149.1199	117.81	120.18	20.0	11/18/06	12.82	107.36

Notes:
msl - mean sea level
ft - feet

Revised: November 20, 2007

TABLE 5-1

SUMMARY OF DETECTED RESULTS - SURFACE SOIL
SWMU 42 - WATER PURIFICATION PLANT LAGOONS
PHASE I RCRA FACILITY INVESTIGATION
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Sample ID Sample Depth (ft bgs) Sampling Date	USEPA Region IX Residential Soil PRGs	*USEPA Region IX Industrial Soil PRGs*	Selected Ecological Surface Soil Screening Values	NAPR [1] Basewide Background	42SB01-00 (0.0 - 1.0) 11/14/06	42SB02-00 (0.0 - 1.0) 11/14/06	42SB03-00 (0.0 - 1.0) 11/14/06	42SB03-00D (0.0 - 1.0) 11/14/06
Volatiles (ug/kg)								
Acetone	1,412,657	5,432,098	NE	NE	91	66	160 J	120
Benzene	643	1,409	105 [3]	NE	4.0 U	1.1 J	3.8 U	4.6 U
Methyl Ethyl Ketone	2,231,120	11,326,440	NE	NE	20 U	5.3 J	6.3 J	5.6 J
Styrene	1,700,000	1,700,000	10,030 [2]	NE	1.2 J	5.1 U	3.8 U	1.1 J
Semivolatiles (ug/kg)	**(none detected)**							
PAHs (ug/kg)								
Pyrene	231,595	2,912,620	1,200 [3]	NE	7.5 U	7.5 U	7.9 U	1.9 J
PCBs (ug/kg)	**(none detected)**							
Inorganics (mg/kg)								
Antimony	3.13	40.88	78 [4]	3.17	4.3 UJ	4.2 UJ	2.6 J	4.7 UJ
Arsenic	0.39	1.59	18 [4]	2.65	**0.94 J**	**0.82 J**	**1.2 J**	**1.2 J**
Barium	537	6,658	330 [4]	199	35 J	13 J	46	50
Beryllium	15.44	1,941	40 [4]	0.590	0.16 J	0.25 J	0.24 J	0.23 J
Cadmium	3.70	45.14	32 [4]	1.02	0.090 J	0.073 J	0.18 J	0.13 J
Chromium	211	448	0.4 [5]	49.8	17 J	16 J	21	22 J
Cobalt (4)	903	1,921	13 [4]	46.2	23	20	23	23
Copper	313	4,088	70 [4]	168	98 J	60 J	86 J	86 J
Lead	400	800	120 [4]	22.0	8.1 J	1.3 J	8.5 J	8.4 J
Nickel	156	2,044	30 [6]	20.7	17 J	30 J	19 J	17 J
Vanadium	7.82	102.20	2 [6]	287	***170 J***	***170 J***	***170***	***170***
Zinc	2,346	100,000	50 [6]	115	78 J	52 J	68 J	64 J
Mercury -7471A	2.35	30.66	0.1 [5]	0.109	0.0049 J	0.012 J	0.0091 J	0.017 J

TABLE 5-1

SUMMARY OF DETECTED RESULTS - SURFACE SOIL
SWMU 42 - WATER PURIFICATION PLANT LAGOONS
PHASE I RCRA FACILITY INVESTIGATION
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Notes:

Entries in **Bold** indicate exceedance of USEPA Region IX Residential Soil PRGs.
Entries in *italics* indicate exceedance of USEPA Region IX Industrial Soil PRGs.
Entries with shading indicate exceedance of Ecological Surface Soil Screening Values.
Underlined entries indicate exceedance of NAPR Basewide Background value.

(1) NAPR Basewide Surface Soil Background - Upper Limit of Means (Mean + 2 standard deviations) Draft Summary Report for Environmental Background Concentrations of Inorganic Compounds, Naval Activity Puerto Rico, Ceiba, PR, Baker, September 2006

(2) The screening value shown is an average of the target and intervention soil standards. The value is based on a default organic carbon content of 0.02 (2 percent), which represents a minimum value (adjustment range is 2 to 30 percent) (MHSPE, 2000)

(3) Plant-based surface soil screening value for benzo(a)pyrene used as a surrogate (USEPA, 1999)

(4) Ecological soil screening level (http://www.epa.gov/ecotox/ecossl/)

(5) Toxicological threshold for earthworms (Efroymson et al., 1997a)

(6) Toxicological threshold for plants (Efroymson et al., 1997b)

U - Not detected
UJ - Reported quantitation limit is qualified as estimated
J - Analyte present - Reported value is estimated
NA - Not Analyzed
ND - Not Detected
NE - Not Established
PRG - Preliminary Remedial Goal
NAPR - Naval Activity Puerto Rico
ft bgs - feet below ground surface
USEPA - United States Environmental Protection Agency
MHSPE - Ministry of Housing, Spatial Planning and Environment

Revised: November 20, 2007

TABLE 5-2

SUMMARY OF DETECTED RESULTS - SUBSURFACE SOIL
SWMU 42 - WATER PURIFICATION PLANT LAGOONS
PHASE I RCRA FACILITY INVESTIGATION
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Sample ID Sample Depth (ft bgs) Sampling Date	**USEPA Region IX Residential Soil PRGs**	*USEPA Region IX Industrial Soil PRGs*	Selected [1] Ecological Surface Soil Screening Values	NAPR [2] Basewide Background	**42SB01-03 (5.0 - 7.0) 11/14/06**	**42SB01-05 (10.0 - 11.0) 11/14/06**	**42SB02-03 (5.0 - 7.0) 11/14/06**	**42SB02-05 (9.0 - 11.0) 11/14/06**	**42SB03-01 (1.0 - 3.0) 11/13/06**	**42SB03-03 (5.0 - 7.0) 11/13/06**
Volatiles (ug/kg)										
Acetone	1,412,657	5,432,098	NE	NE	55 U	14 J	63	18 J	15 J	16 J
Methyl Ethyl Ketone	2,231,120	11,326,440	NE	NE	27 U	26 U	6.8 J	22 U	22 U	20 U
Semivolatiles (ug/kg)	**(none detected)**									
PAHs (ug/kg)	**(none detected)**									
PCBs (ug/kg)	**(none detected)**									
Inorganics (mg/kg)										
Arsenic	0.39	1.59	18 [3]	1.59	**0.87 J**	**0.90 J**	**0.86 J**	**1.4 J**	**0.79 J**	**1.0 J**
Barium	537	6,658	330 [3]	220	43 J	52 J	62 J	95 J	53	63
Beryllium	15.44	1,941	40 [3]	0.596	0.18 J	0.17 J	0.25 J	0.27 J	0.21 J	0.18 J
Cadmium	3.70	45.14	32 [3]	0.66	0.16 J	0.16 J	1.1 U	0.048 J	0.049 J	1.0 U
Chromium	211	448	0.4 [4]	114.5	15 J	23 J	14 J	27 J	16 J	6.3 J
Cobalt	903	1,921	13 [3]	26.9	21	28	25	28	23	21
Copper	313	4,088	70 [3]	246	98 J	120 J	78 J	81 J	110 J	37 J
Lead	400	800	120 [3]	6.3	20 J	25	1.4 J	4.2 J	4.3 J	0.78 J
Nickel	156	2,044	30 [5]	24.7	16 J	21	14 J	12 J	17 J	9.2 J
Vanadium	7.82	102.20	2 [5]	434	***160 J***	***180 J***	***160 J***	***220 J***	***180***	***120***
Zinc	2,346	100,000	50 [5]	88	75 J	100 J	68 J	60 J	67 J	65 J
Mercury -7471A	2.35	30.66	0.1 [4]	0.171	0.011 J	0.0057 J	0.019 J	0.12	0.013 J	0.011 J
Sulfide - 9034	NE	NE	NE	NE	28 U	100	29 U	30 U	29 U	29 U

TABLE 5-2

SUMMARY OF DETECTED RESULTS - SUBSURFACE SOIL
SWMU 42 - WATER PURIFICATION PLANT LAGOONS
PHASE I RCRA FACILITY INVESTIGATION
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Notes:

Entries in **Bold** indicate exceedance of USEPA Region IX Residential Soil PRGs
Entries with shading indicate exceedance of Ecological Surface Soil Screening Values
Underlined entries indicate exceedance of NAPR Basewide Background value

(1) Surface Soil Screening values compared to 42SB03-01 only, since it was from 1 to 3 feet bgs, and anything above 2 feet is ecologically significant

(2) NAPR Basewide Surface Soil Background - Upper Limit of Means (Mean + 2 standard deviations) Draft Summary Report for Environmental Background Concentrations of Inorganic Compounds, Naval Activity Puerto Rico, Ceiba, PR, Baker, September 2006

(3) Ecological soil screening level (http://www.epa.gov/ecotox/ecossl/)

(4) Toxicological threshold for earthworms (Efroymson et al., 1997a)

(5) Toxicological threshold for plants (Efroymson et al., 1997b)

U - Not detected
J - Analyte present - Reported value is estimated
PRG - Preliminary Remedial Goal
NAPR - Naval Activity Puerto Rico
NE - Not Established
ft bgs - feet below ground surface

Revised: November 20, 2007

TABLE 5-3

SUMMARY OF DETECTED RESULTS - SEDIMENT
SWMU 42 - WATER PURIFICATION PLANT LAGOONS
PHASE I RCRA FACILITY INVESTIGATION
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Sample ID Sample Depth (ft bgs) Sampling Date	USEPA Region IX Residential Soil PRGs	*USEPA Region IX Industrial Soil PRGs*	Selected Ecological Soil Screening Values [1]	NAPR [2] Basewide Background	42SD01 (0.0 - 0.5) 11/13/06	42SD01D (0.0 - 0.5) 11/13/06	42SD02 (0.0 - 0.5) 11/13/06	42SD03 (0.0 - 0.5) 11/13/06	42SD03D (0.0 - 0.5) 11/13/06	42SD04 (0.0 - 0.5) 11/13/06
Volatiles (ug/kg)										
1,1,2-Trichloroethane	730	1,610	100 [3]	NE	75 R	84 R	110 R	110 R	NA	90 J
Acetone	1,412,657	5,432,098	NE	NE	2600 J	5200 J	1500 J	2100 J	NA	870 J
Acrolein	10	34	NE	NE	***220 J***	1700 R	2200 R	2100 R	NA	1600 R
Benzene	643	1,409	101 [4]	NE	75 R	22 J	46 J	110 R	NA	80 R
Carbon disulfide	35,534	720,000	NE	NE	62 J	59 J	95 J	110 R	NA	220 J
Methyl Ethyl Ketone	2,231,120	11,326,440	NE	NE	220 J	390 J	280 J	540 R	NA	400 R
Semivolatiles (ug/kg)	**(none detected)**									
PAHs (ug/kg)	**(none detected)**									
PCBs (ug/kg)	**(none detected)**									
Inorganics (mg/kg)										
Arsenic	0.39	1.59	18 [5]	2.65	***3.1 J***	NA	34 UJ	25 UJ	23 UJ	25 UJ
Barium	537	6,658	330 [5]	199	210 J	NA	180 J	91 J	85 J	160 J
Chromium	211	448	0.4 [6]	49.8	190 J	NA	170 J	170 J	150 J	190 J
Cobalt	903	1,921	13 [5]	46.2	6.6 J	NA	6.9 J	5.8 J	5.2 J	5.1 J
Copper	313	4,088	70 [5]	168	**500 J**	NA	**650 J**	**780 J**	**550 J**	**320 J**
Lead	400	800	120 [5]	22.0	6.1 J	NA	4.8 J	3.5 J	6.4 J	3.6 J
Nickel	156	2,044	30 [7]	20.7	5.1 J	NA	5.3 J	3.9 J	3.4 J	3.8 J
Vanadium	7.82	102.20	2 [7]	287	**79 J**	NA	**81 J**	***110 J***	**89 J**	***120 J***
Zinc	2,346	100,000	50 [7]	115	46 J	NA	42 J	38 J	42 J	25 J
Mercury - 7471A (mg/kg)	2.35	30.66	0.1 [6]	0.109	0.17 J	NA	0.14 J	0.16 J	0.11 J	0.095 J
Sulfide - 9034 (mg/kg)	NE	NE	NE	NE	360	NA	530	450	360	530

TABLE 5-3

SUMMARY OF DETECTED RESULTS - SEDIMENT
SWMU 42 - WATER PURIFICATION PLANT LAGOONS
PHASE I RCRA FACILITY INVESTIGATION
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Notes:

Entries in **Bold** indicate exceedance of USEPA Region IX Residential Soil PRGs
Entries in *italics* indicate exceedance of USEPA Region IX Industrial Soil PRGs
Entries with shading indicate exceedance of Ecological Surface Soil Screening Values
Underlined entries indicate exceedance of NAPR Basewide Background value

(1) Soil screening values used to screen sediment data (see Section 5.1.2.2).

(2) NAPR Basewide Surface Soil Background - Upper Limit of Means (Mean + 2 standard deviations) Draft Summary Report for Environmental Background Concentrations of Inorganic Compounds, Naval Activity Puerto Rico, Ceiba, PR, Baker, September 2006

(3) Canadian soil qualitiy guideline (CCME, 2006)

(4) The screening value shown is an average of the target and intervention soil standards. The value is based on a default organic carbon content of 0.02 (2 percent), which represents a minimum value (adjustment range is 2 to 30 percent) (MHSPE, 2000)

(5) Ecological soil screening level (http://www.epa.gov/ecotox/ecossl/).

(6) Toxicological threshold for earthworms (Efroymson et al., 1997a)

(7) Toxicological threshold for plants (Efroymson et al., 1997b)

U - Not detected
UJ - Reported quantitation limit is qualified as estimated
J - Analyte present - Reported value is estimated
NA - Not Analyzed
ND - Not Detected
NE - Not Established
PRG - Preliminary Remedial Goal
NAPR - Naval Activity Puerto Rico
ft bgs - feet below ground surface
CCME - Canadian Council of Ministers of the Environment
MHSPE - Ministry of Housing, Spatial Planning and Environment

Revised: November 20, 2007

TABLE 5-4

SUMMARY OF DETECTED RESULTS - GROUNDWATER
SWMU 42- WATER PURIFICATION PLANT LAGOONS
PHASE I RCRA FACILITY INVESTIGATION
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Sample ID Sample Depth (ft bgs) Sampling Date	USEPA Region IX Tap Water PRGs	*USEPA MCLs*	Selected Ecological Surface Water Screening Values	NAPR [1] Basewide Background	42TW01 NA 11/15/06	42TW01D NA 11/15/06	42TW02 NA 11/15/06	42TW03 NA 11/15/06
Volatiles (ug/L)								
Acetone	548	NE	1000 [4]	NE	25 U	25 U	25 U	13 J
Methyl Ethyl Ketone	697	NE	40000 [5]	NE	10 U	10 U	1.7 J	3.2 J
Semivolatiles (ug/L)								
3 & 4 Methylphenol	18	NE	NE	NE	11 U	11 U	1.4 J	10 U
PAHs (ug/L)	**(none detected)**							
PCBs (ug/L)	**(none detected)**							
Inorganics (ug/L)								
Arsenic	0.045	10	36 [6]	18.89	10 U	10 U	**0.94 J**	**0.91 J**
Barium	260	2,000	50000 [7]	686	40	39	150	**420**
Beryllium	7	4	310 [8]	2.21	4.0 U	4.0 U	4.0 U	0.51 J
Cadmium	1.80	5	8.85 [6]	55.83	5.0 U	5.0 U	5.0 U	0.52 J
Chromium	5,470	100	50.4 [6]	162.41	10 U	2.2 J	12	11
Cobalt	73	NE	45 [9]	633.21	0.69 J	1.1 J	20 J	120 J
Copper	150	1,300.00	3.73 [6]	593.00	20 U	20 U	30 R	97 J
Lead	0.0036 [2]	15 [3]	8.52 [6]	26.25	5.0 U	5.0 U	***1.7 J***	***13***
Selenium	18	50.00	71.1 [6]	33.98	10 U	10 U	0.72 J	0.64 J
Vanadium	3.60	NE	120 [10]	484.66	**6.5 J**	**4.8 J**	**58**	**220**
Zinc	1,090	NE	85.6 [6]	547.53	6.2 J	12 J	25 J	66 J
Mercury-7470A	0.36	2.00	1.15 [6]	0.29	0.20 U	0.17 J	1.0 U	0.20 U

Revised: November 20, 2007

TABLE 5-4

SUMMARY OF DETECTED RESULTS - GROUNDWATER
SWMU 42- WATER PURIFICATION PLANT LAGOONS
PHASE I RCRA FACILITY INVESTIGATION
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Sample ID Sample Depth (ft bgs) Sampling Date	USEPA Region IX Tap Water PRGs	*USEPA MCLs*	Selected Ecological Surface Water Screening Values	NAPR [1] Basewide Background	42TW01 NA 11/15/06	42TW01D NA 11/15/06	42TW02 NA 11/15/06	42TW03 NA 11/15/06
Dissolved Inorganics (ug/L)								
Arsenic, Dissolved	0.045	10	36 [11]	20.41	10 U	**0.62 J**	10 U	**1.0 J**
Barium, Dissolved	260	2,000	50000 [7]	260	39	36	110	73
Chromium, Dissolved	5,470	100	50 [11]	9.0	10 U	10 U	10 U	8.6 J
Cobalt, Dissolved	73	NE	45 [9]	580.5	0.77 J	1.2 J	9.8 J	18
Copper, Dissolved	150	1,300.00	3.1 [11]	324.0	0.41 U	0.76 J	0.68 J	21
Lead, Dissolved	0.0036 [2]	15 [3]	8.1 [11]	2.2	5.0 U	5.0 U	5.0 U	***0.73 J***
Nickel, Dissolved	73	NE	8.2 [11]	84.1	0.80 U	0.50 J	1.9 J	6.7 J
Selenium, Dissolved	18	50	71 [11]	33.98	10 U	10 U	10 U	0.87 J
Vanadium, Dissolved	3.60	NE	120 [10]	265.61	10 U	10 U	3.2 J	**66**
Zinc, Dissolved	1,090	NE	81 [11]	360.64	4.3 J	6.5 J	10 J	19 J

Notes:

Entries in **Bold** indicate exceedance of USEPA Region IX Tap Water PRGs

Entries in *italics* indicate exceedance of USEPA MCLs

Entries with shading indicate exceedance of Ecological Surface Water Screening Values

(1) NAPR Basewide Surface Soil Background - Upper Limit of Means (Mean + 2 standard deviations) Draft Summary Report for Environmental

(2) PRG for tetraethyl lead

(3) EPA Action Level

(4) Minimun acute value (96-hour LC_{50} for *Lumbriculus variegatus* [oligochaete])with a safety factor of 100

(5) Minimum acute value (96-hour NOEC for *Cyprinodan variegatus* [sheepshead minnow]) with a safety factor of 10

(6) USEPA National recommended water quality criterion (total recoverable saltwater CCC derived by dividing the dissolved CCC value by the USEPA recommended conversion factor) (USEPA, 2006)

TABLE 5-4

SUMMARY OF DETECTED RESULTS - GROUNDWATER
SWMU 42- WATER PURIFICATION PLANT LAGOONS
PHASE I RCRA FACILITY INVESTIGATION
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Notes (continued):

(7) Minimum acute value (96-hour LC_{50} for *Americanysis bahia* [opposum shrimp]) with a safety factor of 100 (values expressed as a total recoverable concentration (USEPA, 2003).

(8) Minimum acute value (96-hour LC_{50} for *Fundulus heteroclitus* [mummichog]) with a safety factor of 100 (value expressed as a total recoverable concentration (USEPA, 2003).

(9) Minimum acute value (96-hour LC_{50} for *Nitocra spinipes* [Harpacticoid copepod]) with a safety factor of 100 (value expressed as a total recoverable concentration (USEPA, 2003).

(10) Minimum chronic value (28-day NOEC for *Pimephales promelas* [fathead minnow]) based on growth (value expressed as a total recoverable

(11) USEPA National recommended water quality criterion (dissolved saltwater CCC) (USEPA, 2006)

U - Not detected
UJ - Reported quantitation limit is qualified as estimated
J - Analyte present - Reported value is estimated
NA - Not Analyzed
ND - Not Detected
NE - Not Established
PRG - Preliminary Remedial Goal
NAPR - Naval Activity Puerto Rico
* - Action Level
ft bgs - feet below ground surface
USEPA - United States Environmental Protection Agency
NOEC - No Observed Effect Concentration
CCC - Criteria Continuous Concentration
LC_{50} - Median Lethal Concentration

TABLE 5-5

SUMMARY OF DETECTED RESULTS - QUALITY ASSURANCE / QUALITY CONTROL
SWMU 42 - WATER PURIFICATION PLANT LAGOONS
PHASE I RCRA FACILITY INVESTIGATION
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

	Equipment Rinsates				Field Blanks		Trip Blanks		
Sample ID	**2006ER01**	**2006ER02**	**2006ER03**	**2006ER04**	**2006FB01**	**2006FB02**	**42TB01**	**42TB02**	**42TB03**
Sampling Date	**11/13/2006**	**11/15/2006**	**11/15/2006**	**11/16/2006**	**11/18/2006**	**11/18/2006**	**11/14/06**	**11/15/06**	**11/15/06**
Volatiles (ug/L)									
Bromoform	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Chlorodibromomethane	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	2.8	1.0 U	1.0 U	1.0 U
Chloroform	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	160	1.0 U	1.0 U	1.0 U
Dichlorobromomethane	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	18	1.0 U	1.0 U	1.0 U
Toluene	1.0 U	2.3	6.9	2.2	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Semivolatiles (ug/L)									
14-Dichlorobenzene	9.4 UJ	0.56 J	10 U	10 U	0.53 J	10 U	NA	NA	NA
Diethyl phthalate	0.82 J	10 UJ	10 U	10 U	0.69 J	10 U	NA	NA	NA
PAHs (ug/L)									
Fluoranthene	0.19 UJ	0.19 UJ	0.20 U	0.20 U	0.20 U	0.080 J	NA	NA	NA
Naphthalene	0.20 U	0.20 U	0.025 J	0.20 U	0.20 U	0.20 U	NA	NA	NA
PCBs (ug/L)	**(none detected)**								
Metals (ug/L)									
Copper	20 U	20 U	20 U	20 U	20 U	79	NA	NA	NA
Lead	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	0.69 J	NA	NA	NA
Nickel	40 U	0.26 J	0.16 J	0.19 J	40 U	40 U	NA	NA	NA
Zinc	3.7 J	20 U	20 U	20 U	20 U	20 U	NA	NA	NA

Notes:
U - Not detected
UJ - Reported quantitation limit is qualified as estimated
J - Analyte present - Reported value is estimated
NA - Not Analyzed

FIGURES

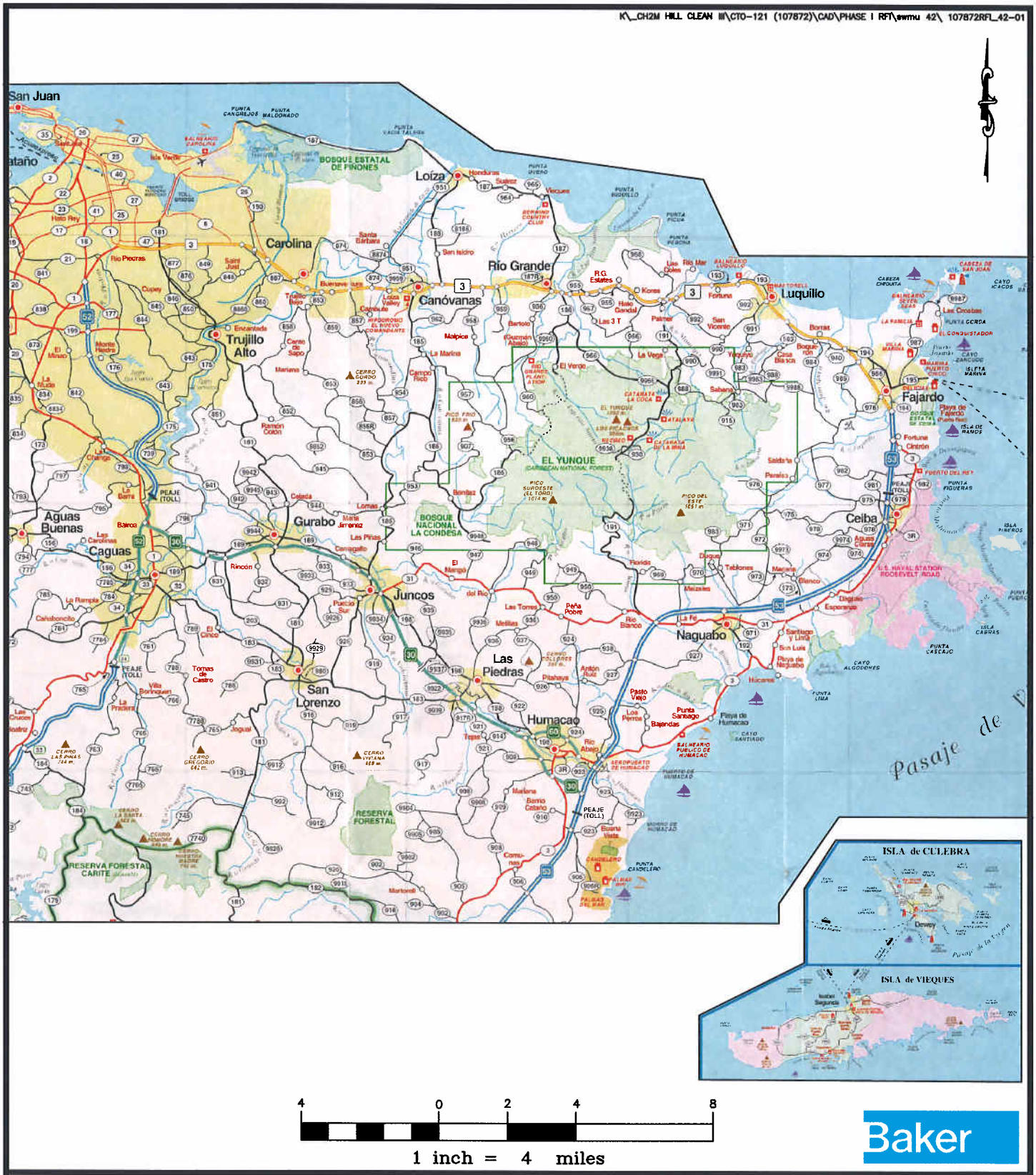
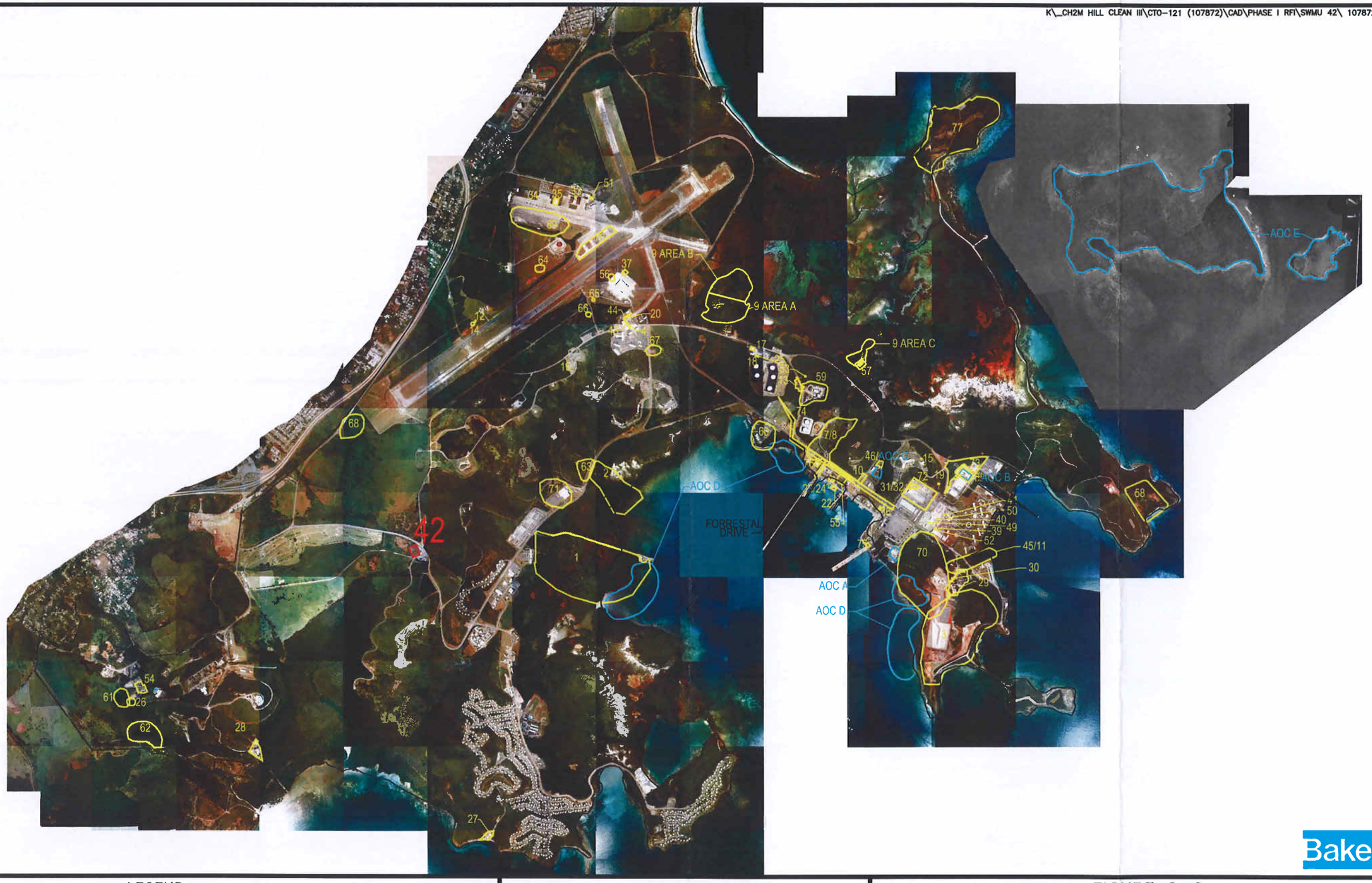


FIGURE 2-1
REGIONAL LOCATION MAP
PHASE I RFI
SWMU 42

NAVAL ACTIVITY PUERTO RICO
PUERTO RICO

SOURCE: METRODATA, INC., 1999.

K_CH2M HILL CLEAN III\CTO-121 (107872)\CAD\PHASE I RFI\SWMU 42\ 107872RFI_42-02



Baker

LEGEND

1 – SWMUs

42 – AREA OF WHICH THIS INVESTIGATION PERTAINS TO

AOC D – AOCs

SOURCE: GEO-MARINE, INC., SEPTEMBER 6, 2000.

3000 0 1500 3000

1 inch = 3000 ft.

FIGURE 2-2
NAPR LOCATION MAP
PHASE I RFI WORK PLAN FOR
SWMU 42
NAVAL ACTIVITY PUERTO RICO
PUERTO RICO

LEGEND

– SWMU 42

SOURCE: GEO–MARINE, INC., SEPTEMBER 6, 2000.

500 0 250 500
1 inch = 500 ft.

FIGURE 2–3
SWMU 42 LOCATION MAP

NAVAL ACTIVITY PUERTO RICO
PUERTO RICO

Baker

100 0 50 100

1 inch = 100 ft.

Baker

LEGEND

- SITE BOUNDARY
- TEMPORARY MONITORING WELL LOCATION
- PROPOSED SEDIMENT SAMPLE LOCATION
- (107.36) – GROUNDWATER ELEVATION

FIGURE 3-1
GROUNDWATER ELEVATIONS (11/18/06)
SWMU 42-WATER PURIFICATION PLANT LAGOONS
PHASE I RFI SWMUs 42

NAVAL ACTIVITY PUERTO RICO
PUERTO RICO

LEGEND

- SITE BOUNDARY
- SURFACE, SUBSURFACE, AND GROUNDWATER SAMPLE LOCATION
- SEDIMENT SAMPLE LOCATION

FIGURE 4-1
SOIL, GROUNDWATER AND SEDIMENT SAMPLING LOCATIONS
SWMU 42-WATER PURIFICATION PLANT LAGOONS
PHASE I RFI SWMU 42
NAVAL ACTIVITY PUERTO RICO
PUERTO RICO

APPENDIX A
2006 FIELD ACTIVITIES

APPENDIX A.1
SWMU 42 FIELD LOG BOOK NOTES

NAPR

425B03

Time	Depth	ID	Recovery	PS	BG
1610	0-4	S-1	3.6	0	0
T1				0	0
				0	0
				0	0
1620	4-8	S-2	3.2	–	–
				0	0
				0	0
				0	0
1630	8-12	S-3	2.3	–	–
				–	–
				0	0
				0	0
1640	12-16	S-4		0	0
				0	0
				0	0
				0	0
1650	16-20	S-5			

MMD

11/13

NAPR

Description

1 SILT, some rock frag, trace clay; -00
2 brown; damp (FILL) -01
3
4
5
6 6.0 -03
7 6.0
8 CLAY, some L sand, little rock
frag; wood frag; green; damp (RESIDUM)
9
10 CLAY, trace silt; brown; damp
11
12 moist zone
13 trace f/c sand; brown; damp
14
15
16 little f/c sand; brown; damp
17
18 trace f/c sand; brown; damp
19
20 19.8
ROCK FRAG; gray; damp

11/13/06

MMD

11/13

Tues. Nov. 14, 2006. Today's Tasks - SWMU 42 & begin SWMU 16
Weather Conditions -
AM: Clearing, calm, high 70's
PM: P. Sunny, lt var wind, high 80's

0613 Arrive at Base. Prep. for the day. PAM & DNH on Base now.
0700 Relocate to SWMU 42
0716 At SWMU 42, driller not on site yet. I prep. for surf. soil at SB03.
0800 Complete SB03-00 collection. Drill crews on site.
0813 Setup at 42SB02
0920 Install ~~TOC~~ 42TW02
Screen 14'-24' 1" Sch 40 PVC
Riser 0-14' 1" Sch 40 PVC
0945 Collect 42SB02-00
William says that he'll try to set up on SB01
1008 Set up on SB01
1109 Note on 42SB01-05 insufficient vol. for metals, CN & Sulfate, may have to pull from 8 oz. jar
1120 Complete SWMU 42. Lunch break

MHD 11/14

1150 Hand off samples to PAM. PAM shows me SWMU 16.
1240 Setup at 16SB06.
1338 Complete 16SB06 to 18' bgs Backfill to 10' w/ cuttings & set 5 ft of screen (5-10') w 5' of risers. Only evidence of water was ~ 6-8' bgs
1406 Relocate to 16SB05.
1431 Relocate to 16SB04.
1528 Relocate to 16SB02. MEK stopped by. We talked about sampling since water is scarce shallow & weathed bedrock is shallow <10' bgs.) We decided to do an exploratory boring to probe refusal or groundwater
1530 I will use SB02 & finish out the day here. Note that saprolite tends to be silty in particle size w/ varying degrees of hardness (indicative of weathering)
1609 USE: SILT, trace f sand & clay for saprolite (CONT. p. 20)

11/14 MHD

NAPR

425B02 — Geoprobe 5400

Time	Depth	ID	Recovery	PID PB	PID BG
0825	0-4	S-1	3.2	–	–
		Soil		0	0
				0	0
				0	0
0832	4-8	S-2	3.3	Δ	0
				0	0
				0	0
				0	0
0840	8-12	S-3	4.0	0	0
				0	0
				0	0
				0	0
0848	12-16	S-4	3.4	0	0
				0	0
				0	0
				0	0
0856	16-20	S-5	1.6	–	–
				–	–
				0	0
				0	0
0910	20-24	S-6	1.0	–	–
				–	–

MKD 11/14

NAPR

William Rodriguez

Description

-00

CLAY, some silt; little rock frag; brown; dry (FILL)

-03

little f/c sand; silt, trace rock frag; dk brown; damp (Fill)

10.5 -05

CLAY, trace rock frag; f sand; dk brown; damp (RESIDUM)

little f sand; gray; wet @ 19.1

little rock frag; f/c sand; brown moist

some f/c sand; green-gray; wet

trace f/c sand; gray; wet

SAPPROLITE; orange, red; black; damp 22.1

11/14 MKD

NAPR

425B01

Time	Depth	ID	Recovery	PID PS	PID BG
1014	0-4	S-1	3.0	–	–
		S-1A		0	0
				0	0
				0	0
1020	4-8	S-2	1.9	–	–
				–	–
				0	0
				0	0
1034	8-12	S-3	0.9	–	–
				–	–
				0	0
				0	0
1045	12-16	S-4	1.9	–	–
				0	0
				0	0
				0	0
1150	16-20	D-N			

Well screen 10-20' 1" Sch 40
Riser 0-10' 1" Sch 40

MLD 11/14

NAPR

Description

1 F/C SAND some rock frag; clay; -00
2 brown; gray; damp
3
4
5 some clay
6 -03
7
8 8.0
9 ROCK FRAG, little F/C sand; clay;
10 brown; damp -05
11
12
13 ROCK FRAG, trace clay; gray;
14 wet 14.0
15 CLAY, trace F sand; gray; moist
16

PVC
PVC

11/14 MLD

site 42 -

TW02-

SWL = 11.00.

WD = 24.85.

13.85 = WC

SAMPLE TIME 0800 FOR 42-TW02.

NOTE: WELL GOES DRY -

COMPLETED SAMPLING @ 1045.

Weather: Mostly Sunny, ~80°F

11/15/06

SWMU-42

Temp. Well 1

SWL @ 0715 = 12.17 ft.

0730 - Begin Sampling
42TW01
" D
" MS
" MSD
Pumped @ 3/4 speed
Post Sample Readings:

Temp. °C	Cond. ms	pH	ORP	Turb.
29.68	0.356	6.91	-85	14

11/15/06

SWMU-42

Temp. Well 3

SWL @ 0920 = 5.38 ft.

0930 - Begin Sampling.
Pumped @ 3/4 speed. Ran Dry after VOA's & 2 Ambers. very slow re-charge

42TW03

Revised: November 20, 2007

"Rite in the Rain"®
ALL-WEATHER WRITING PAPER

Name MARK E. KIMES
BAKER ENVIRONMENTAL, INC.

Address 100 AIRSIDE DRIVE
MOON TOWNSHIP, PA 15108

Phone (412) 269-2009 office
(412) 337-7465 cell

Project RFI INVESTIGATIONS FOR
SWMU. 16, 27, 28, 29, 42, 68, AOC A
NAVAL ACTIVITY PUERTO RICO
NOVEMBER 2006

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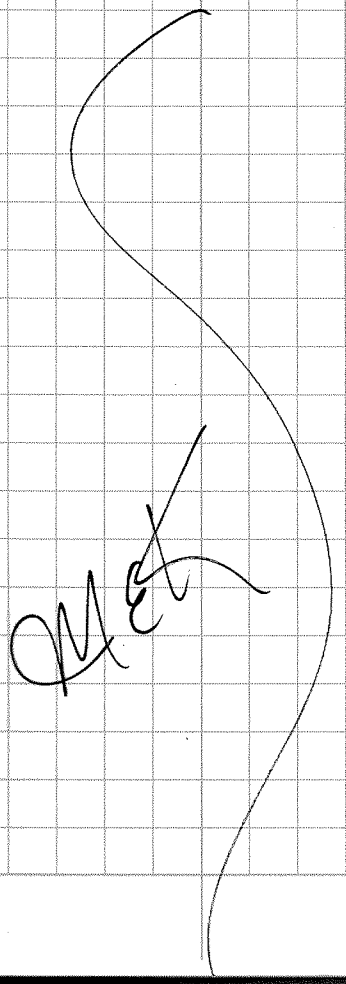
CONTENTS

PAGE	REFERENCE	DATE
1-15	7 SITE RFI (16, 27, 28, 29, 42, 68, A)	11/12/06

SUNDAY 12 NOVEMBER 2006 (1)

TRAVEL DAY FROM PIT TO SJU.
OBTAINED MISCELANEOUS SUPPLIES
ON ISLAND TO CONDUCT THE RFI FIELD
INVESTIGATIONS.



(2) MONDAY 13 NOVEMBER 2006

0600 ARRIVED AT GATE 1.
OBTAINING VEHICLE PASSES FOR ALL 3 VEHICLES.
HEADING OVER BLDG 31 PWD TO UNPACK AND GET READY TO INITIATE THE FIELD EFFORT.

0630 OBTAIN KEY TO STORAGE ROOM.
UNPACKING / ORGANIZING AND GETTING SAMPLE BOTTLE SETS / COOLERS TOGETHER FOR SWMU's 28, 68 TO GET THE DRILLERS GOING.

0755 MKD HEADING TO GATE 1 TO MEET THE DRILLERS.

0830 MKD AND DRILLERS BACK AT PWD.
JOE BURAWA TAKES OFF TO 68 W/ HIS DRILL CREW.
MKD TO HEAD TO 28 W/ HIS DRILL CREW.
HEADING TO 68 W/ GPS UNIT TO STAKE OUT A FEW LOCATIONS @ 68 TO GET JOE STARTED.

0930 DEPART 68 FOR SWMU 28 TO STAKE LOCATIONS FOR MKD AND HIS CREW W/ THE GPS UNIT.

MONDAY 13 NOVEMBER 2006 (3)

0940 STAKING LOCATIONS @ SWMU 28.

1020 DEPARTING 28 FOR 68 TO CONTINUE STAKING OUT REMAINING LOCATIONS.

1230 BREAK FOR LUNCH.

1330 CHECKING IN ON STATUS OF WORK @ SWMU 68 AND 28.

1415 BACK @ PWD TO OBTAIN SAMPLING EQUIPMENT AND SAMPLE CONTAINERS TO COLLECT SEDIMENT SAMPLES @ SWMU 42.
HEADING TO SWMU 42. EDGAR GARCIA INFORMED ME THAT THEY DRAINED THE LAGOONS LAST WEEK AND WE NEED TO GET THE SAMPLES SOON SINCE THEY WILL BE FILLING THEM W/ FILTER BACKWASH WATER AGAIN IN THE NEAR FUTURE.

1450 ARRIVED AT SWMU 42. ASSESSING THE SITE TO DETERMINE SAFEST WAY TO OBTAIN SEDIMENT SAMPLES FROM THE LAGOONS. THE SEDIMENT IS MADE OF FINES FROM THE FILTER BACKWASH AND IS WET AND VERY SOFT. I NEED TO MOVE THE SAMPLING LOCATIONS

MONDAY 13 NOVEMBER 2006

CLOSER TO THE EDGES FOR SAFETY REASONS. WILL COLLECT THE SEDIMENT FROM 0-6" bgs USING A STAINLESS STEEL SPOON AND AL PIE PANS.

1506 COLLECTED 42SD04. SEDIMENT WAS FINE GRAINED BROWN SILT.

1509 COLLECTED 42SD02. SEDIMENT WAS FINE GRAINED BROWN SILT.

1516 COLLECTED 42SD01 AND A DUPLICATE FOR VOC's. SEDIMENT WAS A FINE GRAINED BROWN SILT.

1520 COLLECTED 42SD03 AND A DUPLICATE EXCEPT FOR VOC's, SEDIMENT WAS A FINE GRAINED BROWN SILT.

FOR ALL SEDIMENT SAMPLES

1 - 8 OZ PLASTIC FOR SULFIDE & CYANIDE

1 - 8 OZ PLASTIC FOR METALS & MERCURY

1 - 16 OZ GLASS FOR SVOC's, TL PAH's, PCB's,

1 - TERRA CORE SET FOR VOC's

1550 TALKED TO MRD. HE IS READY TO MOVE TO ANOTHER SITE. DIRECTED HIM TO GO OVER TO SWMU 42. I AM STAKING THE BORING LOCATIONS W/ THE GPS @ SWMU 42.

MEK

MONDAY 13 NOVEMBER 2006

1615 HEADING TO OBTAIN ADDITIONAL ICE FOR THE SAMPLES. STOPING BY 68 TO CHECK ON JOE.

1700 RETURN TO FWD TO LOG IN SAMPLES AND PREPARE FOR TOMORROWS WORK.

1805 OFF-SITE.

PETE MONDAY AND DARRIN HUPE ARRIVED IN PR TODAY. THEY WILL BE ON BASE TOMORROW.

MEK

⑥

TUESDAY 14 NOVEMBER 2006

0600	ON-BASE. HEADING TO PWD TO PREPARE FOR SAMPLING. JOE GOING BACK TO 68, MKD BACK TO 42, DNH TO 28 FOR GW, PAM TO 68 FOR GW.
0800	DRILLERS ON-SITE. CHECKING ON ALL FOUR CREWS.
1100-1130	LUNCH
	HEADING TO SWMU 16 TO STAKE OUT LOCATIONS FOR MKD.
1525	CHECK ON MKD AT 16. MKD DISCUSSED DIFFICULTY IN OBTAINING WATER. RECOMMENDED A DEEPER BORING IN WEATHERED BEDROCK TO SEE IF WE ENCOUNTER A WATER BEARING ZONE. BEDROCK IS AROUND 10' BGS.
1630	DNH MOVING TO 68 FOR GW SAMPLING.
1655	DRILLERS OFF-SITE
	PROCESSING SAMPLES AND ADDING ADDITIONAL ICE TO ALL SAMPLES.
1800	OFF-SITE.
	SHIPPED SOILS FROM 28, 42 AND 68 TO STL

⑦

WEDNESDAY 15 NOVEMBER 2006

0600	ON-BASE. HEADING TO PWD TO PREPARE FOR SAMPLING. JOE HEADING BACK TO 68, MKD RETURNING TO 16, DNH TO 42 FOR GW, PAM TO 28 AND 68 FOR GW.
0730	DRILLERS ON-SITE. PROCESSING SAMPLES, PREPARING COOLERS FOR CREWS, FILLING OUT COC, etc...
1000	MAKING ROUNDS TO ALL SITES TO CHECK ON STATUS OF EVERYONE.
1130	LUNCH BREAK.
1200	JOE HEADING TO 28 W/ AUGERS FOR STUBBORN HOLE WHERE MKD HAD REFUSAL.
1320	MKD HEADING TO 29. CHECKING FOR UTILITIES.
1500	PICKING UP SAMPLES FROM ALL 4 CREWS AND HEDING BACK TO PWD W/ ADDITIONAL ICE TO PROCESS SAMPLES.
1600	DRILLERS OFF-SITE.
1800	OFF-SITE.
	SHIPPED SOILS AND GW FROM 16, 28, 42, 68 TO STL.

(8)

THURSDAY 16 NOVEMBER 2006

0600 ON-BASE. HEADING TO PWD TO PREPARE FOR SAMPLING. JOE TO 27, MED TO 29, DNH TO 68, PAM TO 68. I WILL BE PROCESSING SAMPLES ALL DAY TO MAKE A BIG SHIPMENT TO STL SAVANNAH.

0740 DRILLERS ON-SITE.

1030 HEADING TO 29 TO LOCATE BOREHOLES FOR MED.

1100-1130 LUNCH BREAK. BACK TO PWD TO PACK COOLERS.

SHIPPING GW AND SOIL FROM 27, 28, 29, 42, 68 TO STL SAVANNAH.

1530 DANNY (FEDEX) PICKED UP 9 COOLERS FOR STL SAVANNAH. PRIORITY OVERNIGHT FEDEX INT'L AIRBILL NO.

8462 4272 0305

1555 DRILLERS OFF-SITE.

1600 CLEANING UP ROOM AND GETTING ORGANIZED FOR TOMORROW.

1730 OFF-SITE. DRILLING COMPLETED.

MEK

(9)

FRIDAY 17 NOVEMBER 2006

0600 ON-BASE. HEADING TO PWD TO PREPARE FOR SAMPLING. DNH TO 29 FOR GW, JOE AND MED TO 68 FOR GW, PAM AND MEK TO SURVEY ALL WELLS. DRILLERS WILL BEGIN ABANDONING TEMP. WELLS TODAY AFTER WE SURVEY THEM W.

0700 PAM AND I HEAD OUT W/ SURVEY GRADE GPS EQUIPMENT TO SHOOT ALL POINTS. I SETTING-UP BASE STATION ON MONUMENT TANK. WE SHOULD GET GREAT COVERAGE OF THE BASE FROM HERE.

0745 ROAMING TO ALL SITES TO PICK-UP PTS.

1130-1200 LUNCH. SURVEYING COMPLETED.

1200 BACK TO PWD TO PACK COOLERS FOR TODAY'S SHIPMENT.

1600 FEDEX PICKED UP 11 COOLERS FOR PRIORITY OVERNIGHT TO STL SAVANNAH. FEDEX INT'L AIRBILL #

8462 4272 0316

SATURDAY DELIVERY

68-GW, 27-SOIL/GW, 29-GW, A-SOIL

1800 OFF-SITE.

MEK

SATURDAY 18 NOVEMBER 2006

0600 ON-BASE. PREPARE FOR SAMPLING.
MRD - GW @ 16 & 27. PAM AND MYSELF
AOC A CC & WIPE SAMPLING.

0800 DRILLERS ON-SITE TO COMPLETE
TEMP. WELL REMOVAL AND GROUTING.
CHECKING ALL SITES TO SEE THAT
EVERYTHING IS IN ORDER. i.e. WELLS
PULLED, BACKFILLED, GROUTED, EVERYTHING
REMOVED FROM SITES.

0930 GATHERING SAMPLING EQUIPMENT AND
SAMPLE CONTAINERS FOR CONCRETE CHIP
AND WIPE SAMPLING AT AOC A.

0950 ARRIVE AT AOC A. SCOPING INTERIOR
OF BUILDING FOR SAMPLE LOCATIONS.
ALOT OF THE INTERIOR WALLS SHOWN
ON THE WORK PLAN FIGURE ARE NO
LONGER IN THE BUILDING. CONCRETE
CHIP SAMPLE LOCATIONS AOCACC01, 03,
AND 04 ARE W THE SAME LOCATIONS
IDENTIFIED IN THE WORK PLAN. SAMPLE
02 HAD TO BE MOVED DUE TO RESTRICTED
ACCESS TO THE EQUIPMENT MAINTENANCE Room
IT WAS LOCATED WEST OF THE EQUIP Room.
SAMPLE LOCATIONS 05 AND 06 TO BE

SELECTED IN THE FIELD WERE PLACED
IN HIGH TRAFFIC AREAS NEAR THE
LARGE OVERHEAD DOOR OPENINGS
ALONG THE SOUTHERN WALL.
HAMMER AND DEDICATED CHISELS ARE
BEING USED FOR SAMPLE COLLECTION.

1012 OBTAINED AOCACC04. ATTEMPTED TO
REMOVE AS MUCH OF THE EPOXY FLOOR
COATING PRIOR TO SAMPLE COLLECTION.

1020 COLLECTED AOCACC03, 03D, AND 03MS/MSD.
TRIED TO REMOVE EPOXY FLOOR COATING
PRIOR TO SAMPLE COLLECTION. CONCRETE
SEEMS TO BE HIGH DENSITY.

1100 COLLECTED AOCACC01. ATTEMPTED TO
REMOVE FLOOR COATING PRIOR TO SAMPLE
COLLECTION.

1130 BREAK FOR LUNCH. JOE BURAMA DEPARTURE PR.

1245 RETURN TO AOC A TO RESUME SAMPLE
COLLECTION.

1308 COLLECTED AOCACC02. TRIED TO REMOVE AS
MUCH OF EPOXY COATING AS POSSIBLE PRIOR TO
SAMPLING.

1318 COLLECTED AOCACC05. REMOVED COATING
ON FLOOR.

(12)

SATURDAY 18 NOVEMBER 2006

1330 COLLECTED AOCA CC06, SAME AS PREVIOUS FOR FLOOR COATING.

1340 SCOPING OUT WIPE SAMPLE LOCATIONS. LOOKING FOR AREAS OF STAINING, HIGH TRAFFIC, LOOSE SPOTS ETC... SAMPLE AOCA WP07 WAS MOVED CLOSER TO OVERHEAD DOOR ENTRANCE. AOCA WP03 WAS LOCATED EAST OF THE EQUIP ROOM DUE TO LACK OF ACCESS. AOCA WP06 WAS MOVED SOUTHWEST TO A STAINED AREA ON THE FLOOR. AOCA WP02 WAS MOVED TO OUTSIDE OF THE DOOR TO THE EQUIP ROOM. AOCA WP13, 14, AND 15 WERE PLACED IN THE WESTERN SIDE OF THE BLDG FOR COMPLETE COVERAGE OF THE INTERIOR OF THE BLDG.

A 10cm x 10cm TEMPLATE IS BEING USED FOR SAMPLE COLLECTION. INDIVIDUAL LOCATIONS ON THE FLOOR ARE BEING WIPED FOR EACH ANALYSIS DUE TO DIFFERENT SOLVENTS ETC... FOR EACH WIPE SAMPLE.

MEK

Saturday 18 November 2006

(13)

1- VIAL w/ METHANOL FOR VOC,
1- VIAL w/ METHANOL FOR SVOC, LLPAH,
1- VIAL w/ ACETIC ACID FOR METALS, Hg

1426 COLLECTED WIPE SAMPLE AOCA WP 12
1438 " " " " 11
1441 " " " " 10 AND D
1445 " " " " 07
1447 " " " " 08
1449 " " " " 09
1454 " " " " 06
1456 " " " " 02
1458 " " " " 04
1459 " " " " 03
1502 " " " " 01
1505 " " " " 13
1506 " " " " 14
1508 " " " " 05
1510 " " " " 15, D, MS, MSD
1530 HEADING TO OBTAIN ADDITIONAL ICE AND GOING BACK TO PWD.
1600 OFF-SITE.

MEK

(14)

SUNDAY 19 NOVEMBER 2006

0700 ON-BASE. HEADING TO PWD TO ADD ADDITIONAL ICE ON SAMPLES. PACK-UP, PROCESS SAMPLES, CLEAN-UP.

1230 OFF-BASE.
DARREN HUBE DEPARTING AR.

(15)

MONDAY 20 NOVEMBER 2006

0700 ON-BASE. GETTING READY TO SHIP ALL EQUIPMENT BACK TO OFFICE. PACKING REMAINING SAMPLES TO SHIP TO STL SAVANNAH.

1200 STOPPING @ FED-EX IN SAN JUAN TO SHIP EQUIPMENT AND SAMPLES
16 COOLERS SENT TO STL SAVANNAH
FEDEX INT'L AIRBILL #
8462-4272-0327
FOR PRIORITY OVERNIGHT.

1300 HEADING TO AIRPORT FOR FLIGHT HOME.

APPENDIX A.2
CHAIN-OF-CUSTODY FORMS

Serial Number 76717

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

SEVERN TRENT **STL®**

FedEx Airbill No.: 8462 4272 0305

STL Savannah
5102 LaRoche Avenue
Savannah, GA 31404
Website: www.stl-inc.com
Phone: (912) 354-7858
Fax: (912) 352-0165

42-003

Alternate Laboratory Name/Location
Phone:
Fax:

PROJECT REFERENCE	PROJECT NO.	PROJECT LOCATION (STATE)
	CTO-121	PR
STL (LAB) PROJECT MANAGER	P.O. NUMBER	CONTRACT NO.
Kathy Smith		
CLIENT (SITE) PM	CLIENT PHONE	CLIENT FAX
Mark Kimes	412 337 7465	
CLIENT NAME	CLIENT E-MAIL	
Baker	mkimes@mbakercorp.com	
CLIENT ADDRESS		
100 Airside Dr., Moon Twp., PA 15108		
COMPANY CONTRACTING THIS WORK (if applicable)		
CH2M Hill		

PAGE ____ OF ____

STANDARD REPORT DELIVERY ●
DATE DUE 20 day TAT
EXPEDITED REPORT DELIVERY (SURCHARGE) ○
DATE DUE _____

NUMBER OF COOLERS SUBMITTED PER SHIPMENT:

SAMPLE DATE	SAMPLE TIME	SAMPLE IDENTIFICATION	MATRIX: COMPOSITE (C) OR GRAB (G) INDICATE	AQUEOUS (WATER)	SOLID OR SEMISOLID	AIR	NONAQUEOUS LIQUID (OIL, SOLVENT,...)	REQUIRED ANALYSIS: 8260 B VOCs App IX List	8270 C SVOCs App IX List	8270 C LLPAHs	8082 PCBs	6010 B Metals Total App IX List/7471A Hg	6010 B Metals DIS App IX List/7471A Hg	Sulfide	Cyanide			REMARKS
								HCl	—	—	—	HNO3	HNO3, Z5 Acetate Nadh					
								NUMBER OF CONTAINERS SUBMITTED										
11/15/06	0900	42TW02	G	X				3	2	2	2	1	1	2	1			
11/15/06	0980	42TW03	G	X				3	1	1	1	1	1	2	1			
11/15/06	0900	42TB03	G	X				1	check with lab									
																		TEMP: 0.0

RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RELINQUISHED BY: (SIGNATURE)	DATE	TIME
EMPTY CONTAINERS			Mark E. Kimes	11/16/06	1500			
RECEIVED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	DATE	TIME
Mark E. Kimes	11/13/06	0630						

LABORATORY USE ONLY

RECEIVED FOR LABORATORY BY: (SIGNATURE)	DATE	TIME	CUSTODY INTACT	CUSTODY SEAL NO.	STL SAVANNAH LOG NO.	LABORATORY REMARKS
KL	11/17/06	0916	YES ○ NO ○		680-22060	

STL8240-680 (12/02)

Serial Number 76714

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

SEVERN TRENT **STL**®

FEDEX AIRBILL #: 8462 4272 0290

STL Savannah
5102 LaRoche Avenue
Savannah, GA 31404
Website: www.stl-inc.com
Phone: (912) 354-7858
Fax: (912) 352-0165

42-002

Alternate Laboratory Name/Location
Phone:
Fax:

PROJECT REFERENCE	PROJECT NO.	PROJECT LOCATION (STATE)
SWMU 42 RFI	CTO - 121	PR
STL (LAB) PROJECT MANAGER	P.O. NUMBER	CONTRACT NO.
Kathy Smith		
CLIENT (SITE) PM	CLIENT PHONE	CLIENT FAX
Mark Kimes	412-337-7465	
CLIENT NAME	CLIENT E-MAIL	
Baker	MKimes@mbakercorp.com	
CLIENT ADDRESS		
100 Airside Dr. Moon Twp., PA 15108		
COMPANY CONTRACTING THIS WORK (if applicable)		
CH2M Hill		

PAGE 1 OF 1

STANDARD REPORT DELIVERY ●
DATE DUE 28 Day TAT
EXPEDITED REPORT DELIVERY (SURCHARGE) ○
DATE DUE _____
NUMBER OF COOLERS SUBMITTED PER SHIPMENT:

SAMPLE DATE	SAMPLE TIME	SAMPLE IDENTIFICATION	MATRIX: COMPOSITE (C) OR GRAB (G) INDICATE	AQUEOUS (WATER)	SOLID OR SEMISOLID	AIR	NONAQUEOUS LIQUID (OIL, SOLVENT,...)	REQUIRED ANALYSIS: 8260B VOCs App IX List	8270C SVOCs App IX List	8270C LLPAHs	8082 PCBs	6010B Metals Total App IX List + 7471A Hg	6010B Metals Diss App IX List + 7470A Hg	SULFIDE	CYANIDE			REMARKS
								PRESERVATIVE										NUMBER OF CONTAINERS SUBMITTED
11/15/06	0730	42TWΦ1	G	X				3	2	2	2	1	1	2	1			
		42TWΦ1D	G	X				3	2	2	2	1	1	2	1			
		42TWΦ1MS	G	X				3	2	2	2	1	1	2	1			
		42TWΦ1MSD	G	X				3	2	2	2	1	1	2	1			
11/15/06	1500	42TBΦ2	G	X				3										

TEMP: 1.0 1.0

RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RELINQUISHED BY: (SIGNATURE)	DATE	TIME
EMPTY CONTAINERS			Mark E. Kimes	11/15/06	1500			
RECEIVED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	DATE	TIME
Mark E. Kimes	11/13/06	0630						

LABORATORY USE ONLY

RECEIVED FOR LABORATORY BY: (SIGNATURE)	DATE	TIME	CUSTODY INTACT	CUSTODY SEAL NO.	STL SAVANNAH LOG NO.	LABORATORY REMARKS
KL	11/16/06	0921	YES ○ NO ○		680-52012	

STL8240-680 (12/02)

Serial Number 76704

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

SEVERN TRENT STL®

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5102 LaRoche Avenue
Savannah, GA 31404
Website: www.stl-inc.com
Phone: (912) 354-7858
Fax: (912) 352-0165

42-001

Alternate Laboratory Name/Location
Phone:
Fax:

PROJECT REFERENCE: SWMU 42 RFI	PROJECT NO.: CTO-121	PROJECT LOCATION (STATE): PR	
STL (LAB) PROJECT MANAGER: Kathy Smith	P.O. NUMBER:	CONTRACT NO.:	
CLIENT (SITE) PM: Mark Kimes	CLIENT PHONE: 412-337-7465	CLIENT FAX:	
CLIENT NAME: Baker	CLIENT E-MAIL: MKimes@mbakercorp.com		
CLIENT ADDRESS: 100 Airside Dr. Moon Twp, PA 15108			
COMPANY CONTRACTING THIS WORK (if applicable): CH2M Hill			

PAGE 1 OF 2

STANDARD REPORT DELIVERY ●
DATE DUE 28 day TAT
EXPEDITED REPORT DELIVERY (SURCHARGE) ○
DATE DUE

NUMBER OF COOLERS SUBMITTED PER SHIPMENT:

SAMPLE DATE	SAMPLE TIME	SAMPLE IDENTIFICATION	MATRIX: COMPOSITE (C) OR GRAB (G) INDICATE	AQUEOUS (WATER)	SOLID OR SEMISOLID	AIR	NONAQUEOUS LIQUID (OIL, SOLVENT,...)	REQUIRED ANALYSIS: 8240 B VOCs App IX LIST	8270 C SVOCs App IX LIST	8270 C LL PAHs	8082 PCBs	8015B DRO (w/ SGC) 3630B	8015B GRO (w/ SGC) 3550B	6010 B Metals App IX List	7471 A Hg	Sulfide 9030 B	Cyanide 9012 B	REMARKS
								PRESERVATIVE										
								NUMBER OF CONTAINERS SUBMITTED										
11/14/06	0800	42SBØ3-ØØ	G		X			3	1			3	1	1		1		
↓	0800	42SBØ3-ØØD	G		X			3	1			3	1	1		1		
↓	0800	42SBØ3-ØØMS/MSD	G		X			3	1			3	1	1		1		
11/13/06	1610	42SBØ3-Ø1	G		X			3	1			3	1	1		1		
11/13/06	1620	42SBØ3-Ø3	G		X			3	1			3	1	1		1		
11/14/06	1014	42SBØ1-ØØ	G		X			3	1			3	1	1		1		
↓	1020	42SBØ1-Ø3	G		X			3	1			3	1	1		1		
	1034	42SBØ1-Ø5	G		X			3	1			3	1	1		1		
	0945	42SBØ2-00	G		X			3	1			3	1	1		1		
	0832	42SBØ2-03	G		X			3	1			3	1	1		1		
↓	0840	42SBØ2-05	G		X			3	1			3	1	1		1		
11/13/06	1516	42SDØ1	G		X			3	1			3	1	1		1		

TEMP: 1.0 / 0.0

RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RELINQUISHED BY: (SIGNATURE)	DATE	TIME
EMPTY CONTAINERS			Mark E. Kimes	11/14/06	1500			
RECEIVED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	DATE	TIME
Mark E. Kimes	11/13/06	0630						

LABORATORY USE ONLY

RECEIVED FOR LABORATORY BY: (SIGNATURE)	DATE	TIME	CUSTODY INTACT	CUSTODY SEAL NO.	STL SAVANNAH LOG NO.	LABORATORY REMARKS
KL	11/16/06	0921	YES ○ NO ○		680-22001	

STL8240-680 (12/02)

Serial Number 76705

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

SEVERN TRENT STL®

STL Savannah
5102 LaRoche Avenue
Savannah, GA 31404
Website: www.stl-inc.com
Phone: (912) 354-7858
Fax: (912) 352-0165

42-001

Alternate Laboratory Name/Location
Phone:
Fax:

PROJECT REFERENCE: SWMU 42 RFI	PROJECT NO.: CTO - 121	PROJECT LOCATION (STATE): PR
STL (LAB) PROJECT MANAGER: Kathy Smith	P.O. NUMBER:	CONTRACT NO.:
CLIENT (SITE) PM: Mark Kimes	CLIENT PHONE: 412-337-7465	CLIENT FAX:
CLIENT NAME: Baker	CLIENT E-MAIL: mkimes@mbakercorp.com	
CLIENT ADDRESS: 100 Airside Dr. Moon Twp, PA 15108		
COMPANY CONTRACTING THIS WORK (if applicable): CH2M Hill		

PAGE 2 OF 2

STANDARD REPORT DELIVERY ●
DATE DUE 28 day TAT
EXPEDITED REPORT DELIVERY (SURCHARGE) ○
DATE DUE _____
NUMBER OF COOLERS SUBMITTED PER SHIPMENT:

SAMPLE DATE	SAMPLE TIME	SAMPLE IDENTIFICATION	COMPOSITE (C) OR GRAB (G) INDICATE	MATRIX TYPE: AQUEOUS (WATER)	MATRIX TYPE: SOLID OR SEMISOLID	MATRIX TYPE: AIR	MATRIX TYPE: NONAQUEOUS LIQUID (OIL, SOLVENT,...)	NUMBER OF CONTAINERS SUBMITTED	8260 VOCs App IX List	8270C SVOCs Appix List	8270C LL PAHs	8082 PCBs	6010B Metals App IX List	7471A Hg	Sulfide 9030B	Cyanide 9012B	REMARKS
11/13/06	1516	42SD01D	G		X			3	—	—	—	—	—	—	—	—	Check 11/14/06
	1509	42SD02	G		X			3	—	—	—	—	—	—	—	—	
	1520	42SD03	G		X			3	—	—	—	—	—	—	—	—	
	1520	42SD03D	G		X				—	—	—	—	—	—	—	—	
	1506	42SD04	G		X			3	—	—	—	—	—	—	—	—	
11/4/06	1400	42TB01	G	X				✓									

PRESERVATIVE

EMPTY CONTAINERS

RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RELINQUISHED BY: (SIGNATURE)	DATE	TIME
			Mark E. Kimes	11/14/06	1500			
RECEIVED BY: (SIGNATURE) Mark E. Kimes	DATE 11/13/06	TIME 0630	RECEIVED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	DATE	TIME

LABORATORY USE ONLY

RECEIVED FOR LABORATORY BY: (SIGNATURE)	DATE	TIME	CUSTODY INTACT	CUSTODY SEAL NO.	STL SAVANNAH LOG NO.	LABORATORY REMARKS
KL	11/16/06	0921	YES ○ NO ○		680-22001	

STL8240-680 (12/02)

Serial Number 76716

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

SEVERN TRENT **STL®**

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STL Savannah
5102 LaRoche Avenue
Savannah, GA 31404

Website: www.stl-inc.com
Phone: (912) 354-7858
Fax: (912) 352-0165

2006-001

Alternate Laboratory Name/Location

Phone:
Fax:

PROJECT REFERENCE	PROJECT NO.	PROJECT LOCATION (STATE)
	CTO-121	PR
STL (LAB) PROJECT MANAGER	P.O. NUMBER	CONTRACT NO.
Kathy Smith		
CLIENT (SITE) PM	CLIENT PHONE	CLIENT FAX
Mark Kines	412 337 7465	
CLIENT NAME	CLIENT E-MAIL	
Baker	mKines@mbakercorp.com	
CLIENT ADDRESS		
100 Airside Dr. Moon Twp. PA 15108		
COMPANY CONTRACTING THIS WORK (if applicable)		
CH2M Hill		

MATRIX TYPE — COMPOSITE (C) OR GRAB (G) INDICATE; AQUEOUS (WATER); SOLID OR SEMISOLID; AIR; NONAQUEOUS LIQUID (OIL, SOLVENT,...)

REQUIRED ANALYSIS

PRESERVATIVE

NUMBER OF CONTAINERS SUBMITTED

SAMPLE DATE	SAMPLE TIME	SAMPLE IDENTIFICATION	C	G	Solid	Air	Nonaq. Liquid	8260B VOCs App IX List	8270C SVOCs App IX List	8270C LL PAHs	8082 PCBs	6010B Metals Total App IX List/7470A Hg	6010B Metals Diss App IX List/7470A Hg	9012B Cyanide Soluble	8015B DRO	5030B 8015B GRO	3550B Explosives 8330	REMARKS
								check									check	
11/13/06	1600	2006ER01		G	X			3	2	2	2	1		1	2	2	3	2

STANDARD REPORT DELIVERY ●
DATE DUE 20 Day TAT
EXPEDITED REPORT DELIVERY (SURCHARGE) ○
DATE DUE _____

PAGE _____ OF _____

NUMBER OF COOLERS SUBMITTED PER SHIPMENT:

TEMP.: 0.0

RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RELINQUISHED BY: (SIGNATURE)	DATE	TIME
EMPTY CONTAINERS			Paul E. K—	11/16/06	1500			
RECEIVED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	DATE	TIME
Paul E. K—	11/13/06	0630						

LABORATORY USE ONLY

RECEIVED FOR LABORATORY BY: (SIGNATURE)	DATE	TIME	CUSTODY INTACT	CUSTODY SEAL NO.	STL SAVANNAH LOG NO.	LABORATORY REMARKS
KL	11/14/06	0916	YES ○ NO ○		680-22060	

Serial Number 95086

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

SEVERN TRENT **STL**

FedEx AirBill No: 8462 4272 0327

STL Savannah
5102 LaRoche Avenue
Savannah, GA 31404
Website: www.stl-inc.com
Phone: (912) 354-7858
Fax: (912) 352-0165

2006-002

Alternate Laboratory Name/Location
Phone:
Fax:

PROJECT REFERENCE	PROJECT NO.	PROJECT LOCATION (STATE)
QA/QC	CTO-121	PR
STL (LAB) PROJECT MANAGER	P.O. NUMBER	CONTRACT NO.
Kathy Smith		
CLIENT (SITE) PM	CLIENT PHONE	CLIENT FAX
Mark Kimes	412 337 7465	
CLIENT NAME	CLIENT E-MAIL	
Baker	mkimes@mbakercorp.com	
CLIENT ADDRESS		
100 Airside Dr., Moon Twp, PA 15108		
COMPANY CONTRACTING THIS WORK (if applicable)		
CH2M Hill		

PAGE 1 OF 1

STANDARD REPORT DELIVERY ●
DATE DUE 28 day TAT
EXPEDITED REPORT DELIVERY (SURCHARGE) ○
DATE DUE

NUMBER OF COOLERS SUBMITTED PER SHIPMENT:

SAMPLE DATE	SAMPLE TIME	SAMPLE IDENTIFICATION	MATRIX: COMPOSITE (C) OR GRAB (G) INDICATE	AQUEOUS (WATER)	SOLID OR SEMISOLID	AIR	NONAQUEOUS LIQUID (OIL, SOLVENT,...)	8260B VOCs App IX List	8270C SVOCs App IX List	8270C LL PAHs	8082 PCBs	6010B Metals Total App IX List/7470A Hg	8015B DRO SW3013	8015B GRO 5035B	Explosives 8330	REMARKS
								PRESERVATIVE								
11/14/06	1700	2006ER02	G	X				3	2	2	2	1	2	3	2	
11/15/06	1700	2006ER03	G	X				3	2	2	2	1	2	3	2	
11/17/06	1700	2006ER05	G	X				3	2	2	2	1	2	3	2	
11/18/06	1700	2006FB01	G	X				3	2	2	2	1	2	3	2	
11/18/06	1700	2006FB02	G	X				3	2	2	2	1	2	3	2	
11/16/06		2006ER04	G	X				3	2	2	2	1	2	3	2	

11/20/06 GKC 1.0

TEMP.: 0.0 0.0

0.0/0.0/0.0/1.0/0.0/1.0
0.0/0.0/0.0/0.0/4.0/6.0/1.0
0.0/0.0/1.0

RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RELINQUISHED BY: (SIGNATURE)	DATE	TIME
			Mark E. Kimes	11/20/06	1200			
RECEIVED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	DATE	TIME
Mark E. Kimes	11/13/06	0630						

LABORATORY USE ONLY

RECEIVED FOR LABORATORY BY: (SIGNATURE)	DATE	TIME	CUSTODY INTACT	CUSTODY SEAL NO.	STL SAVANNAH LOG NO.	LABORATORY REMARKS
KL	11/21/06	0919	YES ○ NO ○		680-22139	

APPENDIX A.3
SOIL BORING LOGS AND WELL CONSTRUCTION RECORDS

Baker

Michael Baker Jr., Inc.

TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT:	Roosevelt Roads Puerto Rico, SWMU 42			
PROJ. NO.:	107872		BORING NO.:	42SB01/TW01
COORDINATES:	EAST:	926066.3591	NORTH:	798902.3649
ELEVATION:	SURFACE:	116.82	TOP OF PVC CASING:	117.78

Rig: Geoprobe Track Rig 5400 DT

	MC Sampler	Casing	Augers	Core Barrel	Date	Progress (Ft.)	Weather	Depth to Water (Ft.)
Size (ID)	1-5/8"I.D.	--	--	--	11/14/2006	0.0 - 20.0	Pt. Sunny, 80s	
Length	4'	--	--	--				
Type	--	--	--	--				
Hammer Wt.	--	--	--	--				
Fall	--	--	--	--				

Remarks:

SAMPLE TYPE

S = Split Spoon A = Auger
T = Shelby Tube W = Wash
R = Air Rotary C = Core
D = Direct Push P = Piston
N = No Sample

WELL INFORMATION

Type	Diam.	Top Depth (Ft.)	Bottom Depth (Ft.)
Schedule 40 PVC Riser	1"	0	10.0
Schedule 40 PVC Screen	1"	10.0	20.0

Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab ID	PID (ppm) ps/bg	Visual Description	Well Installation Detail	Elevation (Ft. MSL)
1				42SB01-00 (0-1')		FINE to COARSE SAND, some rock fragments and clay; brown and gray; damp		
2	S-1/S-1A	3.0			0.0	*Collect soil sample from 0 to 1'		
3							1" PVC Riser	
4	4.0					Same as Above; some clay		
5								
6	S-2	1.9		42SB01-03 (5-7')	0.0	*Collect soil sample from 5' to 7'	Open Borehole	
7								
8	8.0					8.0		108.82
9						ROCK FRAGMENTS; little fine to coarse sand and clay; brown; damp		
10	S-3	0.9		42SB02-05 (10-11')	0.0	*Collect soil sample from 10' to 11'	Top of 1" PVC Screen at 10'	106.82

DRILLING CO.:	GeoEnviroTech, Inc.	BAKER REP.:	Mark DeJohn
DRILLER:	William Rodrigez	BORING NO.:	42SB01/TW01 SHEET 1 OF 2

Baker

Michael Baker Jr., Inc.

TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: Roosevelt Roads Puerto Rico, SWMU 42

SO NO.: 107872 BORING NO.: 42SB01/TW01

SAMPLE TYPE

S = Split Spoon A = Auger
T = Shelby Tube W = Wash
R = Air Rotary C = Core
D = Denison P = Piston N = No Sample

DEFINITIONS

SPT = Standard Penetration Test (ASTM D1586)
PID = Photo Ionization Detector Measurement
MSL = Mean Sea Level
ps/bg = point source/background

Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab ID	PID (ppm) ps/bg	Visual Description	Well Installation Detail	Elevation (Ft. MSL)
11						Continued from Sheet 1		
	S-3	0.9			0.0	ROCK FRAGMENTS, little fine to		
12 12.0						coarse sand and clay 12.0'		104.82
						ROCK FRAGMENTS, trace clay;		
13						gray; wet	1" PVC Screen	
	S-4	1.9			0.0	14.0'		102.82
14						CLAY, trace fine sand; gray; moist		
15								
16 16.0								
17								
18	D-N	----				Direct Push, No Sample from 16' to 20'	Open Borehole	
19								
20 20.0							20'	96.82
21						End of Boring at 20.0'		
22								
23								
24								
25								
26								
27								
28								
29								
30								

DRILLING CO.: GeoEnviroTech, Inc. BAKER REP.: Mark DeJohn

DRILLER: William Rodrigez BORING NO.: 42SB01/TW01 SHEET 2 OF 2

Baker

Michael Baker Jr., Inc.

TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT:	Roosevelt Roads Puerto Rico, SWMU 42			
PROJ. NO.:	107872		BORING NO.:	42SB02/TW02
COORDINATES:	EAST:	926021.7063	NORTH:	798697.0993
ELEVATION:	SURFACE:	118.01	TOP OF PVC CASING:	119.37

Rig: Geoprobe Track Rig 5400 DT

	MC Sampler	Casing	Augers	Core Barrel	Date	Progress (Ft.)	Weather	Depth to Water (Ft.)
Size (ID)	1-5/8"I.D.	--	--	--	11/14/2006	0.0 - 24.0	Pt. Sunny, 80s	
Length	4'	--	--	--				
Type	--	--	--	--				
Hammer Wt.	--	--	--	--				
Fall	--	--	--	--				

Remarks:

SAMPLE TYPE

S = Split Spoon A = Auger
T = Shelby Tube W = Wash
R = Air Rotary C = Core
D = Direct Push P = Piston
N = No Sample

WELL INFORMATION

Type	Diam.	Top Depth (Ft.)	Bottom Depth (Ft.)
Schedule 40 PVC Riser	1"	0	14.0
Schedule 40 PVC Screen	1"	14.0	24.0

Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab ID	PID (ppm) ps/bg	Visual Description	Well Installation Detail	Elevation (Ft. MSL)
1				42SB02-00 (0-1')		CLAY, some silt and rock fragments; brown; dry (FILL)		
2	S-1	3.2			0.0	*Collect soil sample from 0 to 1'		
3								
4	4.0							
5						5.0'	1" PVC Riser	113.01
6	S-2	3.3		42SB02-03 (5-7')	0.0	CLAY, little fine to coarse sand and silt, trace rock fragments; dark brown; damp (FILL)		
7						*Collect soil sample from 5' to 7'		
8	8.0						Open Borehole	
9								
10	S-3	4.0		42SB02-05 (9-11')	0.0	*Collect soil sample from 9' to 11'		
						10.5'		107.51

DRILLING CO.:	GeoEnviroTech, Inc.	BAKER REP.:	Mark DeJohn
DRILLER:	William Rodrigez	BORING NO.:	42SB02/TW02 SHEET 1 OF 2

Baker

Michael Baker Jr., Inc.

TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: Roosevelt Roads Puerto Rico, SWMU 42

SO NO.: 107872 BORING NO.: 42SB02/TW02

SAMPLE TYPE

S = Split Spoon A = Auger
T = Shelby Tube W = Wash
R = Air Rotary C = Core
D = Denison P = Piston N = No Sample

DEFINITIONS

SPT = Standard Penetration Test (ASTM D1586)
PID = Photo Ionization Detector Measurement
MSL = Mean Sea Level
ps/bg = point source/background

Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab ID	PID (ppm) ps/bg	Visual Description	Well Installation Detail	Elevation (Ft. MSL)
11	S-3	4.0			0.0	CLAY, trace rock fragments and fine sand; dark brown; damp (RESIDUM)	1" PVC Riser	
12 12.0								
13						13.0'	Top of 1" PVC Screen at 14'	105.01
14	S-4	3.4			0.0	CLAY, little fine sand; gray; wet at 14.1' 14.0'		104.01
15						CLAY, little rock fragments and fine to coarse sand; brown; moist		
16 16.0								
17								
18	S-5	1.6			0.0	18.0'	Open Borehole	100.01
19						CLAY, some fine to coarse sand; green-gray; wet 19.0'		99.01
20 20.0						CLAY, trace fine to coarse sand; gray; wet		
21							1" PVC Screen	
22	S-6	1.0			0.0	22.1'		95.91
23						SAPPROLITE; orange-red and black; damp		
24 24.0							24'	94.01
25						End of Boring at 24.0'		
26								
27								
28								
29								
30								

DRILLING CO.: GeoEnviroTech, Inc. BAKER REP.: Mark DeJohn

DRILLER: William Rodrigez BORING NO.: 42SB02/TW02 SHEET 2 OF 2

Baker

Michael Baker Jr., Inc.

TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT:	Roosevelt Roads Puerto Rico SWMU 68			
PROJ. NO.:	107872		BORING NO.:	42SB03/TW03
COORDINATES:	EAST:	92149.1199	NORTH:	798647.9256
ELEVATION:	SURFACE:	117.81	TOP OF PVC CASING:	120.18

Rig: Geoprobe Track Rig 6620 DT

	MC Sampler	Casing	Augers	Core Barrel	Date	Progress (Ft.)	Weather	Depth to Water (Ft.)
Size (ID)	1-5/8"I.D.	--	--	--	11/13/2006	0.0 - 20.0	Pt. Cloudy, Rain, 80s	
Length	4'	--	--	--				
Type	--	--	--	--				
Hammer Wt.	--	--	--	--				
Fall	--	--	--	--				

Remarks:

SAMPLE TYPE

S = Split Spoon A = Auger
T = Shelby Tube W = Wash
R = Air Rotary C = Core
D = Direct Push P = Piston
N = No Sample

WELL INFORMATION

Type	Diam.	Top Depth (Ft.)	Bottom Depth (Ft.)
Schedule 40 PVC Riser	1"	0	10.0
Schedule 40 PVC Screen	1"	10.0	20.0

Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab ID	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)
1–4	S-1	3.6		42SB03-00 (0-1') 42SB03-01 (1-3')	0.0	SILT, some rock fragments, trace clay; brown; damp (FILL) *Collect soil samples from 0 to 1' and 1' to 3'	1" PVC Riser	
4.0								
5–8	S-2	3.2		42SB03-03 (5-7')	0.0	6.0' CLAY, some coarse sand, little rock fragments; wood fragment; green; damp (RESIDUM)	Open Borehole	114.18
8.0								
9–10	S-3	2.3			0.0	9.0' CLAY, trace silt; brown; damp	Top of 1" PVC Screen at 10'	111.18 / 107.81

DRILLING CO.:	GeoEnviroTech, Inc.	BAKER REP.:	Mark DeJohn
DRILLER:	William Rodrigez	BORING NO.:	42SB03/TW03 SHEET 1 OF 2

Baker

Michael Baker Jr., Inc.

TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: Roosevelt Roads Puerto Rico SWMU 68

SO NO.: 107872 BORING NO.: 42SB03/TW03

SAMPLE TYPE

S = Split Spoon A = Auger
T = Shelby Tube W = Wash
R = Air Rotary C = Core
D = Denison P = Piston N = No Sample

DEFINITIONS

SPT = Standard Penetration Test (ASTM D1586)
PID = Photo Ionization Detector Measurement
MSL = Mean Sea Level
ps/bg = point source/background

Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab ID	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)
11	S-3	2.3			0.0	Continued from Sheet 1 CLAY, trace silt; brown; damp		
12 12.0						moist zone	Open Borehole	
13	S-4				0.0	Same as Above; trace fine to coarse sand; brown; damp		
14								
15								
16 16.0						Same as Above; little fine to coarse sand; brown; damp		
17	S-5				0.0		1" PVC Screen	
18						Same as Above; trace fine to coarse sand; brown; damp		
19								100.38
20 20.0						19.8'		100.18
21						ROCK FRAGMENT; gray; damp 20.0' End of Boring at 20.0'		
22								
23								
24								
25								
26								
27								
28								
29								
30								

DRILLING CO.: GeoEnviroTech, Inc. BAKER REP.: Mark DeJohn

DRILLER: William Rodrigez BORING NO.: 42SB03/TW03 SHEET 2 OF 2

APPENDIX B
LABORATORY ANALYTICAL RESULTS

APPENDIX B

SURFACE SOIL ANALYTICAL RESULTS
SWMU 42 - WATER PURIFICATION PLANT LAGOONS
PHASE I RFI
NAVAL ACTIVITY PUERTO RICO, CEIBA, PR

Sample ID	42SB01-00	42SB02-00	42SB03-00	42SB03-00D
Lab Sample Number	680-22001-19	680-22001-22	680-22001-15	680-22001-16
Sampling Date	11/14/06	11/14/06	11/14/06	11/14/06
Matrix	Solid	Solid	Solid	Solid
Method - 8260B (ug/kg)				
1112-Tetrachloroethane	4.0 U	5.1 U	3.8 U	4.6 U
111-Trichloroethane	4.0 U	5.1 U	3.8 U	4.6 U
1122-Tetrachloroethane	4.0 U	5.1 U	3.8 U	4.6 U
112-Trichloroethane	4.0 U	5.1 U	3.8 U	4.6 U
11-Dichloroethane	4.0 U	5.1 U	3.8 U	4.6 U
11-Dichloroethene	4.0 U	5.1 U	3.8 U	4.6 U
123-Trichloropropane	4.0 U	5.1 U	3.8 U	4.6 U
12-Dibromo-3-Chloropropane	8.0 U	10 U	7.5 U	9.1 U
12-Dichloroethane	4.0 U	5.1 U	3.8 U	4.6 U
12-Dichloropropane	4.0 U	5.1 U	3.8 U	4.6 U
2-Chloro-13-butadiene	4.0 UJ	5.1 U	3.8 UJ	4.6 UJ
2-Hexanone	20 U	25 U	19 U	23 U
3-Chloro-1-propene	4.0 UJ	5.1 UJ	3.8 UJ	4.6 UJ
Acetone	91	66	160 J	120
Acetonitrile	160 U	200 U	150 U	180 U
Acrolein	80 UJ	100 UJ	75 UJ	91 UJ
Acrylonitrile	80 U	100 U	75 U	91 U
Benzene	4.0 U	1.1 J	3.8 U	4.6 U
Bromoform	4.0 U	5.1 U	3.8 U	4.6 U
Bromomethane	4.0 U	5.1 U	3.8 U	4.6 U
Carbon disulfide	4.0 U	5.1 U	3.8 U	4.6 U
Carbon tetrachloride	4.0 U	5.1 U	3.8 U	4.6 U
Chlorobenzene	4.0 U	5.1 U	3.8 U	4.6 U
Chlorodibromomethane	4.0 U	5.1 U	3.8 U	4.6 U
Chloroethane	4.0 U	5.1 U	3.8 U	4.6 U
Chloroform	4.0 U	5.1 U	3.8 U	4.6 U
Chloromethane	4.0 U	5.1 U	3.8 U	4.6 U
cis-13-Dichloropropene	4.0 U	5.1 UJ	3.8 U	4.6 U
Dibromomethane	4.0 U	5.1 U	3.8 U	4.6 U
Dichlorobromomethane	4.0 U	5.1 U	3.8 U	4.6 U
Dichlorodifluoromethane	4.0 U	5.1 U	3.8 U	4.6 U
Ethyl methacrylate	4.0 U	5.1 U	3.8 U	4.6 U
Ethylbenzene	4.0 U	5.1 U	3.8 U	4.6 U
Ethylene Dibromide	4.0 U	5.1 U	3.8 U	4.6 U
Iodomethane	4.0 UJ	5.1 U	3.8 UJ	4.6 UJ
Isobutanol	160 U	200 U	150 U	180 U
Methacrylonitrile	80 U	100 U	75 U	91 U
Methyl Ethyl Ketone	20 U	5.3 J	6.3 J	5.6 J
methyl isobutyl ketone	20 UJ	25 U	19 UJ	23 UJ
Methyl methacrylate	4.0 U	5.1 U	3.8 U	4.6 U
Methylene Chloride	4.0 U	5.1 U	3.8 U	4.6 U
Pentachloroethane	20 UJ	25 UJ	19 UJ	23 UJ
Propionitrile	80 U	100 U	75 U	91 U
Styrene	1.2 J	5.1 U	3.8 U	1.1 J
Tetrachloroethene	4.0 U	5.1 U	3.8 U	4.6 U
Toluene	4.0 U	5.1 U	3.8 U	4.6 U
trans-12-Dichloroethene	4.0 U	5.1 U	3.8 U	4.6 U
trans-13-Dichloropropene	4.0 U	5.1 UJ	3.8 U	4.6 U
trans-14-Dichloro-2-butene	8.0 U	10 U	7.5 U	9.1 U
Trichloroethene	4.0 U	5.1 U	3.8 U	4.6 U
Trichlorofluoromethane	4.0 U	5.1 U	3.8 U	4.6 U
Vinyl acetate	8.0 U	10 U	7.5 U	9.1 U
Vinyl chloride	4.0 U	5.1 U	3.8 U	4.6 U
Xylenes Total	8.0 U	10 U	7.5 U	9.1 U

APPENDIX B

SURFACE SOIL ANALYTICAL RESULTS
SWMU 42 - WATER PURIFICATION PLANT LAGOONS
PHASE I RFI
NAVAL ACTIVITY PUERTO RICO, CEIBA, PR

Sample ID	**42SB01-00**	**42SB02-00**	**42SB03-00**	**42SB03-00D**
Lab Sample Number	**680-22001-19**	**680-22001-22**	**680-22001-15**	**680-22001-16**
Sampling Date	**11/14/06**	**11/14/06**	**11/14/06**	**11/14/06**
Matrix	**Solid**	**Solid**	**Solid**	**Solid**
Method - 8270C (ug/kg)				
11'-Biphenyl	370 U	370 U	390 U	400 U
1245-Tetrachlorobenzene	370 U	370 U	390 U	400 U
124-Trichlorobenzene	370 U	370 U	390 U	400 U
12-Dichlorobenzene	370 U	370 U	390 U	400 U
135-Trinitrobenzene	370 UJ	370 U	390 UJ	400 UJ
13-Dichlorobenzene	370 U	370 U	390 U	400 U
13-Dinitrobenzene	370 U	370 U	390 U	400 U
14-Dichlorobenzene	370 U	370 U	390 U	400 U
14-Dioxane	370 U	370 U	390 U	400 U
14-Naphthoquinone	370 U	370 U	390 U	400 U
1-Naphthylamine	370 U	370 U	390 U	400 U
2346-Tetrachlorophenol	370 U	370 U	390 U	400 U
245-Trichlorophenol	370 U	370 U	390 U	400 U
246-Trichlorophenol	370 U	370 U	390 U	400 U
24-Dichlorophenol	370 U	370 U	390 U	400 U
24-Dimethylphenol	370 U	370 U	390 U	400 U
24-Dinitrophenol	1900 U	1900 U	2000 U	2000 U
24-Dinitrotoluene	370 U	370 U	390 U	400 U
26-Dichlorophenol	370 U	370 U	390 U	400 U
26-Dinitrotoluene	370 U	370 U	390 U	400 U
2-Acetylaminofluorene	370 U	370 U	390 U	400 U
2-Chloronaphthalene	370 U	370 U	390 U	400 U
2-Chlorophenol	370 U	370 U	390 U	400 U
2-Methylphenol	370 U	370 U	390 U	400 U
2-Naphthylamine	370 U	370 U	390 U	400 U
2-Nitroaniline	1900 U	1900 U	2000 U	2000 U
2-Nitrophenol	370 U	370 U	390 U	400 U
2-Picoline	370 U	370 U	390 U	400 U
2-Toluidine	370 U	370 U	390 U	400 U
3 & 4 Methylphenol	370 U	370 U	390 U	400 U
33'-Dichlorobenzidine	730 U	740 U	780 U	790 U
33'-Dimethylbenzidine	1900 U	1900 U	2000 U	2000 U
3-Methylcholanthrene	370 U	370 U	390 U	400 U
3-Nitroaniline	1900 U	1900 U	2000 U	2000 U
46-Dinitro-2-methylphenol	1900 U	1900 U	2000 U	2000 U
4-Aminobiphenyl	370 U	370 U	390 U	400 U
4-Bromophenyl phenyl ether	370 U	370 U	390 U	400 U
4-Chloro-3-methylphenol	370 U	370 U	390 U	400 U
4-Chloroaniline	730 U	740 U	780 U	790 U
4-Chlorophenyl phenyl ether	370 U	370 U	390 U	400 U
4-Nitroaniline	1900 U	1900 U	2000 U	2000 U
4-Nitrophenol	1900 U	1900 U	2000 U	2000 U
4-Nitroquinoline-1-oxide	3700 R	3700 R	3900 R	4000 R
712-Dimethylbenz(a)anthracene	370 U	370 U	390 U	400 U
Acetophenone	370 U	370 U	390 U	400 U
alphaalpha-Dimethyl phenethylamine	74000 UJ	75000 U	79000 UJ	80000 UJ
Aniline	730 U	740 U	780 U	790 U
Aramite Total	370 U	370 U	390 U	400 U
Benzyl alcohol	370 U	370 U	390 U	400 U
Bis(2-chloroethoxy)methane	370 U	370 U	390 U	400 U
Bis(2-chloroethyl)ether	370 U	370 U	390 U	400 U
Bis(2-ethylhexyl) phthalate	370 U	370 U	390 U	400 U
bis(chloroisopropyl) ether	370 U	370 U	390 U	400 U

APPENDIX B

SURFACE SOIL ANALYTICAL RESULTS
SWMU 42 - WATER PURIFICATION PLANT LAGOONS
PHASE I RFI
NAVAL ACTIVITY PUERTO RICO, CEIBA, PR

Sample ID	42SB01-00	42SB02-00	42SB03-00	42SB03-00D
Lab Sample Number	680-22001-19	680-22001-22	680-22001-15	680-22001-16
Sampling Date	11/14/06	11/14/06	11/14/06	11/14/06
Matrix	Solid	Solid	Solid	Solid
Method - 8270C (ug/kg)				
Butyl benzyl phthalate	370 U	370 U	390 U	400 U
Diallate	370 U	370 U	390 U	400 U
Dibenzofuran	370 U	370 U	390 U	400 U
Diethyl phthalate	370 U	370 U	390 U	400 U
Dimethoate	370 U	370 U	390 U	400 U
Dimethyl phthalate	370 U	370 U	390 U	400 U
Di-n-butyl phthalate	370 U	370 U	390 U	400 U
Di-n-octyl phthalate	370 U	370 U	390 U	400 U
Dinoseb	370 U	370 U	390 U	400 U
Disulfoton	370 U	370 U	390 U	400 U
Ethyl methanesulfonate	370 U	370 U	390 U	400 U
Famphur	370 U	370 U	390 U	400 U
Hexachlorobenzene	370 U	370 U	390 U	400 U
Hexachlorobutadiene	370 U	370 U	390 UJ	400 U
Hexachlorocyclopentadiene	370 U	370 U	390 U	400 U
Hexachloroethane	370 U	370 U	390 U	400 U
Hexachlorophene	190000 UJ	190000 UJ	200000 UJ	200000 UJ
Hexachloropropene	370 U	370 U	390 U	400 U
Isophorone	370 U	370 U	390 U	400 U
Isosafrole	370 U	370 U	390 U	400 U
Methapyrilene	74000 UJ	75000 U	79000 UJ	80000 UJ
Methyl methanesulfonate	370 U	370 U	390 U	400 U
Methyl parathion	370 U	370 U	390 U	400 U
Nitrobenzene	370 U	370 U	390 U	400 U
N-Nitro-o-toluidine	370 U	370 U	390 U	400 U
N-Nitrosodiethylamine	370 U	370 U	390 U	400 U
N-Nitrosodimethylamine	370 U	370 U	390 U	400 U
N-Nitrosodi-n-butylamine	370 U	370 U	390 U	400 U
N-Nitrosodi-n-propylamine	370 U	370 U	390 U	400 U
N-Nitrosodiphenylamine	370 U	370 U	390 U	400 U
N-Nitrosomethylethylamine	370 U	370 U	390 U	400 U
N-Nitrosomorpholine	370 U	370 U	390 U	400 U
N-Nitrosopiperidine	370 U	370 U	390 U	400 U
N-Nitrosopyrrolidine	370 U	370 U	390 U	400 U
oo'o"-Triethylphosphorothioate	370 U	370 U	390 U	400 U
Parathion	370 U	370 U	390 U	400 U
p-Dimethylamino azobenzene	370 U	370 U	390 U	400 U
Pentachlorobenzene	370 U	370 U	390 U	400 U
Pentachloronitrobenzene	370 U	370 U	390 U	400 U
Pentachlorophenol	1900 U	1900 U	2000 U	2000 U
Phenacetin	370 U	370 U	390 U	400 U
Phenol	370 U	370 U	390 U	400 U
Phorate	370 UJ	370 U	390 UJ	400 UJ
p-Phenylene diamine	1900 U	1900 U	2000 U	2000 U
Pronamide	370 U	370 U	390 U	400 U
Pyridine	370 U	370 U	390 U	400 U
Safrole Total	370 U	370 U	390 U	400 U
Sulfotepp	370 U	370 U	390 U	400 U
Thionazin	370 U	370 U	390 U	400 U

APPENDIX B

SURFACE SOIL ANALYTICAL RESULTS
SWMU 42 - WATER PURIFICATION PLANT LAGOONS
PHASE I RFI
NAVAL ACTIVITY PUERTO RICO, CEIBA, PR

Sample ID	42SB01-00	42SB02-00	42SB03-00	42SB03-00D
Lab Sample Number	680-22001-19	680-22001-22	680-22001-15	680-22001-16
Sampling Date	11/14/06	11/14/06	11/14/06	11/14/06
Matrix	Solid	Solid	Solid	Solid
Method - 8270_LL (ug/kg)				
1-Methylnaphthalene	7.5 U	7.5 U	7.9 U	8.0 U
2-Methylnaphthalene	7.5 U	7.5 U	7.9 U	8.0 U
Acenaphthene	7.5 U	7.5 U	7.9 U	8.0 U
Acenaphthylene	7.5 U	7.5 U	7.9 U	8.0 U
Anthracene	7.5 U	7.5 U	7.9 U	8.0 U
Benzo[a]anthracene	7.5 U	7.5 U	7.9 U	8.0 U
Benzo[a]pyrene	7.5 U	7.5 U	7.9 U	8.0 U
Benzo[b]fluoranthene	7.5 U	7.5 U	7.9 U	8.0 U
Benzo[ghi]perylene	7.5 U	7.5 U	7.9 U	8.0 U
Benzo[k]fluoranthene	7.5 U	7.5 U	7.9 U	8.0 U
Chrysene	7.5 U	7.5 U	7.9 U	8.0 U
Dibenz(ah)anthracene	7.5 U	7.5 U	7.9 U	8.0 U
Fluoranthene	7.5 U	7.5 U	7.9 U	8.0 U
Fluorene	7.5 U	7.5 U	7.9 U	8.0 U
Indeno[123-cd]pyrene	7.5 U	7.5 U	7.9 U	8.0 U
Naphthalene	7.5 U	7.5 U	7.9 U	8.0 U
Phenanthrene	7.5 U	7.5 U	7.9 U	8.0 U
Pyrene	7.5 U	7.5 U	7.9 U	1.9 J
Method - 8081A_8082 (ug/kg)				
Aroclor 1016	37 U	37 U	39 U	39 U
Aroclor 1221	75 U	75 U	79 U	80 U
Aroclor 1232	37 U	37 U	39 U	39 U
Aroclor 1242	37 U	37 U	39 U	39 U
Aroclor 1248	37 U	37 U	39 U	39 U
Aroclor 1254	37 U	37 U	39 U	39 U
Aroclor 1260	37 U	37 U	39 U	39 U
Method - 6020 (mg/kg)				
Antimony	4.3 UJ	4.2 UJ	2.6 J	4.7 UJ
Arsenic	0.94 J	0.82 J	1.2 J	1.2 J
Barium	35 J	13 J	46	50
Beryllium	0.16 J	0.25 J	0.24 J	0.23 J
Cadmium	0.090 J	0.073 J	0.18 J	0.13 J
Chromium	17 J	16 J	21	22 J
Cobalt	23	20	23	23
Copper	98 J	60 J	86 J	86 J
Lead	8.1 J	1.3 J	8.5 J	8.4 J
Nickel	17 J	30 J	19 J	17 J
Selenium	2.1 U	2.1 U	2.2 U	2.3 U
Silver	2.1 U	2.1 U	2.2 U	2.3 U
Thallium	2.1 U	2.1 U	2.2 U	2.3 U
Tin	11 UJ	11 UJ	11 UJ	12 UJ
Vanadium	170 J	170 J	170	170
Zinc	78 J	52 J	68 J	64 J
Mercury - 7471A (mg/kg)	0.0049 J	0.012 J	0.0091 J	0.017 J
Cyanide Total - 9012 A (mg/kg)	0.55 U	0.56 U	0.58 U	0.59 U
Sulfide - 9034 (mg/kg)	28 U	28 U	29 U	30 U

APPENDIX B

SUBSURFACE SOIL ANALYTICAL RESULTS
SWMU 42 - WATER PURIFICATION PLANT LAGOONS
PHASE I RFI
NAVAL ACTIVITY PUERTO RICO, CEIBA, PR

Sample ID	42SB01-03	42SB01-05	42SB02-03
Lab Sample Number	680-22001-20	680-22001-21	680-22001-23
Sampling Date	11/14/06	11/14/06	11/14/06
Matrix	Solid	Solid	Solid
Method - 8260B (ug/kg)			
1112-Tetrachloroethane	5.5 U	5.2 U	5.1 U
111-Trichloroethane	5.5 U	5.2 U	5.1 U
1122-Tetrachloroethane	5.5 U	5.2 U	5.1 U
112-Trichloroethane	5.5 U	5.2 U	5.1 U
11-Dichloroethane	5.5 U	5.2 U	5.1 U
11-Dichloroethene	5.5 U	5.2 U	5.1 U
123-Trichloropropane	5.5 U	5.2 U	5.1 U
12-Dibromo-3-Chloropropane	11 U	10 U	10 U
12-Dichloroethane	5.5 U	5.2 U	5.1 U
12-Dichloropropane	5.5 U	5.2 U	5.1 U
2-Chloro-13-butadiene	5.5 U	5.2 U	5.1 U
2-Hexanone	27 U	26 U	26 U
3-Chloro-1-propene	5.5 UJ	5.2 UJ	5.1 UJ
Acetone	55 U	14 J	63
Acetonitrile	220 U	210 U	210 U
Acrolein	110 UJ	100 UJ	100 UJ
Acrylonitrile	110 U	100 U	100 U
Benzene	5.5 U	5.2 U	5.1 U
Bromoform	5.5 U	5.2 U	5.1 U
Bromomethane	5.5 U	5.2 U	5.1 U
Carbon disulfide	5.5 U	5.2 U	5.1 U
Carbon tetrachloride	5.5 U	5.2 U	5.1 U
Chlorobenzene	5.5 U	5.2 U	5.1 U
Chlorodibromomethane	5.5 U	5.2 U	5.1 U
Chloroethane	5.5 U	5.2 U	5.1 U
Chloroform	5.5 U	5.2 U	5.1 U
Chloromethane	5.5 U	5.2 U	5.1 U
cis-13-Dichloropropene	5.5 UJ	5.2 UJ	5.1 UJ
Dibromomethane	5.5 U	5.2 U	5.1 U
Dichlorobromomethane	5.5 U	5.2 U	5.1 U
Dichlorodifluoromethane	5.5 U	5.2 U	5.1 U
Ethyl methacrylate	5.5 U	5.2 U	5.1 U
Ethylbenzene	5.5 U	5.2 U	5.1 U
Ethylene Dibromide	5.5 U	5.2 U	5.1 U
Iodomethane	5.5 U	5.2 U	5.1 U
Isobutanol	220 U	210 U	210 U
Methacrylonitrile	110 U	100 U	100 U
Methyl Ethyl Ketone	27 U	26 U	6.8 J
methyl isobutyl ketone	27 U	26 U	26 U
Methyl methacrylate	5.5 U	5.2 U	5.1 U
Methylene Chloride	5.5 U	5.2 U	5.1 U
Pentachloroethane	27 UJ	26 UJ	26 UJ
Propionitrile	110 U	100 U	100 U
Styrene	5.5 U	5.2 U	5.1 U
Tetrachloroethene	5.5 U	5.2 U	5.1 U
Toluene	5.5 U	5.2 U	5.1 U
trans-12-Dichloroethene	5.5 U	5.2 U	5.1 U
trans-13-Dichloropropene	5.5 UJ	5.2 UJ	5.1 UJ
trans-14-Dichloro-2-butene	11 U	10 U	10 U
Trichloroethene	5.5 U	5.2 U	5.1 U
Trichlorofluoromethane	5.5 U	5.2 U	5.1 U
Vinyl acetate	11 U	10 U	10 U
Vinyl chloride	5.5 U	5.2 U	5.1 U
Xylenes Total	11 U	10 U	10 U

SUBSURFACE SOIL ANALYTICAL RESULTS
SWMU 42 - WATER PURIFICATION PLANT LAGOONS
PHASE I RFI
NAVAL ACTIVITY PUERTO RICO, CEIBA, PR

Sample ID	42SB01-03	42SB01-05	42SB02-03
Lab Sample Number	680-22001-20	680-22001-21	680-22001-23
Sampling Date	11/14/06	11/14/06	11/14/06
Matrix	Solid	Solid	Solid
Method - 8270C (ug/kg)			
11'-Biphenyl	380 U	360 U	390 UJ
1245-Tetrachlorobenzene	380 U	360 U	390 UJ
124-Trichlorobenzene	380 U	360 U	390 UJ
12-Dichlorobenzene	380 U	360 U	390 UJ
135-Trinitrobenzene	380 UJ	360 UJ	390 UJ
13-Dichlorobenzene	380 U	360 U	390 UJ
13-Dinitrobenzene	380 U	360 U	390 UJ
14-Dichlorobenzene	380 U	360 U	390 UJ
14-Dioxane	380 U	360 U	390 UJ
14-Naphthoquinone	380 U	360 U	390 UJ
1-Naphthylamine	380 U	360 U	390 UJ
2346-Tetrachlorophenol	380 U	360 UJ	390 U
245-Trichlorophenol	380 U	360 UJ	390 U
246-Trichlorophenol	380 U	360 UJ	390 U
24-Dichlorophenol	380 U	360 UJ	390 U
24-Dimethylphenol	380 U	360 UJ	390 U
24-Dinitrophenol	1900 U	1800 UJ	2000 U
24-Dinitrotoluene	380 U	360 U	390 UJ
26-Dichlorophenol	380 U	360 UJ	390 U
26-Dinitrotoluene	380 U	360 U	390 UJ
2-Acetylaminofluorene	380 U	360 U	390 UJ
2-Chloronaphthalene	380 U	360 U	390 UJ
2-Chlorophenol	380 U	360 UJ	390 U
2-Methylphenol	380 U	360 UJ	390 U
2-Naphthylamine	380 U	360 U	390 UJ
2-Nitroaniline	1900 U	1800 U	2000 UJ
2-Nitrophenol	380 U	360 UJ	390 U
2-Picoline	380 U	360 U	390 UJ
2-Toluidine	380 U	360 U	390 UJ
3 & 4 Methylphenol	380 U	360 UJ	390 U
33'-Dichlorobenzidine	750 U	710 U	770 UJ
33'-Dimethylbenzidine	1900 U	1800 U	2000 UJ
3-Methylcholanthrene	380 UJ	360 U	390 UJ
3-Nitroaniline	1900 U	1800 U	2000 UJ
46-Dinitro-2-methylphenol	1900 U	1800 UJ	2000 U
4-Aminobiphenyl	380 U	360 U	390 UJ
4-Bromophenyl phenyl ether	380 U	360 U	390 UJ
4-Chloro-3-methylphenol	380 U	360 UJ	390 U
4-Chloroaniline	750 U	710 U	770 U
4-Chlorophenyl phenyl ether	380 U	360 U	390 UJ
4-Nitroaniline	1900 U	1800 U	2000 UJ
4-Nitrophenol	1900 U	1800 UJ	2000 U
4-Nitroquinoline-1-oxide	3800 R	3500 UJ	3900 UJ
712-Dimethylbenz(a)anthracene	380 UJ	360 U	390 UJ
Acetophenone	380 U	360 U	390 UJ
alphaalpha-Dimethyl phenethylamine	76000 U	72000 UJ	78000 UJ
Aniline	750 U	710 U	770 UJ
Aramite Total	380 U	360 U	390 U
Benzyl alcohol	380 U	360 UJ	390 UJ
Bis(2-chloroethoxy)methane	380 U	360 U	390 UJ
Bis(2-chloroethyl)ether	380 U	360 U	390 UJ
Bis(2-ethylhexyl) phthalate	380 U	360 U	390 UJ
bis(chloroisopropyl) ether	380 U	360 U	390 UJ

SUBSURFACE SOIL ANALYTICAL RESULTS
SWMU 42 - WATER PURIFICATION PLANT LAGOONS
PHASE I RFI
NAVAL ACTIVITY PUERTO RICO, CEIBA, PR

Sample ID	42SB01-03	42SB01-05	42SB02-03
Lab Sample Number	680-22001-20	680-22001-21	680-22001-23
Sampling Date	11/14/06	11/14/06	11/14/06
Matrix	Solid	Solid	Solid
Method - 8270C (ug/kg)			
Butyl benzyl phthalate	380 U	360 U	390 U
Diallate	380 U	360 U	390 U
Dibenzofuran	380 U	360 U	390 U
Diethyl phthalate	380 U	360 U	390 U
Dimethoate	380 UJ	360 U	390 U
Dimethyl phthalate	380 U	360 U	390 U
Di-n-butyl phthalate	380 U	360 U	390 U
Di-n-octyl phthalate	380 UJ	360 U	390 U
Dinoseb	380 U	360 U	390 U
Disulfoton	380 U	360 U	390 U
Ethyl methanesulfonate	380 U	360 U	390 U
Famphur	380 U	360 U	390 U
Hexachlorobenzene	380 U	360 U	390 U
Hexachlorobutadiene	380 U	360 U	390 U
Hexachlorocyclopentadiene	380 U	360 U	390 U
Hexachloroethane	380 U	360 U	390 U
Hexachlorophene	190000 UJ	180000 UJ	200000 U
Hexachloropropene	380 U	360 U	390 U
Isophorone	380 U	360 U	390 U
Isosafrole	380 U	360 U	390 U
Methapyrilene	76000 U	72000 UJ	78000 U
Methyl methanesulfonate	380 U	360 U	390 U
Methyl parathion	380 U	360 U	390 U
Nitrobenzene	380 U	360 U	390 U
N-Nitro-o-toluidine	380 U	360 U	390 U
N-Nitrosodiethylamine	380 U	360 U	390 U
N-Nitrosodimethylamine	380 U	360 U	390 U
N-Nitrosodi-n-butylamine	380 U	360 U	390 U
N-Nitrosodi-n-propylamine	380 U	360 U	390 U
N-Nitrosodiphenylamine	380 U	360 U	390 U
N-Nitrosomethylethylamine	380 U	360 U	390 U
N-Nitrosomorpholine	380 U	360 U	390 U
N-Nitrosopiperidine	380 U	360 U	390 U
N-Nitrosopyrrolidine	380 U	360 U	390 U
oo'o"-Triethylphosphorothioate	380 U	360 U	390 U
Parathion	380 U	360 U	390 U
p-Dimethylamino azobenzene	380 U	360 U	390 U
Pentachlorobenzene	380 U	360 U	390 U
Pentachloronitrobenzene	380 U	360 U	390 U
Pentachlorophenol	1900 U	1800 UJ	2000 U
Phenacetin	380 U	360 U	390 U
Phenol	380 U	360 UJ	390 U
Phorate	380 UJ	360 UJ	390 U
p-Phenylene diamine	1900 U	1800 U	2000 U
Pronamide	380 U	360 U	390 U
Pyridine	380 U	360 U	390 U
Safrole Total	380 U	360 U	390 U
Sulfotepp	380 U	360 U	390 U
Thionazin	380 U	360 U	390 U

APPENDIX B

SUBSURFACE SOIL ANALYTICAL RESULTS
SWMU 42 - WATER PURIFICATION PLANT LAGOONS
PHASE I RFI
NAVAL ACTIVITY PUERTO RICO, CEIBA, PR

Sample ID	42SB01-03	42SB01-05	42SB02-03
Lab Sample Number	680-22001-20	680-22001-21	680-22001-23
Sampling Date	11/14/06	11/14/06	11/14/06
Matrix	Solid	Solid	Solid
Method - 8270_LL (ug/kg)			
1-Methylnaphthalene	7.6 U	7.2 U	7.8 U
2-Methylnaphthalene	7.6 U	7.2 U	7.8 U
Acenaphthene	7.6 U	7.2 U	7.8 U
Acenaphthylene	7.6 U	7.2 U	7.8 U
Anthracene	7.6 U	7.2 U	7.8 U
Benzo[a]anthracene	7.6 U	7.2 U	7.8 U
Benzo[a]pyrene	7.6 U	7.2 U	7.8 U
Benzo[b]fluoranthene	7.6 U	7.2 U	7.8 U
Benzo[ghi]perylene	7.6 U	7.2 U	7.8 U
Benzo[k]fluoranthene	7.6 U	7.2 U	7.8 U
Chrysene	7.6 U	7.2 U	7.8 U
Dibenz(ah)anthracene	7.6 U	7.2 U	7.8 U
Fluoranthene	7.6 U	7.2 U	7.8 U
Fluorene	7.6 U	7.2 U	7.8 U
Indeno[123-cd]pyrene	7.6 U	7.2 U	7.8 U
Naphthalene	7.6 U	7.2 U	7.8 U
Phenanthrene	7.6 U	7.2 U	7.8 U
Pyrene	7.6 U	7.2 U	7.8 U
Method - 8081A_8082 (ug/kg)			
Aroclor 1016	37 U	36 U	39 U
Aroclor 1221	76 U	72 U	78 U
Aroclor 1232	37 U	36 U	39 U
Aroclor 1242	37 U	36 U	39 U
Aroclor 1248	37 U	36 U	39 U
Aroclor 1254	37 U	36 U	39 U
Aroclor 1260	37 U	36 U	39 U
Method - 6020 (mg/kg)			
Antimony	4.3 UJ	4.0 U	4.3 UJ
Arsenic	0.87 J	0.90 J	0.86 J
Barium	43 J	52 J	62 J
Beryllium	0.18 J	0.17 J	0.25 J
Cadmium	0.16 J	0.16 J	1.1 U
Chromium	15 J	23 J	14 J
Cobalt	21	28	25
Copper	98 J	120 J	78 J
Lead	20 J	25	1.4 J
Nickel	16 J	21	14 J
Selenium	2.1 U	2.0 U	2.2 U
Silver	2.1 U	2.0 U	2.2 U
Thallium	2.1 U	2.0 U	2.2 U
Tin	11 UJ	10 UJ	11 UJ
Vanadium	160 J	180 J	160 J
Zinc	75 J	100 J	68 J
Mercury - 7471A (mg/kg)	0.011 J	0.0057 J	0.019 J
Cyanide Total - 9012 A (mg/kg)	0.55 U	0.52 U	0.57 U
Sulfide - 9034 (mg/kg)	28 U	100	29 U

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SUBSURFACE SOIL ANALYTICAL RESULTS
SWMU 42 - WATER PURIFICATION PLANT LAGOONS
PHASE I RFI
NAVAL ACTIVITY PUERTO RICO, CEIBA, PR

Sample ID	42SB02-05	42SB03-01	42SB03-03
Lab Sample Number	680-22001-24	680-22001-17	680-22001-18
Sampling Date	11/14/06	11/13/06	11/13/06
Matrix	Solid	Solid	Solid
Method - 8260B (ug/kg)			
1112-Tetrachloroethane	4.5 U	4.4 U	4.1 U
111-Trichloroethane	4.5 U	4.4 U	4.1 U
1122-Tetrachloroethane	4.5 U	4.4 U	4.1 U
112-Trichloroethane	4.5 U	4.4 U	4.1 U
11-Dichloroethane	4.5 U	4.4 U	4.1 U
11-Dichloroethene	4.5 U	4.4 U	4.1 U
123-Trichloropropane	4.5 U	4.4 U	4.1 U
12-Dibromo-3-Chloropropane	8.9 U	8.8 U	8.1 U
12-Dichloroethane	4.5 U	4.4 U	4.1 U
12-Dichloropropane	4.5 U	4.4 U	4.1 U
2-Chloro-13-butadiene	4.5 U	4.4 U	4.1 U
2-Hexanone	22 U	22 U	20 U
3-Chloro-1-propene	4.5 UJ	4.4 UJ	4.1 UJ
Acetone	18 J	15 J	16 J
Acetonitrile	180 U	180 U	160 U
Acrolein	89 UJ	88 UJ	81 UJ
Acrylonitrile	89 U	88 U	81 U
Benzene	4.5 U	4.4 U	4.1 U
Bromoform	4.5 U	4.4 U	4.1 U
Bromomethane	4.5 U	4.4 U	4.1 U
Carbon disulfide	4.5 U	4.4 U	4.1 U
Carbon tetrachloride	4.5 U	4.4 U	4.1 U
Chlorobenzene	4.5 U	4.4 U	4.1 U
Chlorodibromomethane	4.5 U	4.4 U	4.1 U
Chloroethane	4.5 U	4.4 U	4.1 U
Chloroform	4.5 U	4.4 U	4.1 U
Chloromethane	4.5 U	4.4 U	4.1 U
cis-13-Dichloropropene	4.5 UJ	4.4 UJ	4.1 UJ
Dibromomethane	4.5 U	4.4 U	4.1 U
Dichlorobromomethane	4.5 U	4.4 U	4.1 U
Dichlorodifluoromethane	4.5 U	4.4 U	4.1 U
Ethyl methacrylate	4.5 U	4.4 U	4.1 U
Ethylbenzene	4.5 U	4.4 U	4.1 U
Ethylene Dibromide	4.5 U	4.4 U	4.1 U
Iodomethane	4.5 U	4.4 U	4.1 U
Isobutanol	180 U	180 U	160 U
Methacrylonitrile	89 U	88 U	81 U
Methyl Ethyl Ketone	22 U	22 U	20 U
methyl isobutyl ketone	22 U	22 U	20 U
Methyl methacrylate	4.5 U	4.4 U	4.1 U
Methylene Chloride	4.5 U	4.4 U	4.1 U
Pentachloroethane	22 UJ	22 UJ	20 UJ
Propionitrile	89 U	88 U	81 U
Styrene	4.5 U	4.4 U	4.1 U
Tetrachloroethene	4.5 U	4.4 U	4.1 U
Toluene	4.5 U	4.4 U	4.1 U
trans-12-Dichloroethene	4.5 U	4.4 U	4.1 U
trans-13-Dichloropropene	4.5 UJ	4.4 UJ	4.1 UJ
trans-14-Dichloro-2-butene	8.9 U	8.8 U	8.1 U
Trichloroethene	4.5 U	4.4 U	4.1 U
Trichlorofluoromethane	4.5 U	4.4 U	4.1 U
Vinyl acetate	8.9 U	8.8 U	8.1 U
Vinyl chloride	4.5 U	4.4 U	4.1 U
Xylenes Total	8.9 U	8.8 U	8.1 U

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SUBSURFACE SOIL ANALYTICAL RESULTS
SWMU 42 - WATER PURIFICATION PLANT LAGOONS
PHASE I RFI
NAVAL ACTIVITY PUERTO RICO, CEIBA, PR

Sample ID	**42SB02-05**	**42SB03-01**	**42SB03-03**
Lab Sample Number	**680-22001-24**	**680-22001-17**	**680-22001-18**
Sampling Date	**11/14/06**	**11/13/06**	**11/13/06**
Matrix	**Solid**	**Solid**	**Solid**
Method - 8270C (ug/kg)			
11'-Biphenyl	390 U	380 U	390 U
1245-Tetrachlorobenzene	390 U	380 U	390 U
124-Trichlorobenzene	390 U	380 U	390 U
12-Dichlorobenzene	390 U	380 U	390 U
135-Trinitrobenzene	390 UJ	380 UJ	390 UJ
13-Dichlorobenzene	390 U	380 U	390 U
13-Dinitrobenzene	390 U	380 U	390 U
14-Dichlorobenzene	390 U	380 U	390 U
14-Dioxane	390 U	380 U	390 U
14-Naphthoquinone	390 U	380 U	390 U
1-Naphthylamine	390 U	380 U	390 U
2346-Tetrachlorophenol	390 U	380 U	390 U
245-Trichlorophenol	390 U	380 U	390 U
246-Trichlorophenol	390 U	380 U	390 U
24-Dichlorophenol	390 U	380 U	390 U
24-Dimethylphenol	390 U	380 U	390 U
24-Dinitrophenol	2000 U	2000 U	2000 U
24-Dinitrotoluene	390 U	380 U	390 U
26-Dichlorophenol	390 U	380 U	390 U
26-Dinitrotoluene	390 U	380 U	390 U
2-Acetylaminofluorene	390 U	380 U	390 U
2-Chloronaphthalene	390 U	380 U	390 U
2-Chlorophenol	390 U	380 U	390 U
2-Methylphenol	390 U	380 U	390 U
2-Naphthylamine	390 U	380 U	390 U
2-Nitroaniline	2000 U	2000 U	2000 U
2-Nitrophenol	390 U	380 U	390 U
2-Picoline	390 U	380 U	390 U
2-Toluidine	390 U	380 U	390 U
3 & 4 Methylphenol	390 U	380 U	390 U
33'-Dichlorobenzidine	780 U	760 U	770 U
33'-Dimethylbenzidine	2000 U	2000 U	2000 U
3-Methylcholanthrene	390 U	380 U	390 U
3-Nitroaniline	2000 U	2000 U	2000 U
46-Dinitro-2-methylphenol	2000 U	2000 U	2000 U
4-Aminobiphenyl	390 U	380 U	390 U
4-Bromophenyl phenyl ether	390 U	380 U	390 U
4-Chloro-3-methylphenol	390 U	380 U	390 U
4-Chloroaniline	780 U	760 U	770 U
4-Chlorophenyl phenyl ether	390 U	380 U	390 U
4-Nitroaniline	2000 U	2000 U	2000 U
4-Nitrophenol	2000 U	2000 U	2000 U
4-Nitroquinoline-1-oxide	3900 R	3800 R	3900 R
712-Dimethylbenz(a)anthracene	390 U	380 U	390 U
Acetophenone	390 U	380 U	390 U
alphaalpha-Dimethyl phenethylamine	79000 U	77000 UJ	78000 UJ
Aniline	780 U	760 U	770 U
Aramite Total	390 U	380 U	390 U
Benzyl alcohol	390 U	380 U	390 U
Bis(2-chloroethoxy)methane	390 U	380 U	390 U
Bis(2-chloroethyl)ether	390 U	380 U	390 U
Bis(2-ethylhexyl) phthalate	390 U	380 U	390 U
bis(chloroisopropyl) ether	390 U	380 U	390 U

SUBSURFACE SOIL ANALYTICAL RESULTS
SWMU 42 - WATER PURIFICATION PLANT LAGOONS
PHASE I RFI
NAVAL ACTIVITY PUERTO RICO, CEIBA, PR

Sample ID	42SB02-05	42SB03-01	42SB03-03
Lab Sample Number	680-22001-24	680-22001-17	680-22001-18
Sampling Date	11/14/06	11/13/06	11/13/06
Matrix	Solid	Solid	Solid
Method - 8270C (ug/kg)			
Butyl benzyl phthalate	390 U	380 U	390 U
Diallate	390 U	380 U	390 U
Dibenzofuran	390 U	380 U	390 U
Diethyl phthalate	390 U	380 U	390 U
Dimethoate	390 U	380 U	390 U
Dimethyl phthalate	390 U	380 U	390 U
Di-n-butyl phthalate	390 U	380 U	390 U
Di-n-octyl phthalate	390 U	380 U	390 U
Dinoseb	390 U	380 U	390 U
Disulfoton	390 U	380 U	390 U
Ethyl methanesulfonate	390 U	380 U	390 U
Famphur	390 U	380 U	390 U
Hexachlorobenzene	390 U	380 U	390 U
Hexachlorobutadiene	390 U	380 U	390 U
Hexachlorocyclopentadiene	390 U	380 U	390 U
Hexachloroethane	390 U	380 U	390 U
Hexachlorophene	200000 R	200000 UJ	200000 UJ
Hexachloropropene	390 U	380 U	390 U
Isophorone	390 U	380 U	390 U
Isosafrole	390 U	380 U	390 U
Methapyrilene	79000 U	77000 UJ	78000 UJ
Methyl methanesulfonate	390 U	380 U	390 U
Methyl parathion	390 U	380 U	390 U
Nitrobenzene	390 U	380 U	390 U
N-Nitro-o-toluidine	390 U	380 U	390 U
N-Nitrosodiethylamine	390 U	380 U	390 U
N-Nitrosodimethylamine	390 U	380 U	390 U
N-Nitrosodi-n-butylamine	390 U	380 U	390 U
N-Nitrosodi-n-propylamine	390 U	380 U	390 U
N-Nitrosodiphenylamine	390 U	380 U	390 U
N-Nitrosomethylethylamine	390 U	380 U	390 U
N-Nitrosomorpholine	390 U	380 U	390 U
N-Nitrosopiperidine	390 U	380 U	390 U
N-Nitrosopyrrolidine	390 U	380 U	390 U
oo'o"-Triethylphosphorothioate	390 U	380 U	390 U
Parathion	390 U	380 U	390 U
p-Dimethylamino azobenzene	390 U	380 U	390 U
Pentachlorobenzene	390 U	380 U	390 U
Pentachloronitrobenzene	390 U	380 U	390 U
Pentachlorophenol	2000 U	2000 U	2000 U
Phenacetin	390 U	380 U	390 U
Phenol	390 U	380 U	390 U
Phorate	390 U	380 UJ	390 UJ
p-Phenylene diamine	2000 U	2000 U	2000 U
Pronamide	390 U	380 U	390 U
Pyridine	390 U	380 U	390 U
Safrole Total	390 U	380 U	390 U
Sulfotepp	390 U	380 U	390 U
Thionazin	390 U	380 U	390 U

APPENDIX B

SUBSURFACE SOIL ANALYTICAL RESULTS
SWMU 42 - WATER PURIFICATION PLANT LAGOONS
PHASE I RFI
NAVAL ACTIVITY PUERTO RICO, CEIBA, PR

Sample ID	42SB02-05	42SB03-01	42SB03-03
Lab Sample Number	680-22001-24	680-22001-17	680-22001-18
Sampling Date	11/14/06	11/13/06	11/13/06
Matrix	Solid	Solid	Solid
Method - 8270_LL (ug/kg)			
1-Methylnaphthalene	7.9 U	7.7 U	7.9 U
2-Methylnaphthalene	7.9 U	7.7 U	7.9 U
Acenaphthene	7.9 U	7.7 U	7.9 U
Acenaphthylene	7.9 U	7.7 U	7.9 U
Anthracene	7.9 U	7.7 U	7.9 U
Benzo[a]anthracene	7.9 U	7.7 U	7.9 U
Benzo[a]pyrene	7.9 U	7.7 U	7.9 U
Benzo[b]fluoranthene	7.9 U	7.7 U	7.9 U
Benzo[ghi]perylene	7.9 U	7.7 U	7.9 U
Benzo[k]fluoranthene	7.9 U	7.7 U	7.9 U
Chrysene	7.9 U	7.7 U	7.9 U
Dibenz(ah)anthracene	7.9 U	7.7 U	7.9 U
Fluoranthene	7.9 U	7.7 U	7.9 U
Fluorene	7.9 U	7.7 U	7.9 U
Indeno[123-cd]pyrene	7.9 U	7.7 U	7.9 U
Naphthalene	7.9 U	7.7 U	7.9 U
Phenanthrene	7.9 U	7.7 U	7.9 U
Pyrene	7.9 U	7.7 U	7.9 U
Method - 8081A_8082 (ug/kg)			
Aroclor 1016	39 U	38 U	39 U
Aroclor 1221	79 U	77 U	78 U
Aroclor 1232	39 U	38 U	39 U
Aroclor 1242	39 U	38 U	39 U
Aroclor 1248	39 U	38 U	39 U
Aroclor 1254	39 U	38 U	39 U
Aroclor 1260	39 U	38 U	39 U
Method - 6020 (mg/kg)			
Antimony	4.2 UJ	4.3 UJ	4.2 UJ
Arsenic	1.4 J	0.79 J	1.0 J
Barium	95 J	53	63
Beryllium	0.27 J	0.21 J	0.18 J
Cadmium	0.048 J	0.049 J	1.0 U
Chromium	27 J	16 J	6.3 J
Cobalt	28	23	21
Copper	81 J	110 J	37 J
Lead	4.2 J	4.3 J	0.78 J
Nickel	12 J	17 J	9.2 J
Selenium	0.60 J	2.1 U	2.1 U
Silver	2.1 U	2.1 U	2.1 U
Thallium	2.1 U	2.1 U	2.1 U
Tin	11 UJ	11 UJ	10 UJ
Vanadium	220 J	180	120
Zinc	60 J	67 J	65 J
Mercury - 7471A (mg/kg)	0.12	0.013 J	0.011 J
Cyanide Total - 9012 A (mg/kg)	0.57 U	0.57 U	0.58 U
Sulfide - 9034 (mg/kg)	30 U	29 U	29 U

APPENDIX B

SEDIMENT ANALYTICAL RESULTS
SWMU 42 - WATER PURIFICATION PLANT LAGOONS
PHASE I RFI
NAVAL ACTIVITY PUERTO RICO, CEIBA, PR

Sample ID	**42SD01**	**42SD01D**	**42SD02**	**42SD03**	**42SD03D**	**42SD04**
Lab Sample Number	**680-22001-25**	**680-22001-26**	**680-22001-27**	**680-22001-28**	**680-22001-29**	**680-22001-30**
Sampling Date	**11/13/06**	**11/13/06**	**11/13/06**	**11/13/06**	**11/13/06**	**11/13/06**
Matrix	**Solid**	**Solid**	**Solid**	**Solid**	**Solid**	**Solid**
Method - 8260B (ug/kg)						
1112-Tetrachloroethane	75 R	84 R	110 R	110 R	NA	80 R
111-Trichloroethane	75 R	84 R	110 R	110 R	NA	80 R
1122-Tetrachloroethane	75 R	84 R	110 R	110 R	NA	80 R
112-Trichloroethane	75 R	84 R	110 R	110 R	NA	90 J
11-Dichloroethane	75 R	84 R	110 R	110 R	NA	80 R
11-Dichloroethene	75 R	84 R	110 R	110 R	NA	80 R
123-Trichloropropane	75 R	84 R	110 R	110 R	NA	80 R
12-Dibromo-3-Chloropropane	150 R	170 R	220 R	210 R	NA	160 R
12-Dichloroethane	75 R	84 R	110 R	110 R	NA	80 R
12-Dichloropropane	75 R	84 R	110 R	110 R	NA	80 R
2-Chloro-13-butadiene	75 R	84 R	110 R	110 R	NA	80 R
2-Hexanone	370 R	420 R	550 R	540 R	NA	400 R
3-Chloro-1-propene	75 R	84 R	110 R	110 R	NA	80 R
Acetone	2600 J	5200 J	1500 J	2100 J	NA	870 J
Acetonitrile	3000 R	3400 R	4400 R	4300 R	NA	3200 R
Acrolein	220 J	1700 R	2200 R	2100 R	NA	1600 R
Acrylonitrile	1500 R	1700 R	2200 R	2100 R	NA	1600 R
Benzene	75 R	22 J	46 J	110 R	NA	80 R
Bromoform	75 R	84 R	110 R	110 R	NA	80 R
Bromomethane	75 R	84 R	110 R	110 R	NA	80 R
Carbon disulfide	62 J	59 J	95 J	110 R	NA	220 J
Carbon tetrachloride	75 R	84 R	110 R	110 R	NA	80 R
Chlorobenzene	75 R	84 R	110 R	110 R	NA	80 R
Chlorodibromomethane	75 R	84 R	110 R	110 R	NA	80 R
Chloroethane	75 R	84 R	110 R	110 R	NA	80 R
Chloroform	75 R	84 R	110 R	110 R	NA	80 R
Chloromethane	75 R	84 R	110 R	110 R	NA	80 R
cis-13-Dichloropropene	75 R	84 R	110 R	110 R	NA	80 R
Dibromomethane	75 R	84 R	110 R	110 R	NA	80 R
Dichlorobromomethane	75 R	84 R	110 R	110 R	NA	80 R
Dichlorodifluoromethane	75 R	84 R	110 R	110 R	NA	80 R
Ethyl methacrylate	75 R	84 R	110 R	110 R	NA	80 R
Ethylbenzene	75 R	84 R	110 R	110 R	NA	80 R
Ethylene Dibromide	75 R	84 R	110 R	110 R	NA	80 R
Iodomethane	75 R	84 R	110 R	110 R	NA	80 R
Isobutanol	3000 R	3400 R	4400 R	4300 R	NA	3200 R
Methacrylonitrile	1500 R	1700 R	2200 R	2100 R	NA	1600 R
Methyl Ethyl Ketone	220 J	390 J	280 J	540 R	NA	400 R
methyl isobutyl ketone	370 R	420 R	550 R	540 R	NA	400 R
Methyl methacrylate	75 R	84 R	110 R	110 R	NA	80 R
Methylene Chloride	75 R	84 R	110 R	110 R	NA	80 R
Pentachloroethane	370 R	420 R	550 R	540 R	NA	400 R
Propionitrile	1500 R	1700 R	2200 R	2100 R	NA	1600 R
Styrene	75 R	84 R	110 R	110 R	NA	80 R
Tetrachloroethene	75 R	84 R	110 R	110 R	NA	80 R
Toluene	75 R	84 R	110 R	110 R	NA	80 R
trans-12-Dichloroethene	75 R	84 R	110 R	110 R	NA	80 R
trans-13-Dichloropropene	75 R	84 R	110 R	110 R	NA	80 R
trans-14-Dichloro-2-butene	150 R	170 R	220 R	210 R	NA	160 R
Trichloroethene	75 R	84 R	110 R	110 R	NA	80 R
Trichlorofluoromethane	75 R	84 R	110 R	110 R	NA	80 R
Vinyl acetate	150 R	170 R	220 R	210 R	NA	160 R
Vinyl chloride	75 R	84 R	110 R	110 R	NA	80 R
Xylenes Total	150 R	170 R	220 R	210 R	NA	160 R

APPENDIX B

SEDIMENT ANALYTICAL RESULTS
SWMU 42 - WATER PURIFICATION PLANT LAGOONS
PHASE I RFI
NAVAL ACTIVITY PUERTO RICO, CEIBA, PR

Sample ID	**42SD01**	**42SD01D**	**42SD02**	**42SD03**	**42SD03D**	**42SD04**
Lab Sample Number	**680-22001-25**	**680-22001-26**	**680-22001-27**	**680-22001-28**	**680-22001-29**	**680-22001-30**
Sampling Date	**11/13/06**	**11/13/06**	**11/13/06**	**11/13/06**	**11/13/06**	**11/13/06**
Matrix	**Solid**	**Solid**	**Solid**	**Solid**	**Solid**	**Solid**
Method - 8270C (ug/kg)						
11'-Biphenyl	4300 R	NA	6200 R	4500 R	4000 R	4200 R
1245-Tetrachlorobenzene	4300 R	NA	6200 R	4500 R	4000 R	4200 R
124-Trichlorobenzene	4300 R	NA	6200 R	4500 R	4000 R	4200 R
12-Dichlorobenzene	4300 R	NA	6200 R	4500 R	4000 R	4200 R
135-Trinitrobenzene	4300 R	NA	6200 R	4500 R	4000 R	4200 R
13-Dichlorobenzene	4300 R	NA	6200 R	4500 R	4000 R	4200 R
13-Dinitrobenzene	4300 R	NA	6200 R	4500 R	4000 R	4200 R
14-Dichlorobenzene	4300 R	NA	6200 R	4500 R	4000 R	4200 R
14-Dioxane	4300 R	NA	6200 R	4500 R	4000 R	4200 R
14-Naphthoquinone	4300 R	NA	6200 R	4500 R	4000 R	4200 R
1-Naphthylamine	4300 R	NA	6200 R	4500 R	4000 R	4200 R
2346-Tetrachlorophenol	4300 R	NA	6200 R	4500 R	4000 R	4200 R
245-Trichlorophenol	4300 R	NA	6200 R	4500 R	4000 R	4200 R
246-Trichlorophenol	4300 R	NA	6200 R	4500 R	4000 R	4200 R
24-Dichlorophenol	4300 R	NA	6200 R	4500 R	4000 R	4200 R
24-Dimethylphenol	4300 R	NA	6200 R	4500 R	4000 R	4200 R
24-Dinitrophenol	22000 R	NA	32000 R	23000 R	21000 R	22000 R
24-Dinitrotoluene	4300 R	NA	6200 R	4500 R	4000 R	4200 R
26-Dichlorophenol	4300 R	NA	6200 R	4500 R	4000 R	4200 R
26-Dinitrotoluene	4300 R	NA	6200 R	4500 R	4000 R	4200 R
2-Acetylaminofluorene	4300 R	NA	6200 R	4500 R	4000 R	4200 R
2-Chloronaphthalene	4300 R	NA	6200 R	4500 R	4000 R	4200 R
2-Chlorophenol	4300 R	NA	6200 R	4500 R	4000 R	4200 R
2-Methylphenol	4300 R	NA	6200 R	4500 R	4000 R	4200 R
2-Naphthylamine	4300 R	NA	6200 R	4500 R	4000 R	4200 R
2-Nitroaniline	22000 R	NA	32000 R	23000 R	21000 R	22000 R
2-Nitrophenol	4300 R	NA	6200 R	4500 R	4000 R	4200 R
2-Picoline	4300 R	NA	6200 R	4500 R	4000 R	4200 R
2-Toluidine	4300 R	NA	6200 R	4500 R	4000 R	4200 R
3 & 4 Methylphenol	4300 R	NA	6200 R	4500 R	4000 R	4200 R
33'-Dichlorobenzidine	8700 R	NA	12000 R	9000 R	8000 R	8500 R
33'-Dimethylbenzidine	22000 R	NA	32000 R	23000 R	21000 R	22000 R
3-Methylcholanthrene	4300 R	NA	6200 R	4500 R	4000 R	4200 R
3-Nitroaniline	22000 R	NA	32000 R	23000 R	21000 R	22000 R
46-Dinitro-2-methylphenol	22000 R	NA	32000 R	23000 R	21000 R	22000 R
4-Aminobiphenyl	4300 R	NA	6200 R	4500 R	4000 R	4200 R
4-Bromophenyl phenyl ether	4300 R	NA	6200 R	4500 R	4000 R	4200 R
4-Chloro-3-methylphenol	4300 R	NA	6200 R	4500 R	4000 R	4200 R
4-Chloroaniline	8700 R	NA	12000 R	9000 R	8000 R	8500 R
4-Chlorophenyl phenyl ether	4300 R	NA	6200 R	4500 R	4000 R	4200 R
4-Nitroaniline	22000 R	NA	32000 R	23000 R	21000 R	22000 R
4-Nitrophenol	22000 R	NA	32000 R	23000 R	21000 R	22000 R
4-Nitroquinoline-1-oxide	43000 R	NA	62000 R	45000 R	40000 R	42000 R
712-Dimethylbenz(a)anthracene	4300 R	NA	6200 R	4500 R	4000 R	4200 R
Acetophenone	4300 R	NA	6200 R	4500 R	4000 R	4200 R
alphaalpha-Dimethyl phenethylamine	880000 R	NA	1300000 R	920000 R	820000 R	860000 R
Aniline	8700 R	NA	12000 R	9000 R	8000 R	8500 R
Aramite Total	4300 R	NA	6200 R	4500 R	4000 R	4200 R
Benzyl alcohol	4300 R	NA	6200 R	4500 R	4000 R	4200 R
Bis(2-chloroethoxy)methane	4300 R	NA	6200 R	4500 R	4000 R	4200 R
Bis(2-chloroethyl)ether	4300 R	NA	6200 R	4500 R	4000 R	4200 R
Bis(2-ethylhexyl) phthalate	4300 R	NA	6200 R	4500 R	4000 R	4200 R
bis(chloroisopropyl) ether	4300 R	NA	6200 R	4500 R	4000 R	4200 R

APPENDIX B

SEDIMENT ANALYTICAL RESULTS
SWMU 42 - WATER PURIFICATION PLANT LAGOONS
PHASE I RFI
NAVAL ACTIVITY PUERTO RICO, CEIBA, PR

Sample ID	42SD01	42SD01D	42SD02	42SD03	42SD03D	42SD04
Lab Sample Number	680-22001-25	680-22001-26	680-22001-27	680-22001-28	680-22001-29	680-22001-30
Sampling Date	11/13/06	11/13/06	11/13/06	11/13/06	11/13/06	11/13/06
Matrix	Solid	Solid	Solid	Solid	Solid	Solid
Method - 8270C (ug/kg)						
Butyl benzyl phthalate	4300 R	NA	6200 R	4500 R	4000 R	4200 R
Diallate	4300 R	NA	6200 R	4500 R	4000 R	4200 R
Dibenzofuran	4300 R	NA	6200 R	4500 R	4000 R	4200 R
Diethyl phthalate	4300 R	NA	6200 R	4500 R	4000 R	4200 R
Dimethoate	4300 R	NA	6200 R	4500 R	4000 R	4200 R
Dimethyl phthalate	4300 R	NA	6200 R	4500 R	4000 R	4200 R
Di-n-butyl phthalate	4300 R	NA	6200 R	4500 R	4000 R	4200 R
Di-n-octyl phthalate	4300 R	NA	6200 R	4500 R	4000 R	4200 R
Dinoseb	4300 R	NA	6200 R	4500 R	4000 R	4200 R
Disulfoton	4300 R	NA	6200 R	4500 R	4000 R	4200 R
Ethyl methanesulfonate	4300 R	NA	6200 R	4500 R	4000 R	4200 R
Famphur	4300 R	NA	6200 R	4500 R	4000 R	4200 R
Hexachlorobenzene	4300 R	NA	6200 R	4500 R	4000 R	4200 R
Hexachlorobutadiene	4300 R	NA	6200 R	4500 R	4000 R	4200 R
Hexachlorocyclopentadiene	4300 R	NA	6200 R	4500 R	4000 R	4200 R
Hexachloroethane	4300 R	NA	6200 R	4500 R	4000 R	4200 R
Hexachlorophene	2200000 R	NA	3200000 R	2300000 R	2100000 R	2200000 R
Hexachloropropene	4300 R	NA	6200 R	4500 R	4000 R	4200 R
Isophorone	4300 R	NA	6200 R	4500 R	4000 R	4200 R
Isosafrole	4300 R	NA	6200 R	4500 R	4000 R	4200 R
Methapyrilene	880000 R	NA	1300000 R	920000 R	820000 R	860000 R
Methyl methanesulfonate	4300 R	NA	6200 R	4500 R	4000 R	4200 R
Methyl parathion	4300 R	NA	6200 R	4500 R	4000 R	4200 R
Nitrobenzene	4300 R	NA	6200 R	4500 R	4000 R	4200 R
N-Nitro-o-toluidine	4300 R	NA	6200 R	4500 R	4000 R	4200 R
N-Nitrosodiethylamine	4300 R	NA	6200 R	4500 R	4000 R	4200 R
N-Nitrosodimethylamine	4300 R	NA	6200 R	4500 R	4000 R	4200 R
N-Nitrosodi-n-butylamine	4300 R	NA	6200 R	4500 R	4000 R	4200 R
N-Nitrosodi-n-propylamine	4300 R	NA	6200 R	4500 R	4000 R	4200 R
N-Nitrosodiphenylamine	4300 R	NA	6200 R	4500 R	4000 R	4200 R
N-Nitrosomethylethylamine	4300 R	NA	6200 R	4500 R	4000 R	4200 R
N-Nitrosomorpholine	4300 R	NA	6200 R	4500 R	4000 R	4200 R
N-Nitrosopiperidine	4300 R	NA	6200 R	4500 R	4000 R	4200 R
N-Nitrosopyrrolidine	4300 R	NA	6200 R	4500 R	4000 R	4200 R
oo'o"-Triethylphosphorothioate	4300 R	NA	6200 R	4500 R	4000 R	4200 R
Parathion	4300 R	NA	6200 R	4500 R	4000 R	4200 R
p-Dimethylamino azobenzene	4300 R	NA	6200 R	4500 R	4000 R	4200 R
Pentachlorobenzene	4300 R	NA	6200 R	4500 R	4000 R	4200 R
Pentachloronitrobenzene	4300 R	NA	6200 R	4500 R	4000 R	4200 R
Pentachlorophenol	22000 R	NA	32000 R	23000 R	21000 R	22000 R
Phenacetin	4300 R	NA	6200 R	4500 R	4000 R	4200 R
Phenol	4300 R	NA	6200 R	4500 R	4000 R	4200 R
Phorate	4300 R	NA	6200 R	4500 R	4000 R	4200 R
p-Phenylene diamine	22000 R	NA	32000 R	23000 R	21000 R	22000 R
Pronamide	4300 R	NA	6200 R	4500 R	4000 R	4200 R
Pyridine	4300 R	NA	6200 R	4500 R	4000 R	4200 R
Safrole Total	4300 R	NA	6200 R	4500 R	4000 R	4200 R
Sulfotepp	4300 R	NA	6200 R	4500 R	4000 R	4200 R
Thionazin	4300 R	NA	6200 R	4500 R	4000 R	4200 R

APPENDIX B

SEDIMENT ANALYTICAL RESULTS
SWMU 42 - WATER PURIFICATION PLANT LAGOONS
PHASE I RFI
NAVAL ACTIVITY PUERTO RICO, CEIBA, PR

Sample ID	42SD01	42SD01D	42SD02	42SD03	42SD03D	42SD04
Lab Sample Number	680-22001-25	680-22001-26	680-22001-27	680-22001-28	680-22001-29	680-22001-30
Sampling Date	11/13/06	11/13/06	11/13/06	11/13/06	11/13/06	11/13/06
Matrix	Solid	Solid	Solid	Solid	Solid	Solid
Method - 8270_LL (ug/kg)						
1-Methylnaphthalene	88 R	NA	130 R	92 R	81 R	86 R
2-Methylnaphthalene	88 R	NA	130 R	92 R	81 R	86 R
Acenaphthene	88 R	NA	130 R	92 R	81 R	86 R
Acenaphthylene	88 R	NA	130 R	92 R	81 R	86 R
Anthracene	88 R	NA	130 R	92 R	81 R	86 R
Benzo[a]anthracene	88 R	NA	130 R	92 R	81 R	86 R
Benzo[a]pyrene	88 R	NA	130 R	92 R	81 R	86 R
Benzo[b]fluoranthene	88 R	NA	130 R	92 R	81 R	86 R
Benzo[ghi]perylene	88 R	NA	130 R	92 R	81 R	86 R
Benzo[k]fluoranthene	88 R	NA	130 R	92 R	81 R	86 R
Chrysene	88 R	NA	130 R	92 R	81 R	86 R
Dibenz(ah)anthracene	88 R	NA	130 R	92 R	81 R	86 R
Fluoranthene	88 R	NA	130 R	92 R	81 R	86 R
Fluorene	88 R	NA	130 R	92 R	81 R	86 R
Indeno[123-cd]pyrene	88 R	NA	130 R	92 R	81 R	86 R
Naphthalene	88 R	NA	130 R	92 R	81 R	86 R
Phenanthrene	88 R	NA	130 R	92 R	81 R	86 R
Pyrene	88 R	NA	130 R	92 R	81 R	86 R
Method - 8081A_8082 (ug/kg)						
Aroclor 1016	430 R	NA	620 R	450 R	400 R	420 R
Aroclor 1221	880 R	NA	1300 R	920 R	810 R	860 R
Aroclor 1232	430 R	NA	620 R	450 R	400 R	420 R
Aroclor 1242	430 R	NA	620 R	450 R	400 R	420 R
Aroclor 1248	430 R	NA	620 R	450 R	400 R	420 R
Aroclor 1254	430 R	NA	620 R	450 R	400 R	420 R
Aroclor 1260	430 R	NA	620 R	450 R	400 R	420 R
Method - 6020 (mg/kg)						
Antimony	50 UJ	NA	68 UJ	50 UJ	46 UJ	50 UJ
Arsenic	3.1 J	NA	34 UJ	25 UJ	23 UJ	25 UJ
Barium	210 J	NA	180 J	91 J	85 J	160 J
Beryllium	9.9 UJ	NA	14 UJ	10 UJ	9.1 UJ	10 UJ
Cadmium	12 UJ	NA	17 UJ	13 UJ	11 UJ	12 UJ
Chromium	190 J	NA	170 J	170 J	150 J	190 J
Cobalt	6.6 J	NA	6.9 J	5.8 J	5.2 J	5.1 J
Copper	500 J	NA	650 J	780 J	550 J	320 J
Lead	6.1 J	NA	4.8 J	3.5 J	6.4 J	3.6 J
Nickel	5.1 J	NA	5.3 J	3.9 J	3.4 J	3.8 J
Selenium	25 UJ	NA	34 UJ	25 UJ	23 UJ	25 UJ
Silver	25 UJ	NA	34 UJ	25 UJ	23 UJ	25 UJ
Thallium	25 UJ	NA	34 UJ	25 UJ	23 UJ	25 UJ
Tin	120 UJ	NA	170 UJ	130 UJ	110 UJ	120 UJ
Vanadium	79 J	NA	81 J	110 J	89 J	120 J
Zinc	46 J	NA	42 J	38 J	42 J	25 J
Mercury - 7471A (mg/kg)	0.17 J	NA	0.14 J	0.16 J	0.11 J	0.095 J
Cyanide Total - 9012 A (mg/kg)	6.5 U	NA	9.0 U	6.7 U	6.0 U	6.3 U
Sulfide - 9034 (mg/kg)	360	NA	530	450	360	530

APPENDIX B

GROUNDWATER ANALYTICAL RESULTS
SWMU 42 - WATER PURIFICATION PLANT LAGOONS
PHASE I RFI
NAVAL ACTIVITY PUERTO RICO, CEIBA, PR

Sample ID	**42TW01**	**42TW01D**	**42TW02**	**42TW03**
Lab Sample Number	**680-22012-47**	**680-22012-48**	**680-22060-35**	**680-22060-36**
Sampling Date	**11/15/06**	**11/15/06**	**11/15/06**	**11/15/06**
Matrix	**Water**	**Water**	**Water**	**Water**
Method - 8260B (ug/L)				
1112-Tetrachloroethane	1.0 U	1.0 U	1.0 U	1.0 U
111-Trichloroethane	1.0 U	1.0 U	1.0 U	1.0 U
1122-Tetrachloroethane	1.0 U	1.0 U	1.0 U	1.0 U
112-Trichloroethane	1.0 U	1.0 U	1.0 U	1.0 U
11-Dichloroethane	1.0 U	1.0 U	1.0 U	1.0 U
11-Dichloroethene	1.0 U	1.0 U	1.0 U	1.0 U
123-Trichloropropane	1.0 U	1.0 U	1.0 U	1.0 U
12-Dibromo-3-Chloropropane	1.0 U	1.0 U	1.0 U	1.0 U
12-Dichloroethane	1.0 U	1.0 U	1.0 U	1.0 U
12-Dichloropropane	1.0 U	1.0 U	1.0 U	1.0 U
2-Chloro-13-butadiene	1.0 U	1.0 U	1.0 U	1.0 U
2-Hexanone	10 U	10 U	10 U	10 U
3-Chloro-1-propene	1.0 U	1.0 U	1.0 U	1.0 U
Acetone	25 U	25 U	25 U	13 J
Acetonitrile	40 U	40 U	40 U	40 U
Acrolein	20 R	20 R	20 R	20 R
Acrylonitrile	20 U	20 U	20 U	20 U
Benzene	1.0 U	1.0 U	1.0 U	1.0 U
Bromoform	1.0 U	1.0 U	1.0 U	1.0 U
Bromomethane	1.0 U	1.0 U	1.0 U	1.0 U
Carbon disulfide	2.0 U	2.0 U	2.0 U	2.0 U
Carbon tetrachloride	1.0 U	1.0 U	1.0 U	1.0 U
Chlorobenzene	1.0 U	1.0 U	1.0 U	1.0 U
Chlorodibromomethane	1.0 U	1.0 U	1.0 U	1.0 U
Chloroethane	1.0 UJ	1.0 UJ	1.0 UJ	1.0 UJ
Chloroform	1.0 U	1.0 U	1.0 U	1.0 U
Chloromethane	1.0 UJ	1.0 UJ	1.0 UJ	1.0 UJ
cis-13-Dichloropropene	1.0 U	1.0 U	1.0 U	1.0 U
Dibromomethane	1.0 U	1.0 U	1.0 U	1.0 U
Dichlorobromomethane	1.0 U	1.0 U	1.0 U	1.0 U
Dichlorodifluoromethane	1.0 UJ	1.0 U	1.0 U	1.0 U
Ethyl methacrylate	1.0 U	1.0 U	1.0 U	1.0 U
Ethylbenzene	1.0 U	1.0 U	1.0 U	1.0 U
Ethylene Dibromide	1.0 U	1.0 U	1.0 U	1.0 U
Iodomethane	5.0 UJ	5.0 UJ	5.0 UJ	5.0 UJ
Isobutanol	40 R	40 R	40 R	40 R
Methacrylonitrile	20 U	20 U	20 U	20 U
Methyl Ethyl Ketone	10 U	10 U	1.7 J	3.2 J
methyl isobutyl ketone	10 U	10 U	10 U	10 U
Methyl methacrylate	1.0 U	1.0 U	1.0 U	1.0 U
Methylene Chloride	5.0 U	5.0 U	5.0 U	5.0 U
Pentachloroethane	5.0 U	5.0 U	5.0 U	5.0 U
Propionitrile	20 U	20 U	20 U	20 U
Styrene	1.0 U	1.0 U	1.0 U	1.0 U
Tetrachloroethene	1.0 U	1.0 U	1.0 U	1.0 U
Toluene	1.0 U	1.0 U	1.0 U	1.0 U
trans-12-Dichloroethene	1.0 U	1.0 U	1.0 U	1.0 U
trans-13-Dichloropropene	1.0 U	1.0 U	1.0 U	1.0 U
trans-14-Dichloro-2-butene	2.0 U	2.0 U	2.0 U	2.0 U
Trichloroethene	1.0 U	1.0 U	1.0 U	1.0 U
Trichlorofluoromethane	1.0 U	1.0 U	1.0 U	1.0 U
Vinyl acetate	2.0 U	2.0 U	2.0 U	2.0 U
Vinyl chloride	1.0 U	1.0 U	1.0 U	1.0 U
Xylenes Total	2.0 U	2.0 U	2.0 U	2.0 U

APPENDIX B

GROUNDWATER ANALYTICAL RESULTS
SWMU 42 - WATER PURIFICATION PLANT LAGOONS
PHASE I RFI
NAVAL ACTIVITY PUERTO RICO, CEIBA, PR

Sample ID	42TW01	42TW01D	42TW02	42TW03
Lab Sample Number	680-22012-47	680-22012-48	680-22060-35	680-22060-36
Sampling Date	11/15/06	11/15/06	11/15/06	11/15/06
Matrix	Water	Water	Water	Water
Method - 8270C (ug/L)				
11'-Biphenyl	11 U	11 U	9.6 U	10 U
1245-Tetrachlorobenzene	11 U	11 U	9.6 U	10 U
124-Trichlorobenzene	11 U	11 U	9.6 U	10 U
12-Dichlorobenzene	11 U	11 U	9.6 U	10 U
135-Trinitrobenzene	11 U	11 U	9.6 UJ	10 U
13-Dichlorobenzene	11 U	11 U	9.6 U	10 U
13-Dinitrobenzene	11 U	11 U	9.6 U	10 U
14-Dichlorobenzene	11 U	11 U	9.6 U	10 U
14-Dioxane	11 U	11 U	9.6 U	10 UJ
14-Naphthoquinone	11 U	11 U	9.6 U	10 U
1-Naphthylamine	11 U	11 U	9.6 U	10 U
2346-Tetrachlorophenol	11 U	11 U	9.6 U	10 U
245-Trichlorophenol	11 U	11 U	9.6 U	10 U
246-Trichlorophenol	11 U	11 U	9.6 U	10 U
24-Dichlorophenol	11 U	11 U	9.6 U	10 U
24-Dimethylphenol	11 U	11 U	9.6 U	10 U
24-Dinitrophenol	57 U	57 U	48 U	50 UJ
24-Dinitrotoluene	11 U	11 U	9.6 U	10 U
26-Dichlorophenol	11 U	11 U	9.6 U	10 U
26-Dinitrotoluene	11 U	11 U	9.6 U	10 U
2-Acetylaminofluorene	11 U	11 U	9.6 U	10 U
2-Chloronaphthalene	11 U	11 U	9.6 U	10 U
2-Chlorophenol	11 U	11 U	9.6 U	10 U
2-Methylphenol	11 U	11 U	9.6 U	10 U
2-Naphthylamine	11 U	11 U	9.6 U	10 U
2-Nitroaniline	57 U	57 U	48 U	50 U
2-Nitrophenol	11 U	11 U	9.6 U	10 U
2-Picoline	11 UJ	11 UJ	9.6 U	10 U
2-Toluidine	11 U	11 U	9.6 U	10 U
3 & 4 Methylphenol	11 U	11 U	1.4 J	10 U
33'-Dichlorobenzidine	23 U	23 U	19 U	20 U
33'-Dimethylbenzidine	23 U	23 U	19 U	20 U
3-Methylcholanthrene	11 U	11 U	9.6 U	10 U
3-Nitroaniline	57 U	57 U	48 U	50 U
46-Dinitro-2-methylphenol	57 U	57 U	48 U	50 U
4-Aminobiphenyl	11 U	11 U	9.6 U	10 U
4-Bromophenyl phenyl ether	11 U	11 U	9.6 U	10 U
4-Chloro-3-methylphenol	11 U	11 U	9.6 U	10 U
4-Chloroaniline	23 U	23 U	19 U	20 U
4-Chlorophenyl phenyl ether	11 U	11 U	9.6 U	10 U
4-Nitroaniline	57 U	57 U	48 U	50 U
4-Nitrophenol	57 U	57 U	48 U	50 U
4-Nitroquinoline-1-oxide	23 U	23 U	19 R	20 R
712-Dimethylbenz(a)anthracene	11 U	11 U	9.6 U	10 U
Acetophenone	11 U	11 U	9.6 U	10 U
alphaalpha-Dimethyl phenethylamine	2300 U	2300 U	1900 U	2000 UJ
Aniline	23 U	23 U	19 U	20 U
Aramite Total	11 UJ	11 UJ	9.6 U	10 U
Benzyl alcohol	11 U	11 U	9.6 U	10 U
Bis(2-chloroethoxy)methane	11 U	11 U	9.6 U	10 U
Bis(2-chloroethyl)ether	11 U	11 U	9.6 U	10 U
Bis(2-ethylhexyl) phthalate	11 U	11 U	9.6 U	10 U

APPENDIX B

GROUNDWATER ANALYTICAL RESULTS
SWMU 42 - WATER PURIFICATION PLANT LAGOONS
PHASE I RFI
NAVAL ACTIVITY PUERTO RICO, CEIBA, PR

Sample ID	**42TW01**	**42TW01D**	**42TW02**	**42TW03**
Lab Sample Number	**680-22012-47**	**680-22012-48**	**680-22060-35**	**680-22060-36**
Sampling Date	**11/15/06**	**11/15/06**	**11/15/06**	**11/15/06**
Matrix	**Water**	**Water**	**Water**	**Water**
Method - 8270C (ug/L)				
bis(chloroisopropyl) ether	11 U	11 U	9.6 U	10 U
Butyl benzyl phthalate	11 U	11 U	9.6 U	10 U
Diallate	11 U	11 U	9.6 U	10 U
Dibenzofuran	11 U	11 U	9.6 U	10 U
Diethyl phthalate	11 U	11 U	9.6 U	10 U
Dimethoate	11 U	11 U	9.6 UJ	10 UJ
Dimethyl phthalate	11 U	11 U	9.6 U	10 U
Di-n-butyl phthalate	11 U	11 U	9.6 U	10 U
Di-n-octyl phthalate	11 U	11 U	9.6 U	10 U
Dinoseb	11 U	11 U	9.6 U	10 U
Disulfoton	11 U	11 U	9.6 U	10 U
Ethyl methanesulfonate	11 U	11 U	9.6 U	10 U
Famphur	11 U	11 U	9.6 U	10 U
Hexachlorobenzene	11 U	11 U	9.6 U	10 U
Hexachlorobutadiene	11 U	11 U	9.6 U	10 U
Hexachlorocyclopentadiene	11 U	11 U	9.6 U	10 U
Hexachloroethane	11 U	11 U	9.6 UJ	10 U
Hexachlorophene	5700 U	5700 U	4800 U	5000 U
Hexachloropropene	11 U	11 U	9.6 U	10 U
Isophorone	11 U	11 U	9.6 U	10 U
Isosafrole	11 U	11 U	9.6 U	10 U
Methapyrilene	2300 UJ	2300 UJ	1900 U	2000 U
Methyl methanesulfonate	11 U	11 U	9.6 U	10 U
Methyl parathion	11 UJ	11 U	9.6 U	10 U
Nitrobenzene	11 U	11 U	9.6 U	10 U
N-Nitro-o-toluidine	11 U	11 U	9.6 U	10 U
N-Nitrosodiethylamine	11 U	11 U	9.6 U	10 U
N-Nitrosodimethylamine	11 U	11 U	9.6 U	10 U
N-Nitrosodi-n-butylamine	11 U	11 U	9.6 U	10 U
N-Nitrosodi-n-propylamine	11 U	11 U	9.6 U	10 U
N-Nitrosodiphenylamine	11 U	11 U	9.6 U	10 U
N-Nitrosomethylethylamine	11 U	11 U	9.6 U	10 U
N-Nitrosomorpholine	11 U	11 U	9.6 U	10 U
N-Nitrosopiperidine	11 U	11 U	9.6 U	10 U
N-Nitrosopyrrolidine	11 U	11 U	9.6 U	10 U
oo'o"-Triethylphosphorothioate	11 U	11 U	9.6 U	10 UJ
Parathion	11 U	11 U	9.6 U	10 U
p-Dimethylamino azobenzene	11 U	11 U	9.6 U	10 U
Pentachlorobenzene	11 U	11 U	9.6 U	10 U
Pentachloronitrobenzene	11 U	11 U	9.6 U	10 U
Pentachlorophenol	57 U	57 U	48 U	50 U
Phenacetin	11 U	11 U	9.6 U	10 U
Phenol	11 U	11 U	9.6 U	10 U
Phorate	11 U	11 U	9.6 UJ	10 UJ
p-Phenylene diamine	2300 U	2300 U	1900 U	2000 U
Pronamide	11 U	11 U	9.6 U	10 U
Pyridine	57 U	57 U	48 U	50 U
Safrole Total	11 U	11 U	9.6 U	10 U
Sulfotepp	11 U	11 U	9.6 U	10 U
Thionazin	11 U	11 U	9.6 U	10 U

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GROUNDWATER ANALYTICAL RESULTS
SWMU 42 - WATER PURIFICATION PLANT LAGOONS
PHASE I RFI
NAVAL ACTIVITY PUERTO RICO, CEIBA, PR

Sample ID	**42TW01**	**42TW01D**	**42TW02**	**42TW03**
Lab Sample Number	**680-22012-47**	**680-22012-48**	**680-22060-35**	**680-22060-36**
Sampling Date	**11/15/06**	**11/15/06**	**11/15/06**	**11/15/06**
Matrix	**Water**	**Water**	**Water**	**Water**
Method - 8270_LL (ug/L)				
1-Methylnaphthalene	0.20 U	0.20 U	0.19 U	0.20 U
2-Methylnaphthalene	0.20 U	0.20 U	0.19 U	0.20 U
Acenaphthene	0.20 U	0.20 U	0.19 U	0.20 U
Acenaphthylene	0.20 U	0.20 U	0.19 U	0.20 U
Anthracene	0.20 U	0.20 U	0.19 U	0.20 U
Benzo[a]anthracene	0.20 U	0.20 U	0.19 U	0.20 U
Benzo[a]pyrene	0.20 U	0.20 U	0.19 U	0.20 U
Benzo[b]fluoranthene	0.20 U	0.20 U	0.19 U	0.20 U
Benzo[ghi]perylene	0.20 U	0.20 U	0.19 U	0.20 U
Benzo[k]fluoranthene	0.20 U	0.20 U	0.19 U	0.20 U
Chrysene	0.20 U	0.20 U	0.19 U	0.20 U
Dibenz(ah)anthracene	0.20 U	0.20 U	0.19 U	0.20 U
Fluoranthene	0.20 U	0.20 U	0.19 U	0.20 U
Fluorene	0.20 U	0.20 U	0.19 U	0.20 U
Indeno[123-cd]pyrene	0.20 U	0.20 U	0.19 U	0.20 U
Naphthalene	0.20 U	0.20 U	0.19 U	0.20 U
Phenanthrene	0.20 U	0.20 U	0.19 U	0.20 U
Pyrene	0.20 U	0.20 U	0.19 U	0.20 U
Method - 8081A_8082 (ug/L)				
Aroclor 1016	1.0 U	1.0 U	1.0 UJ	1.0 R
Aroclor 1221	2.0 U	2.0 U	2.0 UJ	2.0 R
Aroclor 1232	1.0 U	1.0 U	1.0 UJ	1.0 R
Aroclor 1242	1.0 U	1.0 U	1.0 UJ	1.0 R
Aroclor 1248	1.0 U	1.0 U	1.0 UJ	1.0 R
Aroclor 1254	1.0 U	1.0 U	1.0 UJ	1.0 R
Aroclor 1260	1.0 U	1.0 U	1.0 UJ	1.0 R
Method - 6020 (ug/L)				
Antimony	20 U	20 U	20 U	20 U
Arsenic	10 U	10 U	0.94 J	0.91 J
Barium	40	39	150	420
Beryllium	4.0 U	4.0 U	4.0 U	0.51 J
Cadmium	5.0 U	5.0 U	5.0 U	0.52 J
Chromium	10 U	2.2 J	12	11
Cobalt	0.69 J	1.1 J	20 J	120 J
Copper	20 U	20 U	30 R	97 J
Lead	5.0 U	5.0 U	1.7 J	13
Nickel	40 U	40 U	40 U	40 U
Selenium	10 U	10 U	0.72 J	0.64 J
Silver	10 U	10 U	10 U	10 U
Thallium	10 U	10 U	10 U	10 U
Tin	10 UJ	10 UJ	10 UJ	10 UJ
Vanadium	6.5 J	4.8 J	58	220
Zinc	6.2 J	12 J	25 J	66 J
Mercury-7470A	0.20 U	0.17 J	1.0 U	0.20 U
Cyanide Total - 9012A	0.010 U	0.010 U	0.010 U	0.010 U
Sulfide - 9034	1.0 U	1.0 U	1.0 U	1.0 U

APPENDIX B

GROUNDWATER ANALYTICAL RESULTS
SWMU 42 - WATER PURIFICATION PLANT LAGOONS
PHASE I RFI
NAVAL ACTIVITY PUERTO RICO, CEIBA, PR

Sample ID	**42TW01**	**42TW01D**	**42TW02**	**42TW03**
Lab Sample Number	**680-22012-47**	**680-22012-48**	**680-22060-35**	**680-22060-36**
Sampling Date	**11/15/06**	**11/15/06**	**11/15/06**	**11/15/06**
Matrix	**Water**	**Water**	**Water**	**Water**
Method - 6020 Dissolved (ug/L)				
Antimony Dissolved	20 U	20 U	20 U	20 U
Arsenic Dissolved	10 U	0.62 J	10 U	1.0 J
Barium Dissolved	39	36	110	73
Beryllium Dissolved	4.0 U	4.0 U	4.0 U	4.0 U
Cadmium Dissolved	5.0 U	5.0 U	5.0 U	5.0 U
Chromium Dissolved	10 U	10 U	10 U	8.6 J
Cobalt Dissolved	0.77 J	1.2 J	9.8 J	18
Copper Dissolved	0.41 U	0.76 J	0.68 J	21
Lead Dissolved	5.0 U	5.0 U	5.0 U	0.73 J
Nickel Dissolved	0.80 U	0.50 J	1.9 J	6.7 J
Selenium Dissolved	10 U	10 U	10 U	0.87 J
Silver Dissolved	10 U	10 U	10 U	10 U
Thallium Dissolved	10 U	10 U	10 U	10 U
Tin Dissolved	10 UJ	10 UJ	10 UJ	10 UJ
Vanadium Dissolved	10 U	10 U	3.2 J	66
Zinc Dissolved	4.3 J	6.5 J	10 J	19 J
Mercury Dissolved - 7470A	0.20 U	0.20 U	0.20 U	0.20 U

APPENDIX B

TRIP BLANKS ANALYTICAL RESULTS
SWMU 42 - WATER PURIFICATION PLANT LAGOONS
PHASE I RFI
NAVAL ACTIVITY PUERTO RICO, CEIBA, PR

Sample ID	**42TB01**	**42TB02**	**42TB03**
Lab Sample Number	**680-22001-31**	**680-22012-49**	**680-22060-37**
Sampling Date	**11/14/06**	**11/15/06**	**11/15/06**
Matrix	**Water**	**Water**	**Water**
Method - 8260B (ug/kg)			
1112-Tetrachloroethane	1.0 U	1.0 U	1.0 U
111-Trichloroethane	1.0 U	1.0 U	1.0 U
1122-Tetrachloroethane	1.0 U	1.0 U	1.0 U
112-Trichloroethane	1.0 U	1.0 U	1.0 U
11-Dichloroethane	1.0 U	1.0 U	1.0 U
11-Dichloroethene	1.0 U	1.0 U	1.0 U
123-Trichloropropane	1.0 U	1.0 U	1.0 U
12-Dibromo-3-Chloropropane	1.0 U	1.0 U	1.0 U
12-Dichloroethane	1.0 U	1.0 U	1.0 U
12-Dichloropropane	1.0 U	1.0 U	1.0 U
2-Chloro-13-butadiene	1.0 U	1.0 U	1.0 U
2-Hexanone	10 U	10 U	10 U
3-Chloro-1-propene	1.0 U	1.0 U	1.0 U
Acetone	25 U	25 U	25 U
Acetonitrile	40 U	40 U	40 U
Acrolein	20 R	20 R	20 R
Acrylonitrile	20 U	20 U	20 U
Benzene	1.0 U	1.0 U	1.0 U
Bromoform	1.0 U	1.0 U	1.0 U
Bromomethane	1.0 U	1.0 U	1.0 U
Carbon disulfide	2.0 U	2.0 U	2.0 U
Carbon tetrachloride	1.0 U	1.0 U	1.0 U
Chlorobenzene	1.0 U	1.0 U	1.0 U
Chlorodibromomethane	1.0 U	1.0 U	1.0 U
Chloroethane	1.0 UJ	1.0 UJ	1.0 UJ
Chloroform	1.0 U	1.0 U	1.0 U
Chloromethane	1.0 UJ	1.0 UJ	1.0 UJ
cis-13-Dichloropropene	1.0 U	1.0 U	1.0 U
Dibromomethane	1.0 U	1.0 U	1.0 U
Dichlorobromomethane	1.0 U	1.0 U	1.0 U
Dichlorodifluoromethane	1.0 U	1.0 U	1.0 U
Ethyl methacrylate	1.0 U	1.0 U	1.0 U
Ethylbenzene	1.0 U	1.0 U	1.0 U
Ethylene Dibromide	1.0 U	1.0 U	1.0 U
Iodomethane	5.0 UJ	5.0 UJ	5.0 UJ
Isobutanol	40 R	40 R	40 R
Methacrylonitrile	20 U	20 U	20 U
Methyl Ethyl Ketone	10 U	10 U	10 U
methyl isobutyl ketone	10 U	10 U	10 U
Methyl methacrylate	1.0 U	1.0 U	1.0 U
Methylene Chloride	5.0 U	5.0 U	5.0 U
Pentachloroethane	5.0 U	5.0 U	5.0 U
Propionitrile	20 U	20 U	20 U
Styrene	1.0 U	1.0 U	1.0 U
Tetrachloroethene	1.0 U	1.0 U	1.0 U
Toluene	1.0 U	1.0 U	1.0 U
trans-12-Dichloroethene	1.0 U	1.0 U	1.0 U
trans-13-Dichloropropene	1.0 U	1.0 U	1.0 U
trans-14-Dichloro-2-butene	2.0 U	2.0 U	2.0 U
Trichloroethene	1.0 U	1.0 U	1.0 U
Trichlorofluoromethane	1.0 U	1.0 U	1.0 U
Vinyl acetate	2.0 U	2.0 U	2.0 U
Vinyl chloride	1.0 U	1.0 U	1.0 U
Xylenes Total	2.0 U	2.0 U	2.0 U

APPENDIX B

QA/QC ANALYTICAL RESULTS
SWMU 42 - WATER PURIFICATION PLANT LAGOONS
PHASE I RFI
NAVAL AVTIVITY PUERTO RICO, CEIBA, PR

Sample ID	**2006ER01**	**2006ER02**	**2006ER03**	**2006ER04**
Lab Sample Number	**680-22060-38**	**680-22139-1**	**680-22139-2**	**680-22139-6**
Sampling Date	**11/13/2006**	**11/15/2006**	**11/15/2006**	**11/16/2006**
Matrix	**Water**	**Water**	**Water**	**Water**
Method - 8260B (ug/L)				
1112-Tetrachloroethane	1.0 U	1.0 U	1.0 U	1.0 U
111-Trichloroethane	1.0 U	1.0 U	1.0 U	1.0 U
1122-Tetrachloroethane	1.0 U	1.0 U	1.0 U	1.0 U
112-Trichloroethane	1.0 U	1.0 U	1.0 U	1.0 U
11-Dichloroethane	1.0 U	1.0 U	1.0 U	1.0 U
11-Dichloroethene	1.0 U	1.0 U	1.0 U	1.0 U
123-Trichloropropane	1.0 U	1.0 UJ	1.0 U	1.0 U
12-Dibromo-3-Chloropropane	1.0 U	1.0 U	1.0 U	1.0 U
12-Dichloroethane	1.0 U	1.0 U	1.0 U	1.0 U
12-Dichloropropane	1.0 U	1.0 U	1.0 U	1.0 U
2-Chloro-13-butadiene	1.0 U	1.0 U	1.0 U	1.0 U
2-Hexanone	10 U	10 U	10 U	10 U
3-Chloro-1-propene	1.0 U	1.0 U	1.0 U	1.0 U
Acetone	25 U	25 U	25 U	25 U
Acetonitrile	40 U	40 U	40 U	40 U
Acrolein	20 R	20 R	20 R	20 R
Acrylonitrile	20 U	20 U	20 U	20 U
Benzene	1.0 U	1.0 U	1.0 U	1.0 U
Bromoform	1.0 U	1.0 U	1.0 U	1.0 U
Bromomethane	1.0 U	1.0 U	1.0 U	1.0 U
Carbon disulfide	2.0 U	2.0 U	2.0 U	2.0 U
Carbon tetrachloride	1.0 U	1.0 U	1.0 U	1.0 U
Chlorobenzene	1.0 U	1.0 U	1.0 U	1.0 U
Chlorodibromomethane	1.0 U	1.0 U	1.0 U	1.0 U
Chloroethane	1.0 UJ	1.0 UJ	1.0 UJ	1.0 UJ
Chloroform	1.0 U	1.0 U	1.0 U	1.0 U
Chloromethane	1.0 U	1.0 U	1.0 U	1.0 U
cis-13-Dichloropropene	1.0 U	1.0 U	1.0 U	1.0 U
Dibromomethane	1.0 U	1.0 U	1.0 U	1.0 U
Dichlorobromomethane	1.0 U	1.0 U	1.0 U	1.0 U
Dichlorodifluoromethane	1.0 U	1.0 U	1.0 U	1.0 U
Ethyl methacrylate	1.0 U	1.0 U	1.0 U	1.0 U
Ethylbenzene	1.0 U	1.0 U	1.0 U	1.0 U
Ethylene Dibromide	1.0 U	1.0 U	1.0 U	1.0 U
Iodomethane	5.0 UJ	5.0 UJ	5.0 UJ	5.0 UJ
Isobutanol	40 R	40 R	40 R	40 R
Methacrylonitrile	20 U	20 U	20 U	20 U
Methyl Ethyl Ketone	10 U	10 U	10 U	10 U
methyl isobutyl ketone	10 U	10 U	10 U	10 U
Methyl methacrylate	1.0 U	1.0 U	1.0 U	1.0 U
Methylene Chloride	5.0 U	5.0 U	5.0 U	5.0 U
Pentachloroethane	5.0 U	5.0 U	5.0 U	5.0 U
Propionitrile	20 U	20 U	20 U	20 U
Styrene	1.0 U	1.0 U	1.0 U	1.0 U
Tetrachloroethene	1.0 U	1.0 U	1.0 U	1.0 U
Toluene	1.0 U	2.3	6.9	2.2
trans-12-Dichloroethene	1.0 U	1.0 U	1.0 U	1.0 U
trans-13-Dichloropropene	1.0 U	1.0 U	1.0 U	1.0 U
trans-14-Dichloro-2-butene	2.0 U	2.0 U	2.0 U	2.0 U
Trichloroethene	1.0 U	1.0 U	1.0 U	1.0 U
Trichlorofluoromethane	1.0 U	1.0 U	1.0 U	1.0 U
Vinyl acetate	2.0 UJ	2.0 U	2.0 UJ	2.0 UJ
Vinyl chloride	1.0 U	1.0 U	1.0 U	1.0 U
Xylenes Total	2.0 U	2.0 U	2.0 U	2.0 U

QA/QC ANALYTICAL RESULTS
SWMU 42 - WATER PURIFICATION PLANT LAGOONS
PHASE I RFI
NAVAL AVTIVITY PUERTO RICO, CEIBA, PR

Sample ID	2006ER01	2006ER02	2006ER03	2006ER04
Lab Sample Number	680-22060-38	680-22139-1	680-22139-2	680-22139-6
Sampling Date	11/13/2006	11/15/2006	11/15/2006	11/16/2006
Matrix	Water	Water	Water	Water
Method - 8270C (ug/L)				
11'-Biphenyl	9.4 UJ	10 UJ	10 U	10 U
1245-Tetrachlorobenzene	9.4 UJ	10 UJ	10 U	10 U
124-Trichlorobenzene	9.4 UJ	10 UJ	10 U	10 UJ
12-Dichlorobenzene	9.4 UJ	10 UJ	10 U	10 U
135-Trinitrobenzene	9.4 UJ	10 UJ	10 UJ	10 U
13-Dichlorobenzene	9.4 UJ	10 UJ	10 U	10 U
13-Dinitrobenzene	9.4 UJ	10 UJ	10 U	10 U
14-Dichlorobenzene	9.4 UJ	0.56 J	10 U	10 U
14-Dioxane	9.4 UJ	10 UJ	10 U	10 U
14-Naphthoquinone	9.4 UJ	10 UJ	10 U	10 U
1-Naphthylamine	9.4 UJ	10 UJ	10 U	10 U
2346-Tetrachlorophenol	9.4 UJ	10 UJ	10 U	10 U
245-Trichlorophenol	9.4 UJ	10 UJ	10 U	10 U
246-Trichlorophenol	9.4 UJ	10 UJ	10 U	10 U
24-Dichlorophenol	9.4 UJ	10 UJ	10 U	10 U
24-Dimethylphenol	9.4 UJ	10 UJ	10 U	10 U
24-Dinitrophenol	47 UJ	50 UJ	50 U	50 U
24-Dinitrotoluene	9.4 UJ	10 UJ	10 U	10 U
26-Dichlorophenol	9.4 UJ	10 UJ	10 U	10 U
26-Dinitrotoluene	9.4 UJ	10 UJ	10 U	10 U
2-Acetylaminofluorene	9.4 UJ	10 UJ	10 U	10 U
2-Chloronaphthalene	9.4 UJ	10 UJ	10 U	10 U
2-Chlorophenol	9.4 UJ	10 UJ	10 U	10 U
2-Methylphenol	9.4 UJ	10 UJ	10 U	10 U
2-Naphthylamine	9.4 UJ	10 UJ	10 U	10 U
2-Nitroaniline	47 UJ	50 UJ	50 U	50 U
2-Nitrophenol	9.4 UJ	10 UJ	10 U	10 U
2-Picoline	9.4 UJ	10 UJ	10 U	10 U
2-Toluidine	9.4 UJ	10 UJ	10 U	10 U
3 & 4 Methylphenol	9.4 UJ	10 UJ	10 U	10 U
33'-Dichlorobenzidine	19 UJ	20 UJ	20 U	20 U
33'-Dimethylbenzidine	19 UJ	20 UJ	20 U	20 U
3-Methylcholanthrene	9.4 UJ	10 UJ	10 U	10 U
3-Nitroaniline	47 UJ	50 UJ	50 U	50 U
46-Dinitro-2-methylphenol	47 UJ	50 UJ	50 U	50 U
4-Aminobiphenyl	9.4 UJ	10 UJ	10 U	10 U
4-Bromophenyl phenyl ether	9.4 UJ	10 UJ	10 U	10 U
4-Chloro-3-methylphenol	9.4 UJ	10 UJ	10 U	10 U
4-Chloroaniline	19 UJ	20 UJ	20 U	20 U
4-Chlorophenyl phenyl ether	9.4 UJ	10 UJ	10 U	10 U
4-Nitroaniline	47 UJ	50 UJ	50 U	50 U
4-Nitrophenol	47 UJ	50 UJ	50 U	50 U
4-Nitroquinoline-1-oxide	19 R	20 R	20 R	20 R
712-Dimethylbenz(a)anthracene	9.4 UJ	10 UJ	10 U	10 U
Acetophenone	9.4 UJ	10 UJ	10 U	10 U
alphaalpha-Dimethyl phenethylamine	1900 UJ	2000 UJ	2000 U	2000 U
Aniline	19 UJ	20 UJ	20 U	20 U
Aramite Total	9.4 UJ	10 UJ	10 U	10 U
Benzyl alcohol	9.4 UJ	10 UJ	10 U	10 U
Bis(2-chloroethoxy)methane	9.4 UJ	10 UJ	10 U	10 U
Bis(2-chloroethyl)ether	9.4 UJ	10 UJ	10 U	10 U
Bis(2-ethylhexyl) phthalate	9.4 UJ	10 UJ	10 U	10 U
bis(chloroisopropyl) ether	9.4 UJ	10 UJ	10 U	10 U

QA/QC ANALYTICAL RESULTS
SWMU 42 - WATER PURIFICATION PLANT LAGOONS
PHASE I RFI
NAVAL AVTIVITY PUERTO RICO, CEIBA, PR

Sample ID	2006ER01	2006ER02	2006ER03	2006ER04
Lab Sample Number	680-22060-38	680-22139-1	680-22139-2	680-22139-6
Sampling Date	11/13/2006	11/15/2006	11/15/2006	11/16/2006
Matrix	Water	Water	Water	Water
Method - 8270C (ug/L)				
Butyl benzyl phthalate	9.4 UJ	10 UJ	10 U	10 U
Diallate	9.4 UJ	10 UJ	10 U	10 U
Dibenzofuran	9.4 UJ	10 UJ	10 U	10 U
Diethyl phthalate	0.82 J	10 UJ	10 U	10 U
Dimethoate	9.4 UJ	10 UJ	10 UJ	10 UJ
Dimethyl phthalate	9.4 UJ	10 UJ	10 U	10 U
Di-n-butyl phthalate	9.4 UJ	10 UJ	10 U	10 U
Di-n-octyl phthalate	9.4 UJ	10 UJ	10 U	10 U
Dinoseb	9.4 UJ	10 UJ	10 U	10 U
Disulfoton	9.4 UJ	10 UJ	10 U	10 U
Ethyl methanesulfonate	9.4 UJ	10 UJ	10 U	10 U
Famphur	9.4 UJ	10 UJ	10 U	10 U
Hexachlorobenzene	9.4 UJ	10 UJ	10 U	10 U
Hexachlorobutadiene	9.4 UJ	10 UJ	10 U	10 U
Hexachlorocyclopentadiene	9.4 UJ	10 UJ	10 U	10 U
Hexachloroethane	9.4 UJ	10 UJ	10 U	10 U
Hexachlorophene	4700 UJ	5000 UJ	5000 UJ	5000 UJ
Hexachloropropene	9.4 UJ	10 UJ	10 U	10 U
Isophorone	9.4 UJ	10 UJ	10 U	10 U
Isosafrole	9.4 UJ	10 UJ	10 U	10 U
Methapyrilene	1900 UJ	2000 UJ	2000 U	2000 U
Methyl methanesulfonate	9.4 UJ	10 UJ	10 U	10 U
Methyl parathion	9.4 UJ	10 UJ	10 U	10 U
Nitrobenzene	9.4 UJ	10 UJ	10 U	10 U
N-Nitro-o-toluidine	9.4 UJ	10 UJ	10 U	10 U
N-Nitrosodiethylamine	9.4 UJ	10 UJ	10 U	10 U
N-Nitrosodimethylamine	9.4 UJ	10 UJ	10 U	10 U
N-Nitrosodi-n-butylamine	9.4 UJ	10 UJ	10 U	10 U
N-Nitrosodi-n-propylamine	9.4 UJ	10 UJ	10 U	10 U
N-Nitrosodiphenylamine	9.4 UJ	10 UJ	10 U	10 U
N-Nitrosomethylethylamine	9.4 UJ	10 UJ	10 U	10 U
N-Nitrosomorpholine	9.4 UJ	10 UJ	10 U	10 U
N-Nitrosopiperidine	9.4 UJ	10 UJ	10 U	10 U
N-Nitrosopyrrolidine	9.4 UJ	10 UJ	10 U	10 U
oo'o"-Triethylphosphorothioate	9.4 UJ	10 UJ	10 U	10 U
Parathion	9.4 UJ	10 UJ	10 U	10 U
p-Dimethylamino azobenzene	9.4 UJ	10 UJ	10 U	10 U
Pentachlorobenzene	9.4 UJ	10 UJ	10 U	10 U
Pentachloronitrobenzene	9.4 UJ	10 UJ	10 U	10 U
Pentachlorophenol	47 UJ	50 UJ	50 U	50 U
Phenacetin	9.4 UJ	10 UJ	10 U	10 U
Phenol	9.4 UJ	10 UJ	10 U	10 U
Phorate	9.4 UJ	10 UJ	10 UJ	10 UJ
p-Phenylene diamine	1900 UJ	2000 UJ	2000 U	2000 U
Pronamide	9.4 UJ	10 UJ	10 U	10 U
Pyridine	47 UJ	50 UJ	50 U	50 U
Safrole Total	9.4 UJ	10 UJ	10 U	10 U
Sulfotepp	9.4 UJ	10 UJ	10 U	10 U
Thionazin	9.4 UJ	10 UJ	10 U	10 U

APPENDIX B

QA/QC ANALYTICAL RESULTS
SWMU 42 - WATER PURIFICATION PLANT LAGOONS
PHASE I RFI
NAVAL AVTIVITY PUERTO RICO, CEIBA, PR

Sample ID	2006ER01	2006ER02	2006ER03	2006ER04
Lab Sample Number	680-22060-38	680-22139-1	680-22139-2	680-22139-6
Sampling Date	11/13/2006	11/15/2006	11/15/2006	11/16/2006
Matrix	Water	Water	Water	Water
Method - 8270_LL (ug/L)				
1-Methylnaphthalene	0.19 UJ	0.19 UJ	0.20 U	0.20 U
2-Methylnaphthalene	0.19 UJ	0.19 UJ	0.20 U	0.20 U
Acenaphthene	0.19 UJ	0.19 UJ	0.20 U	0.20 U
Acenaphthylene	0.19 UJ	0.19 UJ	0.20 U	0.20 U
Anthracene	0.19 UJ	0.19 UJ	0.20 U	0.20 U
Benzo[a]anthracene	0.19 UJ	0.19 UJ	0.20 U	0.20 U
Benzo[a]pyrene	0.19 UJ	0.19 UJ	0.20 U	0.20 U
Benzo[b]fluoranthene	0.19 UJ	0.19 UJ	0.20 U	0.20 U
Benzo[ghi]perylene	0.19 UJ	0.19 UJ	0.20 U	0.20 U
Benzo[k]fluoranthene	0.19 UJ	0.19 UJ	0.20 U	0.20 U
Chrysene	0.19 UJ	0.19 UJ	0.20 U	0.20 U
Dibenz(ah)anthracene	0.19 UJ	0.19 UJ	0.20 U	0.20 U
Fluoranthene	0.19 UJ	0.19 UJ	0.20 U	0.20 U
Fluorene	0.19 UJ	0.19 UJ	0.20 U	0.20 U
Indeno[123-cd]pyrene	0.19 UJ	0.19 UJ	0.20 U	0.20 U
Naphthalene	0.19 UJ	0.19 UJ	0.025 J	0.20 U
Phenanthrene	0.19 UJ	0.19 UJ	0.20 U	0.20 U
Pyrene	0.19 UJ	0.19 UJ	0.20 U	0.20 U
Method - 8081A_8082 (ug/L)				
Aroclor 1016	0.96 UJ	1.0 UJ	1.0 U	1.1 U
Aroclor 1221	1.9 UJ	2.0 UJ	2.0 U	2.2 U
Aroclor 1232	0.96 UJ	1.0 UJ	1.0 U	1.1 U
Aroclor 1242	0.96 UJ	1.0 UJ	1.0 U	1.1 U
Aroclor 1248	0.96 UJ	1.0 UJ	1.0 U	1.1 U
Aroclor 1254	0.96 UJ	1.0 UJ	1.0 U	1.1 U
Aroclor 1260	0.96 UJ	1.0 UJ	1.0 UJ	1.1 UJ
Method - 8015B (mg/L)				
Diesel Range Organics [C10-C28]	0.096 UJ	0.10 UJ	0.10 U	0.10 U
Gasoline Range Organics (GRO)-C6-C10	0.050 U	0.050 U	0.015 J	0.050 U
Method - 8330 (ug/L)				
4-Amino-26-dinitrotoluene	0.1 U	0.1 U	0.1 U	0.1 U
2-Amino-46-dinitrotoluene	0.2 U	0.2 U	0.2 U	0.2 U
13-Dinitrobenzene	0.1 U	0.1 U	0.1 U	0.1 U
24-Dinitrotoluene	0.1 U	0.1 U	0.1 U	0.1 U
26-Dinitrotoluene	0.1 U	0.1 U	0.1 U	0.1 U
HMX	0.1 U	0.1 U	0.1 U	0.1 U
Nitrobenzene	0.1 U	0.097 J	0.1 U	0.1 U
2-Nitrotoluene	0.5 U	0.5 U	0.5 U	0.5 U
3-Nitrotoluene	0.5 U	0.22 J	0.14 J	0.31 J
4-Nitrotoluene	0.5 U	0.5 U	0.5 U	0.5 U
RDX	0.1 U	0.1 U	0.1 U	0.1 U
Tetryl	0.1 U	0.1 U	0.1 U	0.1 U
135-Trinitrobenzene	0.1 U	0.13 J	0.13 J	0.13 J
Picric Acid	1.0 U	1.0 U	1.0 U	1.0 U
246-Trinitrotoluene	0.1 U	0.1 U	0.1 U	0.1 U

APPENDIX B

QA/QC ANALYTICAL RESULTS
SWMU 42 - WATER PURIFICATION PLANT LAGOONS
PHASE I RFI
NAVAL AVTIVITY PUERTO RICO, CEIBA, PR

Sample ID	**2006ER01**	**2006ER02**	**2006ER03**	**2006ER04**
Lab Sample Number	**680-22060-38**	**680-22139-1**	**680-22139-2**	**680-22139-6**
Sampling Date	**11/13/2006**	**11/15/2006**	**11/15/2006**	**11/16/2006**
Matrix	**Water**	**Water**	**Water**	**Water**
Method - 6020 (ug/L)				
Antimony	20 U	20 U	20 U	20 U
Arsenic	10 U	10 U	10 U	10 U
Barium	10 U	10 U	10 U	10 U
Beryllium	4.0 U	4.0 U	4.0 U	4.0 U
Cadmium	5.0 U	5.0 U	5.0 U	5.0 U
Chromium	10 U	10 U	10 U	10 U
Cobalt	10 U	10 U	10 U	10 U
Copper	20 U	20 U	20 U	20 U
Lead	5.0 U	5.0 U	5.0 U	5.0 U
Nickel	40 U	0.26 J	0.16 J	0.19 J
Selenium	10 U	10 U	10 U	10 U
Silver	10 U	10 U	10 U	10 U
Thallium	10 U	10 U	10 U	10 U
Tin	10 UJ	10 UJ	10 UJ	10 UJ
Vanadium	10 U	10 U	10 U	10 U
Zinc	3.7 J	20 U	20 U	20 U
Mercury - 7470A	0.20 U	0.20 UJ	0.20 UJ	0.20 UJ
Cyanide Total - 9012A	0.010 U	NA	NA	NA
Sulfide - 9034	1.0 U	NA	NA	NA

QA/QC ANALYTICAL RESULTS
SWMU 42 - WATER PURIFICATION PLANT LAGOONS
PHASE I RFI
NAVAL AVTIVITY PUERTO RICO, CEIBA, PR

Sample ID	2006ER05	2006FB01	2006FB02
Lab Sample Number	680-22139-3	680-22139-4	680-22139-5
Sampling Date	11/17/2006	11/18/2006	11/18/2006
Matrix	Water	Water	Water
Method - 8260B (ug/L)			
1112-Tetrachloroethane	1.0 U	1.0 U	1.0 U
111-Trichloroethane	1.0 U	1.0 U	1.0 U
1122-Tetrachloroethane	1.0 U	1.0 U	1.0 U
112-Trichloroethane	1.0 U	1.0 U	1.0 U
11-Dichloroethane	1.0 U	1.0 U	1.0 U
11-Dichloroethene	1.0 U	1.0 U	1.0 U
123-Trichloropropane	1.0 U	1.0 U	1.0 U
12-Dibromo-3-Chloropropane	1.0 U	1.0 U	1.0 U
12-Dichloroethane	1.0 U	1.0 U	1.0 U
12-Dichloropropane	1.0 U	1.0 U	1.0 U
2-Chloro-13-butadiene	1.0 U	1.0 U	1.0 U
2-Hexanone	10 U	10 U	10 U
3-Chloro-1-propene	1.0 U	1.0 U	1.0 U
Acetone	25 U	25 U	25 U
Acetonitrile	40 U	40 U	40 U
Acrolein	20 R	20 R	20 R
Acrylonitrile	20 U	20 U	20 U
Benzene	1.0 U	1.0 U	1.0 U
Bromoform	1.0 U	1.0 U	1.0 U
Bromomethane	1.0 U	1.0 U	1.0 U
Carbon disulfide	2.0 U	2.0 U	2.0 U
Carbon tetrachloride	1.0 U	1.0 U	1.0 U
Chlorobenzene	1.0 U	1.0 U	1.0 U
Chlorodibromomethane	1.0 U	1.0 U	2.8
Chloroethane	1.0 UJ	1.0 UJ	1.0 UJ
Chloroform	1.0 U	1.0 U	160
Chloromethane	1.0 U	1.0 U	1.0 U
cis-13-Dichloropropene	1.0 U	1.0 U	1.0 U
Dibromomethane	1.0 U	1.0 U	1.0 U
Dichlorobromomethane	1.0 U	1.0 U	18
Dichlorodifluoromethane	1.0 U	1.0 U	1.0 U
Ethyl methacrylate	1.0 U	1.0 U	1.0 U
Ethylbenzene	1.0 U	1.0 U	1.0 U
Ethylene Dibromide	1.0 U	1.0 U	1.0 U
Iodomethane	5.0 UJ	5.0 UJ	5.0 UJ
Isobutanol	40 R	40 R	40 R
Methacrylonitrile	20 U	20 U	20 U
Methyl Ethyl Ketone	10 U	10 U	10 U
methyl isobutyl ketone	10 U	10 U	10 U
Methyl methacrylate	1.0 U	1.0 U	1.0 U
Methylene Chloride	5.0 U	5.0 U	5.0 U
Pentachloroethane	5.0 U	5.0 U	5.0 U
Propionitrile	20 U	20 U	20 U
Styrene	1.0 U	1.0 U	1.0 U
Tetrachloroethene	1.0 U	1.0 U	1.0 U
Toluene	3.0	1.0 U	1.0 U
trans-12-Dichloroethene	1.0 U	1.0 U	1.0 U
trans-13-Dichloropropene	1.0 U	1.0 U	1.0 U
trans-14-Dichloro-2-butene	2.0 U	2.0 U	2.0 U
Trichloroethene	1.0 U	1.0 U	1.0 U
Trichlorofluoromethane	1.0 U	1.0 U	1.0 U
Vinyl acetate	2.0 UJ	2.0 UJ	2.0 UJ
Vinyl chloride	1.0 U	1.0 U	1.0 U
Xylenes Total	2.0 U	2.0 U	2.0 U

QA/QC ANALYTICAL RESULTS
SWMU 42 - WATER PURIFICATION PLANT LAGOONS
PHASE I RFI
NAVAL AVTIVITY PUERTO RICO, CEIBA, PR

Sample ID	2006ER05	2006FB01	2006FB02
Lab Sample Number	680-22139-3	680-22139-4	680-22139-5
Sampling Date	11/17/2006	11/18/2006	11/18/2006
Matrix	Water	Water	Water
Method - 8270C (ug/L)			
11'-Biphenyl	10 U	10 U	10 U
1245-Tetrachlorobenzene	10 U	10 U	10 U
124-Trichlorobenzene	10 U	10 U	10 U
12-Dichlorobenzene	10 U	10 U	10 U
135-Trinitrobenzene	10 UJ	10 UJ	10 U
13-Dichlorobenzene	10 U	10 U	10 U
13-Dinitrobenzene	10 U	10 U	10 U
14-Dichlorobenzene	0.52 J	0.53 J	10 U
14-Dioxane	10 U	10 U	10 U
14-Naphthoquinone	10 UJ	10 UJ	10 U
1-Naphthylamine	10 U	10 U	10 U
2346-Tetrachlorophenol	10 U	10 U	10 U
245-Trichlorophenol	10 U	10 U	10 U
246-Trichlorophenol	10 U	10 U	10 U
24-Dichlorophenol	10 U	10 U	10 U
24-Dimethylphenol	10 U	10 U	10 U
24-Dinitrophenol	50 U	50 U	50 U
24-Dinitrotoluene	10 U	10 U	10 U
26-Dichlorophenol	10 U	10 U	10 U
26-Dinitrotoluene	10 U	10 U	10 U
2-Acetylaminofluorene	10 U	10 U	10 U
2-Chloronaphthalene	10 U	10 U	10 U
2-Chlorophenol	10 U	10 U	10 U
2-Methylphenol	10 U	10 U	10 U
2-Naphthylamine	10 U	10 U	10 U
2-Nitroaniline	50 U	50 U	50 U
2-Nitrophenol	10 U	10 U	10 U
2-Picoline	10 U	10 U	10 UJ
2-Toluidine	10 U	10 U	10 U
3 & 4 Methylphenol	10 U	10 U	10 U
33'-Dichlorobenzidine	20 U	20 U	20 U
33'-Dimethylbenzidine	20 U	20 U	20 U
3-Methylcholanthrene	10 U	10 U	10 U
3-Nitroaniline	50 U	50 U	50 U
46-Dinitro-2-methylphenol	50 U	50 U	50 U
4-Aminobiphenyl	10 U	10 U	10 U
4-Bromophenyl phenyl ether	10 U	10 U	10 U
4-Chloro-3-methylphenol	10 U	10 U	10 U
4-Chloroaniline	20 U	20 U	20 U
4-Chlorophenyl phenyl ether	10 U	10 U	10 U
4-Nitroaniline	50 U	50 U	50 U
4-Nitrophenol	50 U	50 U	50 U
4-Nitroquinoline-1-oxide	20 R	20 R	20 U
712-Dimethylbenz(a)anthracene	10 U	10 U	10 U
Acetophenone	10 U	10 U	10 U
alphaalpha-Dimethyl phenethylamine	2000 U	2000 U	2000 U
Aniline	20 U	20 U	20 U
Aramite Total	10 UJ	10 UJ	10 UJ
Benzyl alcohol	10 U	10 U	10 U
Bis(2-chloroethoxy)methane	10 U	10 U	10 U
Bis(2-chloroethyl)ether	10 U	10 U	10 U
Bis(2-ethylhexyl) phthalate	10 U	10 U	10 U
bis(chloroisopropyl) ether	10 U	10 U	10 U

QA/QC ANALYTICAL RESULTS
SWMU 42 - WATER PURIFICATION PLANT LAGOONS
PHASE I RFI
NAVAL AVTIVITY PUERTO RICO, CEIBA, PR

Sample ID	2006ER05	2006FB01	2006FB02
Lab Sample Number	680-22139-3	680-22139-4	680-22139-5
Sampling Date	11/17/2006	11/18/2006	11/18/2006
Matrix	Water	Water	Water
Method - 8270C (ug/L)			
Butyl benzyl phthalate	10 U	10 U	10 U
Diallate	10 UJ	10 UJ	10 U
Dibenzofuran	10 U	10 U	10 U
Diethyl phthalate	10 U	0.69 J	10 U
Dimethoate	10 U	10 U	10 U
Dimethyl phthalate	10 U	10 U	10 U
Di-n-butyl phthalate	10 U	10 U	10 U
Di-n-octyl phthalate	10 U	10 U	10 U
Dinoseb	10 U	10 U	10 U
Disulfoton	10 U	10 U	10 U
Ethyl methanesulfonate	10 U	10 U	10 U
Famphur	10 U	10 U	10 U
Hexachlorobenzene	10 U	10 U	10 U
Hexachlorobutadiene	10 U	10 U	10 U
Hexachlorocyclopentadiene	10 U	10 U	10 U
Hexachloroethane	10 U	10 U	10 U
Hexachlorophene	5000 U	5000 U	5000 U
Hexachloropropene	10 U	10 U	10 U
Isophorone	10 U	10 U	10 U
Isosafrole	10 U	10 U	10 U
Methapyrilene	2000 UJ	2000 UJ	2000 U
Methyl methanesulfonate	10 U	10 U	10 U
Methyl parathion	10 U	10 U	10 U
Nitrobenzene	10 U	10 U	10 U
N-Nitro-o-toluidine	10 U	10 U	10 U
N-Nitrosodiethylamine	10 U	10 U	10 U
N-Nitrosodimethylamine	10 U	10 U	10 U
N-Nitrosodi-n-butylamine	10 U	10 U	10 U
N-Nitrosodi-n-propylamine	10 U	10 U	10 U
N-Nitrosodiphenylamine	10 U	10 U	10 U
N-Nitrosomethylethylamine	10 U	10 U	10 U
N-Nitrosomorpholine	10 U	10 U	10 U
N-Nitrosopiperidine	10 U	10 U	10 U
N-Nitrosopyrrolidine	10 U	10 U	10 U
oo'o"-Triethylphosphorothioate	10 U	10 U	10 U
Parathion	10 U	10 U	10 U
p-Dimethylamino azobenzene	10 U	10 U	10 U
Pentachlorobenzene	10 U	10 U	10 U
Pentachloronitrobenzene	10 U	10 U	10 U
Pentachlorophenol	50 U	50 U	50 U
Phenacetin	10 U	10 U	10 U
Phenol	10 U	10 U	10 U
Phorate	10 U	10 U	10 U
p-Phenylene diamine	2000 U	2000 U	2000 U
Pronamide	10 U	10 U	10 U
Pyridine	50 U	50 U	50 U
Safrole Total	10 U	10 U	10 U
Sulfotepp	10 U	10 U	10 U
Thionazin	10 U	10 U	10 U

APPENDIX B

QA/QC ANALYTICAL RESULTS
SWMU 42 - WATER PURIFICATION PLANT LAGOONS
PHASE I RFI
NAVAL AVTIVITY PUERTO RICO, CEIBA, PR

Sample ID	2006ER05	2006FB01	2006FB02
Lab Sample Number	680-22139-3	680-22139-4	680-22139-5
Sampling Date	11/17/2006	11/18/2006	11/18/2006
Matrix	Water	Water	Water
Method - 8270_LL (ug/L)			
1-Methylnaphthalene	0.20 U	0.20 U	0.19 U
2-Methylnaphthalene	0.20 UJ	0.20 UJ	0.19 U
Acenaphthene	0.20 U	0.20 U	0.19 U
Acenaphthylene	0.20 UJ	0.20 UJ	0.19 U
Anthracene	0.20 U	0.20 U	0.19 U
Benzo[a]anthracene	0.20 U	0.20 U	0.19 U
Benzo[a]pyrene	0.20 U	0.20 U	0.19 U
Benzo[b]fluoranthene	0.20 U	0.20 U	0.19 U
Benzo[ghi]perylene	0.20 U	0.20 U	0.19 U
Benzo[k]fluoranthene	0.20 U	0.20 U	0.19 U
Chrysene	0.20 U	0.20 U	0.19 U
Dibenz(ah)anthracene	0.20 UJ	0.20 UJ	0.19 U
Fluoranthene	0.20 U	0.20 U	0.080 J
Fluorene	0.20 U	0.20 U	0.19 U
Indeno[123-cd]pyrene	0.20 UJ	0.20 UJ	0.19 U
Naphthalene	0.20 U	0.20 U	0.19 U
Phenanthrene	0.20 U	0.20 U	0.19 U
Pyrene	0.20 U	0.20 U	0.19 U
Method - 8081A_8082 (ug/L)			
Aroclor 1016	0.99 U	1.0 U	0.98 U
Aroclor 1221	2.0 U	2.0 U	2.0 U
Aroclor 1232	0.99 U	1.0 U	0.98 U
Aroclor 1242	0.99 U	1.0 U	0.98 U
Aroclor 1248	0.99 U	1.0 U	0.98 U
Aroclor 1254	0.99 U	1.0 U	0.98 U
Aroclor 1260	0.99 UJ	1.0 UJ	0.98 UJ
Method - 8015B (mg/L)			
Diesel Range Organics [C10-C28]	0.099 U	0.052 J	0.10 U
Gasoline Range Organics (GRO)-C6-C10	0.050 U	0.050 U	0.050 U
Method - 8330 (ug/L)			
4-Amino-26-dinitrotoluene	0.1 U	0.1 U	0.1 U
2-Amino-46-dinitrotoluene	0.2 U	0.2 U	0.2 U
13-Dinitrobenzene	0.1 U	0.1 U	0.1 U
24-Dinitrotoluene	0.1 U	0.1 U	0.1 U
26-Dinitrotoluene	0.1 U	0.1 U	0.1 U
HMX	0.1 U	0.1 U	0.1 U
Nitrobenzene	0.1 U	0.1 U	0.1 U
2-Nitrotoluene	0.5 U	0.5 U	0.5 U
3-Nitrotoluene	0.26 J	0.5 U	0.5 U
4-Nitrotoluene	0.5 U	0.5 U	0.5 U
RDX	0.1 U	0.14	0.1 U
Tetryl	0.1 U	0.077 J	0.1 U
135-Trinitrobenzene	0.15 J	0.1 U	0.1 U
Picric Acid	1.0 U	1.0 U	1.0 U
246-Trinitrotoluene	0.1 U	0.1 U	0.1 U

APPENDIX B

QA/QC ANALYTICAL RESULTS
SWMU 42 - WATER PURIFICATION PLANT LAGOONS
PHASE I RFI
NAVAL AVTIVITY PUERTO RICO, CEIBA, PR

Sample ID	**2006ER05**	**2006FB01**	**2006FB02**
Lab Sample Number	**680-22139-3**	**680-22139-4**	**680-22139-5**
Sampling Date	**11/17/2006**	**11/18/2006**	**11/18/2006**
Matrix	**Water**	**Water**	**Water**
Method - 6020 (ug/L)			
Antimony	20 U	20 U	20 U
Arsenic	10 U	10 U	10 U
Barium	10 U	10 U	10 U
Beryllium	4.0 U	4.0 U	4.0 U
Cadmium	5.0 U	5.0 U	5.0 U
Chromium	10 U	10 U	10 U
Cobalt	10 U	10 U	10 U
Copper	20 U	20 U	79
Lead	5.0 U	5.0 U	0.69 J
Nickel	40 U	40 U	40 U
Selenium	10 U	10 U	10 U
Silver	10 U	10 U	10 U
Thallium	10 U	10 U	10 U
Tin	10 UJ	10 UJ	10 UJ
Vanadium	10 U	10 U	10 U
Zinc	20 U	20 U	20 U
Mercury - 7470A	0.20 UJ	0.20 UJ	0.20 UJ
Cyanide Total - 9012A	NA	NA	NA
Sulfide - 9034	NA	NA	NA

APPENDIX C
2006 RFI DATA VALIDATION SUMMARIES

APPENDIX C.1
PUERTO RICAN CHEMIST CERTIFICATIONS

SEVERN TRENT STL

PUERTO RICO CERTIFICATION

I Herby certify that I have reviewed the Quality Assurance Data for Project Number **680-22001-2**, and to the best of my knowledge, the results are correct and reliable.

Abraham Ortiz

SEVERN TRENT STL

PUERTO RICO CERTIFICATION

I Herby certify that I have reviewed the Quality Assurance Data for Project Number **680-22012-3**, and to the best of my knowledge, the results are correct and reliable.

Abraham Ortiz

APPENDIX C.2
STL SAVANNAH SDG 22001-2

ENVIRONMENTAL
Data Services, Inc.

VOLATILE ORGANIC COMPOUNDS
USEPA Region II - Level IV Review

Site: RCRA Facility Investigation, CTO 121, Ceiba, PR SDG #: NAPR 22001-2

Client: CH2M HILL, Inc./Baker Environmental, Inc. Date: December 29, 2006

Laboratory: Severn Trent Laboratories, Savannah, GA Reviewer: Christine Garvey

EDS ID	Client Sample ID	Laboratory Sample ID	Matrix
1	42SB03-00	680-22001-15	Soil
1 MS	42SB03-00 MS	680-22001-15 MS	Soil
1 MSD	42SB03-00 MSD	680-22001-15 MSD	Soil
2	42SB03-00D	680-22001-16	Soil
3	42SB03-01	680-22001-17	Soil
4	42SB03-03	680-22001-18	Soil
5	42SB01-00	680-22001-19	Soil
6	42SB01-03	680-22001-20	Soil
7	42SB01-05	680-22001-21	Soil
8	42SB02-00	680-22001-22	Soil
9	42SB02-03	680-22001-23	Soil
10	42SB02-05	680-22001-24	Soil
11	42SD01	680-22001-25	Sediment
12	42SD01D	680-22001-26	Sediment
13	42SD02	680-22001-27	Sediment
14	42SD03	680-22001-28	Sediment
15	42SD04	680-22001-30	Sediment
16	42TB01	680-22001-31	Water

The USEPA Region II SOP HW-24, Revision 1, June 1999: Validating Volatile Organic Compounds by SW-846 Method 8260B was used in evaluating the data in this summary report.

Sample Conditions/Problems - The Traffic Reports/Chain-of-Custody Records, Sampling Report and/or Laboratory Case Narrative did not indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data.

Holding Times - All samples were analyzed within 14 days for preserved water and soil samples.

Surrogates - All samples exhibited acceptable surrogate recoveries except the following:

Sample ID	Surrogate	%R	Qualifier
1	Toluene-d8	139%	J
12	Toluene-d8	131%	Qualified due to % moisture

MS/MSD - The MS/MSD sample exhibited acceptable %R and RPD values except the following:

MS/MSD Sample ID	Compound	MS/MSD %R/RPD	Qualifier
1	Acetone	144%/193%/OK	Qualified due to surrogates
	Methyl ethyl ketone	159%/171%/OK	
	Chloroethane	163% /OK/OK	None ND
	Ethylene Dibromide	152%/157%/OK	
	Dibromomethane	145%/156%/OK	
	1,2-Dichloroethane	146% /161%/OK	
	1,2-Dichloropropane	125%/126%/OK	
	2-Hexanone	205%/265%/OK	
	Methyl isobutyl ketone	256%/302%/OK	
	1,1,2,2-Tetrachloroethane	150%/175%/OK	
	1,1,2-Trichloroethane	143%/144%/OK	
	Dichlorodifluoromethane	OK/123%/OK	None ND
	Bromoform	OK/148%/OK	
	Methyl ethyl ketone	OK/169%/OK	Qualified due to surrogates
	1,2-Dibromo-3-Chloropropene	OK/203%/OK	None ND
	trans-1,3-Dichloropropene	OK/127%/OK	

Laboratory Control Sample - The LCS sample(s) exhibited acceptable %R values except the following:

LCS ID	Compound	%R	Qualifier	Affected Samples
LCS 680-60901/3	1,1,1,2-Tetrachloroethane	113%	None	Samples ND

Method Blank - The method blanks were free of contamination.

Trip, Field, Equipment Blank - Field QC results are summarized below.

Blank ID	Compound	Conc. ug/L	Action Level ug/kg	Qualifier	Affected Samples
42TB01	None	ND	-	-	-
2006ER01 (SDG 22060-3)	None	ND	-	-	-
2006ER02 (SDG 22060-3)	Toluene	2.3	23	None	All ND

Blank ID	Compound	Conc. ug/L	Action Level ug/kg	Qualifier	Affected Samples
2006FB01 (SDG 22060-3)	Toluene	6.9	69	None	All ND
2006FB02 (SDG 22060-3)	None	ND	-	-	-
2006ER01 (SDG 22060-3)	Dichlorobromomethane	18	90	None	All ND
	Chloroform	160	800	None	
	Chlorodibromomethane	2.8	14	None	

GC/MS Instrument Performance Check - All of the BFB tunes in the initial and continuing calibrations met the percent relative abundance criteria.

Target Compound List (TCL) Analytes - The Form Is were present with the required header information. All mass spectral data were included and no discrepancies were identified.

Tentatively Identified Compounds (TIC) - TICs were not reported for the samples in this data package.

Compound Quantitation and Reported Detection Limits - The following samples exhibited percent moisture results greater than 90% and were qualified accordingly.

EDS ID	% Moisture	Qualifier
11	92.4	J/R
12	92.6	J/R
13	94.7	J/R
14	92.7	J/R
15	92.2	J/R

GC/MS Initial Calibration - The initial calibrations exhibited acceptable %RSD and mean RRF values with the exception of the following.

ICAL Date	Compound	%RSD/RRF	Qualifier	Affected Samples
11/19/06	Acrolein	RRF 0.0222	J/R	16
	Isobutanol	RRF 0.0305	J/R	16

GC/MS Continuing Calibration - The continuing calibrations exhibited acceptable %D and RRF values with the exception of the following.

CCAL Date	Compound	%D/RRF	Qualifier	Affected Samples
11/17/06 2041	Acrolein	28%	J/UJ	1, 2, 5
	Iodomethane	25%	J/UJ	

CCAL Date	Compound	%D/RRF	Qualifier	Affected Samples
11/17/06 2041	3-Chloro-1-propene	47%	J/UJ	1, 2, 5
	2-Chloro-1,3-butadiene	47%	J/UJ	
	Pentachloroethane	45%	J/UJ	
11/17/06 2122	4-Methyl-2-pentanone	24%	J/UJ	
11/20/06 0952	Acrolein	74%	J/UJ	3, 4, 6-10
	3-Chloro-1-propene	22%	J/UJ	
	Pentachloroethane	34%	J/UJ	
11/20/06 1013	cis-1,3-dichloropropene	21%	J/UJ	
	trans-1,3-Dichloropropene	21%	J/UJ	
11/27/06 1013	Chloromethane	23%	J/UJ	16
	Chloroethane	41%	J/UJ	
11/27/06 1041	Acrolein	RRF 0.0446/101%	None	Qualified due to ICAL
	Iodomethane	29%	J/UJ	16
	Isobutanol	RRF 0.0306	J/UJ	Qualified due to ICAL

Internal Standard (IS) Area Performance - All internal standards met response and retention time (RT) criteria. No qualifications were required.

Field Duplicates - Field duplicate results are summarized below.

Compound	42SB03-00 ug/kg	42-SB03-00D ug/kg	RPD	Qualifier
Acetone	160	120	29%	None
Methyl ethyl ketone	6.3	5.6	12%	
Styrene	3.8 U	1.1 J	NC	

Compound	42SD01 ug/kg	42SD01D ug/kg	RPD	Qualifier
Acetone	2600	5200	67%	None
Acrolein	220 J	1700 U	NC	
Methyl ethyl ketone	220 J	390 J	56%	
Carbon disulfide	62 J	59 J	5%	
Benzene	75 U	22 J	NC	

ENVIRONMENTAL
Data Services, Inc.

SEMIVOLATILE ORGANIC COMPOUNDS

USEPA Region II - Level IV Review

Site: RCRA Facility Investigation, CTO-121, Ceiba, PR SDG #: NAPR22001-2

Client: CH2M HILL, Inc./Baker Environmental, Inc. Date: December 29, 2006

Laboratory: Severn Trent Laboratories, Savannah, GA Reviewer: Christine Garvey

EDS ID	Client Sample ID	Laboratory Sample ID	Matrix
1	42SB03-00	680-22001-15	Soil
1 MS	42SB03-00 MS	680-22001-15 MS	Soil
1 MSD	42SB03-00 MSD	680-22001-15 MSD	Soil
2	42SB03-00D	680-22001-16	Soil
3	42SB03-01	680-22001-17	Soil
4	42SB03-03	680-22001-18	Soil
5	42SB01-00	680-22001-19	Soil
6	42SB01-03	680-22001-20	Soil
7	42SB01-05	680-22001-21	Soil
7 RE	42SB01-05 RE	680-22001-21 RE	Soil
8	42SB02-00	680-22001-22	Soil
9	42SB02-03	680-22001-23	Soil
9 RE	42SB02-03 RE	680-22001-23 RE	Soil
10	42SB02-05	680-22001-24	Soil
11	42SD01	680-22001-25	Sediment
12	42SD02	680-22001-27	Sediment
13	42SD03	680-22001-28	Sediment
14	42SD03D	680-22001-29	Sediment
15	42SD04	680-22001-30	Sediment

The USEPA Region II SOP No. HW-22, Revision 2, June 2001: Validating Semivolatile Organic Compounds by SW-846 Method 8270C was used in evaluating the data in this summary report.

Sample Conditions/Problems - The Traffic Reports/Chain-of-Custody Records, Sampling Report and/or Laboratory Case Narrative did not indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data.

Holding Times - All samples were extracted within 14 days for soil samples and analyzed within 40 days for all samples except the following.

Sample	Date Sampled	Date Extracted	# of Days	Qualifier
7RE	11/14/06	12/04/06	20	J/UJ
9 RE	11/14/06	12/04/06	20	J/UJ

Surrogates - All samples exhibited acceptable surrogate recoveries except the following:

Sample ID	Surrogate	%R	Qualifier
7	2-Fluorophenol	35%	J/UJ - acid compounds
	Nitrobenzene-d5	31%	J/UJ - base/neutral compounds
	Phenol-d5	36%	J/UJ - acid compounds
7 RE	Nitrobenzene-d5	32%	None for 1 out
9	2-Fluorobiphenyl	35%	J/UJ - BN
	Nitrobenzene-d5	27%	
	Phenol-d5	34%	None for 1 out
9RE	Nitrobenzene-d5	29%	

MS/MSD - The MS/MSD sample exhibited acceptable %R and RPD values except the following:

MS/MSD Sample ID	Compound	MS/MSD %R/RPD	Qualifier
1	2,4-Dinitrophenol	OK/OK/60	No action based on RPD alone
	Hexachlorobutadiene	OK/41%/OK	J/UJ

Laboratory Control Sample - The LCS sample(s) exhibited acceptable %R values.

Method Blank - The method blanks were free of contamination.

Field, Equipment Blank - Field QC results are summarized below.

Blank ID	Compound	Conc. ug/L	Action Level ug/kg	Qualifier	Affected Samples
2006ER01 (SDG 22060-3)	Diethylphthalate	0.82	290	None	All ND
2006ER02 (SDG 22060-3)	1,4-Dichlorobenzene	0.56	93	None	
2006ER03 (SDG 22060-3)	None	ND	-	-	-
2006FB01 (SDG 22060-3)	1,4-Dichlorobenzene	0.53	88	None	All ND
	Diethylphthalate	0.69	230	None	
2006FB02 (SDG 22060-3)	None	ND	-	-	-

GC/MS Instrument Performance Check - All of the DFTPP tunes in the initial and continuing calibrations met the percent relative abundance criteria.

Target Compound List (TCL) Analytes - The Form Is were present with the required header information. All mass spectral data were included and no discrepancies were identified.

Tentatively Identified Compounds (TIC) - TICs were not reported for the samples in this data package.

Compound Quantitation and Reported Detection Limits - EDS sample ID #s 7 and 9 exhibited low surrogate recoveries. The samples were reextracted outside hold time with similar results. The original results should be used for reporting purposes.

EDS sample ID #s 7-9 were rejected for 4-nitroquinoline-1-oxide due to ICAL results but were qualified as estimated (UJ) for 7RE and 9RE. The reextracted results were transferred to the original Form Is and should be used for reporting purposes.

EDS sample ID #s 11-15 exhibited the following percent moisture values.

EDS Sample ID	Percent Moisture	Qualifier
11	92.4	J/R
12	94.7	J/R
13	92.7	J/R
14	91.8	J/R
15	92.2	J/R

GC/MS Initial Calibration - The initial calibrations exhibited acceptable %RSD and mean RRF values with the exception of the following.

ICAL Date	Compound	%RSD/RRF	Qualifier	Affected Samples
11/21/06	a,a-Dimethylphenethylamine	30%	None	All ND
	2-Picoline	20%	None	
	Methapyriline	17%	None	
	Aramite total	21%	None	
	4-Nitroquinoline-1-oxide	RRF 0.0243/21%	J/R	8-15
11/24/06	a,a-Dimethylphenethylamine	30%	None	All ND
	1,3,5-Trinitrobenzene	23%	None	
	Methapyrilene	35%	None	
	4-Nitroquinoline-1-oxide	RRF 0.0316	J/R	1-7

GC/MS Continuing Calibration - The continuing calibrations exhibited acceptable %D and RRF values with the exception of the following. Several compounds on 12/04/06 exhibited %D or RRF values outside of acceptance limits. No qualifiers were required as the associated samples were already were qualified due to holding times.

CCAL Date	Compound	%D/RRF	Qualifier	Affected Samples
11/24/06 1025	1,3,5-Trinitrobenzene	30% D	J/UJ	10
	Hexachlorophene	RRF0.046/32% D	J/R	
11/24/06 0734	4-Nitroquinoline-1-oxide	RRF 0.0229	None	Qualified due to ICAL
	Hexachlorophene	26% D	J/UJ	8
11/27/06 0815	a,a-Dimethylphenethylamine	22% D	J/UJ	1-5, 7
	1,3,5-Trinitrobenzene	29% D	J/UJ	
	Methapyrilene	39% D	J/UJ	
	4-Nitroquinoline-1-oxide	RRF 0.0313	None	Qualified due to ICAL
	Hexachlorophene	21% D	J/UJ	1-5, 7
11/27/06 0839	Phorate	28% D	J/UJ	
11/28/06 0714	1,3,5-Trinitrobenzene	57% D	J/UJ	6
	4-Nitroquinoline-1-oxide	RRF 0.025, 21% D	None	Qualified due to ICAL
	Hexachlorophene	41% D	J/UJ	6
11/28/06 0737	Phorate	33% D	J/UJ	
	Dimethoate	20.3% D	J/UJ	

Internal Standard (IS) Area Performance - All internal standards met response and retention time (RT) criteria except the following.

Sample ID	Internal Standard	Area Count	Qualifier
6	IS6-Perylene-d12	Low	J/UJ - associated compounds

Field Duplicates - Field duplicate results are summarized below.

Compound	42SB03-00 ug/kg	42SB03-00D ug/kg	RPD	Qualifier
None	ND	ND	-	-

Compound	42SD03 ug/kg	42SD03D ug/kg	RPD	Qualifier
None	ND	ND	-	-

ENVIRONMENTAL
Data Services, Inc.

POLYNUCLEAR AROMATIC HYDROCARBONS

USEPA Region II - Level IV Review

Site: RCRA Facility Investigation, CTO-121, Ceiba, PR SDG #: NAPR22001-2

Client: CH2M HILL, Inc./Baker Environmental, Inc. Date: January 1, 2007

Laboratory: Severn Trent Laboratories, Savannah, GA Reviewer: Christine Garvey

EDS ID	Client Sample ID	Laboratory Sample ID	Matrix
1	42SB03-00	680-22001-15	Soil
1 MS	42SB03-00 MS	680-22001-15 MS	Soil
1 MSD	42SB03-00 MSD	680-22001-15 MSD	Soil
2	42SB03-00D	680-22001-16	Soil
3	42SB03-01	680-22001-17	Soil
4	42SB03-03	680-22001-18	Soil
5	42SB01-00	680-22001-19	Soil
6	42SB01-03	680-22001-20	Soil
7	42SB01-05	680-22001-21	Soil
8	42SB02-00	680-22001-22	Soil
9	42SB02-03	680-22001-23	Soil
10	42SB02-05	680-22001-24	Soil
11	42SD01	680-22001-25	Sediment
12	42SD02	680-22001-27	Sediment
13	42SD03	680-22001-28	Sediment
14	42SD03D	680-22001-29	Sediment
15	42SD04	680-22001-30	Sediment

The USEPA Region II SOP No. HW-22, Revision 2, June 2001: Validating Semivolatile Organic Compounds by SW-846 Method 8270C was used in evaluating the data in this summary report.

Sample Conditions/Problems - The Traffic Reports/Chain-of-Custody Records, Sampling Report and/or Laboratory Case Narrative did not indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data.

Holding Times - All samples were extracted within 14 days for soil samples and analyzed within 40 days for all samples.

Surrogates - All samples exhibited acceptable surrogate recoveries.

MS/MSD - The MS/MSD sample exhibited acceptable %R and RPD values.

Laboratory Control Sample - The LCS samples exhibited acceptable %R values.

Method Blank - The method blank was free of contamination.

Field, Equipment Blank - Field QC results are summarized below.

Blank ID	Compound	Conc. ug/L	Action Level ug/kg	Qualifier	Affected Samples
2006ER01 (SDG 22060-3)	None	ND	-	-	-
2006ER02 (SDG 22060-3)	None	ND	-	-	--
2006ER03 (SDG 22060-3)	Naphthalene	0.025	8.3	None	Samples ND
2006FB01 (SDG 22060-3)	None	ND	-	-	-
2006FB02 (SDG 22060-3)	Fluoranthene	0.080	14	U	2

GC/MS Instrument Performance Check - All of the DFTPP tunes in the initial and continuing calibrations met the percent relative abundance criteria.

Target Compound List (TCL) Analytes - The Form Is were present with the required header information. All mass spectral data were included and no discrepancies were identified.

Tentatively Identified Compounds (TIC) - TICs were not reported for the samples in this data package.

Compound Quantitation and Reported Detection Limits - EDS sample ID #s 11-15 exhibited the following percent moisture results:

EDS Sample ID	Percent Moisture	Qualifier
11	92.4	J/R
12	94.7	J/R
13	92.7	J/R
14	91.8	J/R
15	92.2	J/R

GC/MS Initial Calibration - The initial calibrations exhibited acceptable %RSD and mean RRF values.

GC/MS Continuing Calibration - The continuing calibrations exhibited acceptable %D and RRF values with the exception of the following.

CCAL Date	Compound	%D/RRF	Qualifier	Affected Samples
12/01/06	Indeno (1,2,3-cd) pyrene	22% D	None	Already qualified due to percent moisture

Internal Standard (IS) Area Performance - All internal standards met response and retention time (RT) criteria.

Field Duplicates - Field duplicate results are summarized below.

Compound	42SB03-00 ug/kg	42SB03-00D ug/kg	RPD	Qualifier
Fluoranthene	2.2J	7.9 U	NC	None
Pyrene	1.9 J	7.9 U	NC	None

Compound	42SD03 ug/kg	42SD03 ug/kg	RPD	Qualifier
None	ND	ND	NC	None

ENVIRONMENTAL
Data Services, Inc.

PCBs
USEPA Region II - Level IV Review

Site: RCRA Facility Investigation, CTO-121, Ceiba, PR SDG #: NAPR 22001-2

Client: CH2M HILL, Inc./Baker Environmental, Inc. Date: January 1, 2007

Laboratory: Severn Trent Laboratories, Savannah, GA Reviewer: Christine Garvey

EDS ID	Client Sample ID	Laboratory Sample ID	Matrix
1	42SB03-00	680-22001-15	Soil
1 MS	42SB03-00 MS	680-22001-15 MS	Soil
1 MSD	42SB03-00 MSD	680-22001-15 MSD	Soil
2	42SB03-00D	680-22001-16	Soil
3	42SB03-01	680-22001-17	Soil
4	42SB03-03	680-22001-18	Soil
5	42SB01-00	680-22001-19	Soil
6	42SB01-03	680-22001-20	Soil
7	42SB01-05	680-22001-21	Soil
8	42SB02-00	680-22001-22	Soil
9	42SB02-03	680-22001-23	Soil
10	42SB02-05	680-22001-24	Soil
11	42SD01	680-22001-25	Sediment
12	42SD02	680-22001-27	Sediment
13	42SD03	680-22001-28	Sediment
14	42SB03D	680-22001-29	Sediment
15	42SB04	680-22001-30	Sediment

The USEPA Region II SOP No. HW-23, Revision 0, April 1995: Validating Pesticide/PCB Compounds by SW-846 Method 8080A and SOP No. HW-23B, Revision 1.0, May 2002, were used in evaluating the data in this summary report.

Sample Conditions/Problems - The Traffic Reports/Chain-of-Custody Records, Sampling Report and/or Laboratory Case Narrative did not indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data.

Holding Times - All samples were extracted within 14 days for soil samples and analyzed within 40 days for all samples.

Surrogates - All samples exhibited acceptable surrogate %R values.

MS/MSD - The MS/MSD sample exhibited acceptable %R and RPD values.

Laboratory Control Sample - The LCS sample(s) exhibited acceptable %R values.

Method Blank - The method blanks were free of contamination.

Trip, Field, Equipment Blank - Field QC results are summarized below.

Blank ID	Compound	Conc. ug/L	Action Level ug/kg	Qualifier	Affected Samples
2006ER01 (SDG 22060-3)	None	ND	-	-	-
2006ER02 (SDG 22060-3)	None	ND	-	-	-
2006ER03 (SDG 22060-3)	None	ND	-	-	-
2006FB01 (SDG 22060-3)	None	ND	-	-	-
2006FB02 (SDG 22060-3)	None	ND	-	-	-

Initial Calibration - The initial calibrations exhibited acceptable %RSD values.

Calibration and GC Performance - The continuing calibrations exhibited acceptable %D values.

Analytical Sequence Check - No discrepancies were identified.

Compound Quantitation and Reported Detection Limits - EDS sample ID #s 11-15 exhibited the following percent moisture results:

EDS Sample ID	Percent Moisture	Qualifier
11	92.4	J/R
12	94.7	J/R
13	92.7	J/R
14	91.8	J/R
15	92.2	J/R

Field Duplicates - Field duplicate results are summarized below.

Compound	42SB03-00 ug/kg	42SB03-00D ug/kg	RPD	Qualifier
None	ND	ND	-	-

Compound	42SD03 ug/kg	42SD03D ug/kg	RPD	Qualifier
None	ND	ND	-	-

ENVIRONMENTAL
Data Services, Inc.

METALS

USEPA Region II - Level IV Review

Site: RCRA Facility Investigation, CTO-121, Ceiba, PR SDG #: NAPR 22001-2

Client: CH2M Hill, Inc.,/Baker Environmental, Inc. Date: January 5, 2007

Laboratory: Severn Trent Laboratories, Savannah, GA Reviewer: Christine Garvey

EDS ID	Client Sample ID	Laboratory Sample ID	Matrix
1	42SB03-00	680-22001-15	Soil
1 MS	42SB03-00 MS	680-22001-15 MS	Soil
1 MSD	42SB03-00 MSD	680-22001-15 MSD	Soil
2	42SB03-00D	680-22001-16	Soil
3	42SB03-01	680-22001-17	Soil
4	42SB03-03	680-22001-18	Soil
5	42SB01-00	680-22001-19	Soil
6	42SB01-03	680-22001-20	Soil
7	42SB01-05	680-22001-21	Soil
8	42SB02-00	680-22001-22	Soil
9	42SB02-03	680-22001-23	Soil
10	42SB02-05	680-22001-24	Soil
10 MS	42SB02-05 MS	680-22001-24 MS	Soil
10 MSD	42SB02-05 MSD	680-22001-24 MSD	Soil
11	42SD01	680-22001-25	Sediment
12	42SD02	680-22001-27	Sediment
13	42SD03	680-22001-28	Sediment
14	42SD03D	680-22001-29	Sediment
15	42SD04	680-22001-30	Sediment

The USEPA Region II SOP No. HW-2, Revision 11, January 1992 for Evaluation of Metals Data for the Contract Laboratory Program was used in evaluating the data in this summary report.

Sample Conditions/Problems - The Traffic Reports/Chain-of-Custody Records, Sampling Report and/or Laboratory Case Narrative did not indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data.

Holding Times - All samples were prepared and analyzed within 28 days for mercury and 180 days for all other metals.

Calibration - The ICV and CCV %R values were acceptable.

CRDL Standard - The CRDL standards exhibited acceptable %R values except those noted below. The associated samples were qualified as indicated.

Compound	%R - High/Low	Qualifier	Affected Samples
Copper - 11/22	147% - High	J	7
Tin - 11/22	69% - Low	J/UJ	
Zinc - 11/22	55% - Low	None	Postitive results > 2X CRDL
Tin - 12/04	59% - Low	J/UJ	1-6, 8-15

Method and Calibration Blanks - The method blanks and continuing calibration blanks exhibited contamination for several compounds, however, all sample results are non-detect or greater than 5X the blank concentration with the exception of the following:

Compound	Conc.	Action Level	Qualifier	Affected Samples
Barium PBS-2	0.1111 mg/kg	1.111 mg/kg	None	> 10X blank
CCB Copper 11/22	0.412 ug/L	0.412 mg/kg	None	
Copper PBS-2	0.121 mg/kg	1.21 mg/kg	None	
Copper PBS-3	0.0594 mg/kg	0.594 mg/kg	None	
Mercury	0.0091 J mg/kg	0.017 J mg/kg	0.0079	None
Nickel PBS-2	0.0499 mg/kg	0.499 mg/kg	None	> 10 X Blank

ICP Interference Check Sample - All %R values were acceptable except the following:

Compound	%R	Qualifier	Affected Samples
Zinc	128%	J	7
Cadmium	71%	J	1-3, 5-6, 8, 10
Silver	76%	None	All ND
Zinc	129%	J	1-6, 8-15

Matrix Spike/Matrix Spike Duplicate - The matrix spike/matrix spike duplicate sample exhibited acceptable %R and RPD values except the following:

MS Sample ID	Compound	%R/RPD	Qualifier	Affected Samples
1	Antimony	17%/20%/OK	J/UJ	1-4
	Chromium	130%/144%/OK	J	
	Lead	156%/262%/OK	J	
	Nickel	OK/136%/OK	J	
	Tin	OK/126%/OK	None	All ND
10	Antimony	47%/64%/OK	J/UJ	5-6, 8-15
	Chromium	194%/85%/91	J	
	Lead	138%/40%/59	J	
	Nickel	OK/55%/OK	J/UJ	

MS Sample ID	Compound	%R/RPD	Qualifier	Affected Samples
10	Tin	OK/126%/OK	None	All ND
	Barium	OK/OK/69	J	5-6, 8-15
	Copper	OK/OK/42	J	
	Vanadium	OK/OK/45	J	
Reference	Chromium	69%/OK/OK	J/UJ	7
	Tin	184%/185%/OK	None	All ND

Field Duplicates - Field duplicate results are summarized below.

Compound	42SB03-00 mg/kg	42SB03-00D mg/kg	RPD or difference	Qualifier
Antimony	2.6 J	4.7 U	NC	None
Arsenic	1.2 J	1.2 J	0	None
Barium	46	50	8%	
Beryllium	0.24 J	0.23 J	0.01	
Cadmium	0.18 J	0.13 J	0.05	
Chromium	21	22	5%	
Cobalt	23	23	0%	
Copper	86	86	0%	
Lead	8.5	8.4	1%	
Nickel	19	17	2	
Vanadium	170	170	0%	
Zinc	68	64	6%	

Compound	42SD03 mg/kg	42SD03D mg/kg	RPD or difference	Qualifier
Barium	91	85	6	None
Chromium	170	150	13%	
Cobalt	5.8 J	5.2 J	0.6	
Copper	780	550	34.6%	
Lead	3.5 J	6.4 J	2.9	
Mercury	0.16 J	0.11 J	0.05	
Nickel	3.9 J	3.4 J	0.5	
Vanadium	110	89	21	
Zinc	38 J	42 J	4	

LCS - The LCS samples exhibited acceptable %R values.

ICP Serial Dilution - The ICP serial dilution sample exhibited acceptable %D values except the following:

ICP Sample ID	Compound	%D	Qualifier	Affected Samples
Reference 1	Barium	11.4%	J	7
	Chromium	12.8%	None	Qualified due to MS/MSD
	Vanadium	12.0%	J	7
	Copper	10.4%	None	Qualified due to CRDL

Field and Equipment Blank - Field QC results are summarized below.

Blank ID	Compound	Conc. ug/L	Action Level mg/kg	Qualifier	Affected Samples
2006ER01 (SDG 22060-3)	None	ND	-	-	-
2006ER02 (SDG 22060-3)	Nickel	0.26 J	None	None	< CRDL
2006ER03 (SDG 22060-3)	Nickel	0.16 J	None	None	
2006FB01 (SDG 22060-3)	None	ND	-	-	-
2006FB02 (SDG 22060-3)	Copper	79	158	J/R	Qualified due to MS/MSD
	Lead	0.69 J	None	None	< CRDL

Compound Quantitation - EDS sample ID #s 11-15 exhibited the following percent solids results.

Compound ID	Percent Solids	Qualifier
11	7.6%	J/UJ
12	5.3%	J/UJ
13	7.3%	J/UJ
14	8.2%	J/UJ
15	7.8%	J/UJ

All ICP soil samples were analyzed at a 2X dilution.

APPENDIX C.3
STL SAVANNAH SDG 22012-3

ENVIRONMENTAL
Data Services, Inc.

VOLATILE ORGANIC COMPOUNDS
USEPA Region II - Level IV Review

Site: RCRA Facility Investigation, CTO 121, Ceiba, PR SDG #: NAPR 22012-3

Client: CH2M HILL, Inc./Baker Environmental, Inc. Date: January 10, 2007

Laboratory: Severn Trent Laboratories, Savannah, GA Reviewer: Christine Garvey

EDS ID	Client Sample ID	Laboratory Sample ID	Matrix
1	42TW01	680-22012-47	Water
1 MS	42TW01 MS	680-22012-47 MS	Water
1 MSD	42TW01 MSD	680-22012-47 MSD	Water
2	42TW01D	680-22012-48	Water
3	42TB02	680-22012-49	Water
4	42TW02	680-22060-35	Water
5	42TW03	680-22060-36	Water
6	42TB03	680-22060-37	Water

The USEPA Region II SOP HW-24, Revision 1, June 1999: Validating Volatile Organic Compounds by SW-846 Method 8260B was used in evaluating the data in this summary report.

Sample Conditions/Problems - The Traffic Reports/Chain-of-Custody Records, Sampling Report and/or Laboratory Case Narrative did not indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data.

Holding Times - All samples were analyzed within 14 days for preserved water samples.

Surrogates - All samples exhibited acceptable surrogate recoveries.

MS/MSD - The MS/MSD sample exhibited acceptable %R and RPD values except the following.

MS/MSD Sample ID	Compound	MS/MSD %R/RPD	Qualifier
1	Dichlorodifluoromethane	63%/63%/OK	J/UJ
	1,1,1,2-Tetrachloroethane	108%/108%/OK	None- Samples ND

Laboratory Control Sample - The LCS sample(s) exhibited acceptable %R values except the following.

LCS ID	Compound	%R	Qualifier	Affected Samples
680-6091/3	1,1,1,2-Tetrachloroethane	113%	None	All ND

Method Blank - The method blanks were free of contamination.

Trip, Field, Equipment Blank - Field QC results are summarized below.

Blank ID	Compound	Conc. ug/L	Action Level ug/L	Qualifier	Affected Samples
2006ER04 (SDG 22060-3)	Tolune	2.2	22	None	Samples ND
2006FB01 (SDG 22060-3)	None	ND	-	-	-
2006FB02 (SDG 22060-3)	Dichlorobromomethane	18	90	None	Samples ND
	Chloroform	160	800		
	Chlorodibromomethane	2.8	14		
42TB02	None	ND	-	-	-
42TB03	None	ND	-	-	-

GC/MS Instrument Performance Check - All of the BFB tunes in the initial and continuing calibrations met the percent relative abundance criteria.

Target Compound List (TCL) Analytes - The Form Is were present with the required header information. All mass spectral data were included and no discrepancies were identified.

Tentatively Identified Compounds (TIC) - TICs were not reported for the samples in this data package.

Compound Quantitation and Reported Detection Limits - No discrepancies were identified.

GC/MS Initial Calibration - The initial calibrations exhibited acceptable %RSD and mean RRF values except the following.

ICAL Date	Compound	%RSD/RRF	Qualifier	Affected Samples
11/19/06	Acrolein	0.0222	J/R	1-6
	Isobutanol	0.031	J/R	

GC/MS Continuing Calibration - The continuing calibrations exhibited acceptable %D and RRF values except the following.

CCAL Date	Compound	%D/RRF	Qualifier	Affected Samples
11/27/06	Chloromethane	23% D	J/UJ	1-6
	Chloroethane	41% D	J/UJ	
	Acrolein	RRF 0.045/101%	None	Qualified due to ICAL
	Iodomethane	29% D	J/UJ	1-6
	Isobutanol	RRF 0.031	None	Qualified due to ICAL

Internal Standard (IS) Area Performance - All internal standards met response and retention time (RT) criteria. No qualifications were required.

Field Duplicates - Field duplicate results are summarized below.

Compound	42TW01 ug/L	42TW01D ug/L	RPD	Qualifier
None	ND	ND	-	-

ENVIRONMENTAL
Data Services, Inc.

SEMIVOLATILE ORGANIC COMPOUNDS

USEPA Region II - Level IV Review

Site: RCRA Facility Investigation, CTO-121, Ceiba, PR SDG #: NAPR 22012-3

Client: CH2M HILL, Inc./Baker Environmental, Inc. Date: January 10, 2007

Laboratory: Severn Trent Laboratories, Savannah, GA Reviewer: Christine Garvey

EDS ID	Client Sample ID	Laboratory Sample ID	Matrix
1	42TW01	680-22012-47	Water
1 MS	42TW01 MS	680-22012-47 MS	Water
1 MSD	42TW01 MSD	680-22012-47 MSD	Water
2	42TW01D	680-22012-48	Water
3	42TW02	680-22060-35	Water
4	42TW03	680-22060-36	Water

The USEPA Region II SOP No. HW-22, Revision 2, June 2001: Validating Semivolatile Organic Compounds by SW-846 Method 8270C was used in evaluating the data in this summary report.

Sample Conditions/Problems - The Traffic Reports/Chain-of-Custody Records, Sampling Report and/or Laboratory Case Narrative did not indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data.

Holding Times - All samples were extracted within 7 days for water samples and analyzed within 40 days for all samples.

Surrogates - All samples exhibited acceptable surrogate recoveries.

MS/MSD - The MS/MSD sample exhibited acceptable %R and RPD values.

Laboratory Control Sample - The LCS sample(s) exhibited acceptable %R values.

Method Blank - The method blanks were free of contamination.

Field, Equipment Blank - Field QC results are summarized below.

Blank ID	Compound	Conc. ug/L	Action Level ug/kg	Qualifier	Affected Samples
2006ER04 (SDG 22060-3)	None	ND	-	-	-
2006FB01 (SDG 22060-3)	1,4-Dichlorobenzene	0.53	88	None	All ND
	Diethylphthalate	0.69	230	None	
2006FB02 (SDG 22060-3)	None	ND	-	-	-

GC/MS Instrument Performance Check - All of the DFTPP tunes in the initial and continuing calibrations met the percent relative abundance criteria.

Target Compound List (TCL) Analytes - The Form Is were present with the required header information. All mass spectral data were included and no discrepancies were identified.

Tentatively Identified Compounds (TIC) - TICs were not reported for the samples in this data package.

Compound Quantitation and Reported Detection Limits - No discrepancies were identified.

GC/MS Initial Calibration - The initial calibrations exhibited acceptable %RSD and mean RRF values with the exception of the following.

ICAL Date	Compound	%RSD/RRF	Qualifier	Affected Samples
11/24/06	a,a-Dimethylphenethylamine	30%	None	All ND
	1,3,5-Trinitrobenzene	23%	None	All ND
	4-Nitroquinoline-1-oxide	RRF 0.032	J/R	3, 4
	Methapyrilene	35%	None	All ND
11/21/06	2-Picoline	20%	None	All ND
	a,a-Dimethylphenethylamine	30%	None	
	Methapyrilene	17%	None	
	Aramite, total	21%	None	

GC/MS Continuing Calibration - The continuing calibrations exhibited acceptable %D and RRF values with the exception of the following.

CCAL Date	Compound	%D/RRF	Qualifier	Affected Samples
11/28/06 C0714	1,3,5-Trinitrobenzene	51% D	J/UJ	3
	4-Nitroquinoline-1-oxide	RRF 0.025	21%	Qualified due to ICAL
	Hexachlorophene	41% D	J/UJ	3
	Phorate	33% D	J/UJ	
	Dimethoate	20.3% D	J/UJ	
11/29/06 0638/0727/0813	1,4-Dioxane	31% D	J/UJ	4
	2,4-Dinitrophenol	22% D	J/UJ	
	0,0,0-Triethylphosphorothioate	25% D	J/UJ	
	Phorate	34% D	J/UJ	
	Dimethoate	23% D	J/UJ	
	a,a-Dimethylphenethylamine	26% D	J/UJ	
	4-Nitroquinoline-1-oxide	RRF 0.034	None	Qualified due to ICAL
11/28/06 0745/0818/0846	2-Picoline	28% D	J/UJ	1-2
	Methapyrilene	37% D	J/UJ	
	Aramite, total	36% D	J/UJ	
	Methyl parathion	29%	J/UJ	

Internal Standard (IS) Area Performance - All internal standards met response and retention time (RT) criteria.

Field Duplicates - Field duplicate results are summarized below.

Compound	42TW01 ug/L	42TW01D ug/L	RPD	Qualifier
None	ND	ND	-	-

ENVIRONMENTAL
Data Services, Inc.

POLYNUCLEAR AROMATIC HYDROCARBONS

USEPA Region II - Level IV Review

Site: RCRA Facility Investigation, CTO-121, Ceiba, PR SDG #: NAPR 22012-3

Client: CH2M HILL, Inc./Baker Environmental, Inc. Date: January 11, 2007

Laboratory: Severn Trent Laboratories, Savannah, GA Reviewer: Christine Garvey

EDS ID	Client Sample ID	Laboratory Sample ID	Matrix
1	42TW01	680-22012-47	Water
1 MS	42TW01 MS	680-22012-47 MS	Water
1 MSD	42TW01 MSD	680-22012-47 MSD	Water
2	42TW01D	680-22012-48	Water
3	42TW02	680-22060-35	Water
4	42TW03	680-22060-36	Water

The USEPA Region II SOP No. HW-22, Revision 2, June 2001: Validating Semivolatile Organic Compounds by SW-846 Method 8270C was used in evaluating the data in this summary report.

Sample Conditions/Problems - The Traffic Reports/Chain-of-Custody Records, Sampling Report and/or Laboratory Case Narrative did not indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data.

Holding Times - All samples were extracted within 7 days for water samples and analyzed within 40 days for all samples.

Surrogates - All samples exhibited acceptable surrogate recoveries.

MS/MSD - The MS/MSD samples exhibited acceptable %R and RPD values.

Laboratory Control Sample - The LCS samples exhibited acceptable %R values.

Method Blank - The method blanks exhibited the following contamination.

Blank ID	Compound	Conc. ug/L	Action Level ug/L	Qualifier	Affected Samples
680-60424/7-AA	Benzo (a) anthracene	0.036	0. 18	None	All ND
	Fluoranthene	0.020	0.10	None	

Field, Equipment Blank - Field QC results are summarized below.

Blank ID	Compound	Conc. ug/L	Action Level ug/L	Qualifier	Affected Samples
2006ER04 (SDG 22060-3)	None	ND	-	-	-
2006FB01 (SDG 22060-3)	None	ND	-	-	-
2006FB02 (SDG 22060-3)	Fluoranthene	0.080	0.40	None	All ND

GC/MS Instrument Performance Check - All of the DFTPP tunes in the initial and continuing calibrations met the percent relative abundance criteria.

Target Compound List (TCL) Analytes - The Form Is were present with the required header information. All mass spectral data were included and no discrepancies were identified.

Tentatively Identified Compounds (TIC) - TICs were not reported for the samples in this data package.

Compound Quantitation and Reported Detection Limits - No discrepancies were identified.

GC/MS Initial Calibration - The initial calibrations exhibited acceptable %RSD and mean RRF values.

GC/MS Continuing Calibration - The continuing calibrations exhibited acceptable %D and RRF values.

Internal Standard (IS) Area Performance - All internal standards met response and retention time (RT) criteria.

Field Duplicates - Field duplicate results are summarized below.

Compound	42TW01 ug/L	42TW01D ug/L	RPD	Qualifier
None	ND	ND	-	-

ENVIRONMENTAL
Data Services, Inc.

PCBs
USEPA Region II - Level IV Review

Site: RCRA Facility Investigation, CTO-121, Ceiba, PR SDG #: NAPR 22012-3

Client: CH2M HILL, Inc./Baker Environmental, Inc. Date: January 11, 2007

Laboratory: Severn Trent Laboratories, Savannah, GA Reviewer: Christine Garvey

EDS ID	Client Sample ID	Laboratory Sample ID	Matrix
1	42TW01	680-22012-47	Water
1 MS	42TW01 MS	680-22012-47 MS	Water
1 MSD	42TW01 MSD	680-22012-47 MSD	Water
2	42TW01D	680-22012-48	Water
3	42TW02	680-22060-35	Water
4	42TW03	680-22060-36	Water

The USEPA Region II SOP No. HW-23, Revision 0, April 1995: Validating Pesticide/PCB Compounds by SW-846 Method 8080A and SOP No. HW-23B, Revision 1.0, May 2002, were used in evaluating the data in this summary report.

Sample Conditions/Problems - The Traffic Reports/Chain-of-Custody Records, Sampling Report and/or Laboratory Case Narrative did not indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data.

Holding Times - All samples were extracted within 7 days for water samples and analyzed within 40 days.

Surrogates - All samples exhibited acceptable surrogate recoveries except the following.

Sample ID	Surrogate	%R	Qualifier
3	DCB1	12%	J/UJ
4	DCB1	9%	J/R

MS/MSD - The MS/MSD samples exhibited acceptable %R and RPD values.

Laboratory Control Sample - The LCS sample(s) exhibited acceptable %R values.

Method Blank - The method blanks were free of contamination.

Field, Equipment Blank - Field QC results are summarized below.

Blank ID	Compound	Conc. ug/L	Action Level ug/L	Qualifier	Affected Samples
2006ER04 (SDG 22060-3)	None	ND	-	-	-
2006FB01 (SDG 22060-3)	None	ND	-	-	-
2006FB02 (SDG 22060-3)	None	ND	-	-	-

Initial Calibration - The initial calibrations exhibited acceptable %RSD values.

Continuing Calibration - The continuing calibrations exhibited acceptable %D values.

Breakdown - All performance evaluation standards exhibited acceptable breakdown levels.

Analytical Sequence Check - No discrepancies were identified.

Compound Identification - Retention times were acceptable and no further action was taken.

Target Compound List (TCL) Analytes - The Form Is were present with the required header information. All pesticide chromatographic data were included and no discrepancies were identified.

Compound Quantitation - No discrepancies were identified.

Field Duplicates - Field duplicate results are summarized below.

Compound	42TW01 ug/L	42TW01D ug/L	RPD	Qualifier
None	ND	ND	-	-

ENVIRONMENTAL
Data Services, Inc.

METALS

USEPA Region II - Level IV Review

Site: RCRA Facility Investigation, CTO-121, Ceiba, PR SDG #: NAPR 22012-3

Client: CH2M Hill, Inc.,/Baker Environmental, Inc. Date: January 11, 2007

Laboratory: Severn Trent Laboratories, Savannah, GA Reviewer: Christine Garvey

EDS ID	Client Sample ID	Laboratory Sample ID	Matrix
1	42TW01	680-22012-47	Water
1 MS	42TW01 MS	680-22012-47 MS	Water
1 MSD	42TW01 MSD	680-22012-47 MSD	Water
1F	42TW01F	680-22012-47F	Water
1F MS	42TW01F MS	680-22012-47F MS	Water
1F MSD	42TW01F MSD	680-22012-47F MSD	Water
2	42TW01D	680-22012-48	Water
2 F	42TW01D F	680-22012-48 F	Water
3	42TW02	680-22060-35	Water
3 F	42TW02 F	680-22060-35 F	Water
4	42TW03	680-22060-36	Water
4 F	42TW03 F	680-22060-36 F	Water

The USEPA Region II SOP No. HW-2, Revision 13, September 2005 for Evaluation of Metals Data for the Contract Laboratory Program was used in evaluating the data in this summary report.

Sample Conditions/Problems - The Traffic Reports/Chain-of-Custody Records, Sampling Report and/or Laboratory Case Narrative did not indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data.

Holding Times - All samples were prepared and analyzed within 28 days for mercury and 180 days for all other metals.

Calibration - The ICV and CCV %R values were acceptable.

CRDL Standard - The CRDL standards exhibited acceptable %R values except those noted below. The associated samples were qualified as indicated.

Compound	%R - High/Low	Qualifier	Affected Samples
CCB1 Tin 11/25	60% - Low	J/UJ	1-4
CCB 2 Tin 12/5-12/06/06	60% - Low	J/UJ	1-4F
CCB1 Mercury 11/28-11/29/06	145% - High	J	2

Method and Calibration Blanks - The method blanks and continuing calibration blanks exhibited contamination for several compounds, however, all sample results are non-detect or greater than 5X the blank concentration with the exception of the following:

Compound	Conc.	Action Level	Qualifier	Affected Samples
Barium PBW-1	1.2555	1.2555	None	All > CRDL
Barium PBW-2	1.1905 J	1.1905	None	All >CRDL
Nickel PBW-1	0.2173 J	0.2173	U	1-4 total
Thallium 11/25	0.059 J	0.059	U	2
Thallium 12/05-12/06	0.064 J	0.064	U	2F, 3F

ICP Interference Check Sample - All %R values were acceptable except the following.

Compound	%R	Qualifier	Affected Samples
Zinc	125%	J	1-4
Cadmium	77%/78%	None	All ND
Silver	77%/75%	None	
Zinc	OK/129%	J	1F-4F

Matrix Spike/Matrix Spike Duplicate - The matrix spike/matrix spike duplicate samples exhibited acceptable %R values and RPD values.

Field Duplicates - Field duplicate results are summarized below.

Compound	42TW01 ug/L	42TW01D ug/L	RPD or difference	Qualifier
Barium	40	39	3%	None
Chromium	10 U	2.2 J	NC	
Cobalt	0.69 J	1.1 J	0.41	
Mercury	0.20 U	0.17 J	NC	
Vanadium	6.5 J	4.8 J	1. 7	
Zinc	6.2	12	5.8	

Compound	42TW01F ug/L	42TW01D F ug/L	RPD or difference	Qualifier
Arsenic	10	0.62 J	NC	None
Barium	39	36	8%	
Cobalt	0.77 J	1.2 J	0.43	

Compound	42TW01F ug/L	42TW01D F ug/L	RPD or difference	Qualifier
Copper	0.41 J	0.76 J	0.35	None
Nickel	0.80 J	0.50 J	0.30	
Zinc	4.3 J	6.5 J	2.2	

LCS - The LCS samples exhibited acceptable %R values.

ICP Serial Dilution - The ICP serial dilution sample exhibited acceptable %D values except the following.

ICP Sample ID	Compound	%D	Qualifier	Affected Samples
Reference 1 total	Cobalt	13%	J	1-4 total

Total versus dissolved metal - All criteria were met.

Field and Equipment Blank - Field QC results are summarized below.

Blank ID	Compound	Conc. ug/L	Action Level ug/L	Qualifier	Affected Samples
2006ER04 (SDG 22060-3)	Nickel	0.19 J	None	None	<CRDL
2006FB01 (SDG 22060-3)	None	ND	-	-	-
2006FB02 (SDG 22060-3)	Copper	79	790	U/J/R	1-4 total
	Lead	0.69 J	None	None	<CRDL

Compound Quantitation - EDS ID #3 was analyzed at a 5X dilution for total mercury due to low post digestion spike result.

APPENDIX D
PRELIMINARY HUMAN HEALTH RISK CALCULATIONS

TABLE D-1
SUMMARY OF EXPOSURE PARAMETERS
SWMU 42
RCRA FACILITY INVESTIGATION
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Parameter	Units	Future Adult Trespassers		Future Adolescent Trespassers		Future Adult On-Site Workers	
		RME	CT	RME	CT	RME	CT
Sediment							
Ingestion Rate of Sediment (IR-S)	mg/day	100 USEPA, 1993	--	100 USEPA, 1993	--	100 USEPA, 1997	--
Fraction Ingested from Source (Fi)	NA	1 Prof Judge	--	1 Prof Judge	--	1 Prof Judge	--
Exposure Frequency (EF)	days/year	52 Prof Judge	--	52 Prof Judge	--	250 USEPA, 1991	--
Exposure Duration (ED)	years	24 USEPA, 1991	--	9 USEPA, 1991	--	25 USEPA, 2004	--
Surface Area Available for Contact (SA)	cm2/day	5,700 USEPA, 1997	--	3,200 USEPA, 1997	--	5,700 USEPA, 1997	--
Conversion Factor (CF)	kg/mg	1.00E-06 USEPA, 1989	--	1.00E-06 USEPA, 1989	--	1.00E-06 USEPA, 1989	--
Averaging Time (Non-Cancer) (AT-N)	days	8,760 USEPA, 1989	--	3,285 USEPA, 1989	--	9,125 USEPA, 1989	--
Other Parameters							
Body Weight (BW)	kg	70 USEPA, 1997	--	45 USEPA, 1997	--	70 USEPA, 1997	--
Soil to Skin Adherence Factor (AF)	mg/cm2	0.07 USEPA, 1997	--	0.2 USEPA, 1997	--	0.2 USEPA, 1997	--
Averaging Time (Cancer) (AT-C)	days	25,550 USEPA, 1989	--	25,550 USEPA, 1989	--	25,550 USEPA, 1989	--

Notes:

RME - Reasonalble Maximum Exposure
CT - Central Tendency

ABS - Absorption Factors
USEPA, 2004: Risk Assessment Guidance for Superfund Vol 1, Human Health Evaluation Manual
(Part E, Supplemental Guidance for Dermal Risk Assessment). EPA/540/R-99/005.
The following USEPA Region III default absorbance factors will be applied in the absence of reference values fron
USEPA, 2001 to estimate dermal intake of COPCs in soil and sediment (USEPA, 1995):
0.05% and 3.0% - VOAs (chemical specific)
1.0% - Inorganics
3.0% - Dioxins / Furans
3.2% - Arsenic
14% - PCBs
10% - SVOAs, Pesticides, Explosives, Herbicides, TPH
13% - PAHs

Prof Judge - Professional Judgmen

Cowherd, et al., 1995: Rapid Assessment of Exposure to Particulate Emissions from Surface Contamination. OHEA. EPA/600/8-85/002
USEPA, 1989. Risk Assessment Guidance for Superfund, Volume I - Human Health Evaluation Manual (Part A) Interim Fina
USEPA, 1991. Risk Assessment Guidance for Superfund, Volume I - Human Health Evaluation Manual Supplemental Gudiance "Standard Default Exposure Factors."
USEPA, 1997. Exposure Factors Handbook. Vol. 1: General Factors. ORD. EPA/600/P-95/002Fa.

TABLE D-2
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
SWMU 42
RCRA FACILITY INVESTIGATION
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Scenario Timeframe: Future
Receptor Population: Industrial Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Sediment	Sediment	Sediment	Acrolein	--	--	--	--	--	(o) Whole Body, (i) RsS	0.0004	--	2.5E-06	0.0004
			Arsenic	1.6E-06	--	5.6E-07	--	2.18E-06	(o) Skin / CVS	0.01	--	0.003	0.01
			Copper	--	--	--	--	--	(o) GIS	0.02	--	0.002	0.02
			Vanadium	--	--	--	--	--	(o) GIS / Kidney	0.12	--	0.51	0.63
			Chemical Total	1.6E-06	--	5.6E-07		2.18E-06		0.15	--	0.52	0.67
		Exposure Point Total						2.18E-06					0.67
	Exposure Medium Total							2.18E-06					0.67
Sediment Total								**2.18E-06**					**0.67**
Industrial Workers Total								**2.18E-06**					**0.67**

Notes:
Target Organ Abbreviations:
CVS = Cardiovascular System
GIS = Gastrointestinal System
RsS = Respiratory System

(o) Oral exposure
(i) Inhalation exposure

Total Risk Across Sediment	2.2E-06
Total Risk Across All Media and All Exposure Routes	2.2E-06

Total Hazard Index Across Sediment	0.67
Total Hazard Index Across All Media and All Exposure Routes	0.67

Oral and Dermal Exposure Routes:

Oral / Dermal Gastrointestinal System HI =	0.65
Oral / Dermal Cardiovascular System HI =	0.01
Oral / Dermal Skin HI =	0.01
Oral / Dermal Kidney HI =	0.63

Ingestion Pathway Intake:
CDI (mg/kg-day) = C x IR x CF x Fi x EF x ED x 1/BW x 1/AT

Dermal Pathway Intake:
CDI (mg/kg-day) = C x CF x SA x AF x ABS x EF x ED x 1/BW x1/AT

Carcinogenic Risk =
ILCR = ∑CDI*CSF

Noncarcinogenic Risk =
HQ = ∑CDI/RfD

TABLE D-3
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
SWMU 42
RCRA FACILITY INVESTIGATION
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Scenario Timeframe: Future
Receptor Population: Trespassers
Receptor Age: Adolescent

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Sediment	Sediment	Sediment	Acrolein	--	--	--	--	--	(o) Whole Body, (i) RsS	0.0001	--	4.5E-07	0.0001
			Arsenic	1.9E-07	--	3.6E-08	--	2.26E-07	(o) Skin / CVS	0.003	--	0.0006	0.004
			Copper	--	--	--	--	--	(o) GIS	0.006	--	0.0004	0.01
			Vanadium	--	--	--	--	--	(o) GIS / Kidney	0.04	--	0.09	0.13
			Chemical Total	1.9E-07	--	3.6E-08		2.26E-07		0.05	--	0.09	0.14
		Exposure Point Total						2.26E-07					0.14
	Exposure Medium Total							2.26E-07					0.14
Sediment Total								**2.26E-07**					**0.14**
Adolescent Trespassers Total								**2.26E-07**					**0.14**

Notes:
Target Organ Abbreviations:
CVS = Cardiovascular System
GIS = Gastrointestinal System
RsS = Respiratory System

(o) Oral exposure
(i) Inhalation exposure

Total Risk Across Sediment	2.3E-07
Total Risk Across All Media and All Exposure Routes	2.3E-07

Total Hazard Index Across Sediment	0.14
Total Hazard Index Across All Media and All Exposure Routes	0.14

Oral and Dermal Exposure Routes:

Oral / Dermal Gastrointestinal System HI =	0.14
Oral / Dermal Cardiovascular System HI =	0.004
Oral / Dermal Skin HI =	0.004
Oral / Dermal Kidney HI =	0.13

Ingestion Pathway Intake:
CDI (mg/kg-day) = C x IR x CF x Fi x EF x ED x 1/BW x 1/AT

Dermal Pathway Intake:
CDI (mg/kg-day) = C x CF x SA x AF x ABS x EF x ED x 1/BW x1/AT

Carcinogenic Risk =
ILCR = ∑CDI*CSF

Noncarcinogenic Risk =
HQ = ∑CDI/RfD

TABLE D-4
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
SWMU 42
RCRA FACILITY INVESTIGATION
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

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

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Sediment	Sediment	Sediment	Acrolein	--	--	--	--	--	(o) Whole Body, (i) RsS	0.0001	--	1.8E-07	0.0001
			Arsenic	3.2E-07	--	3.9E-08	--	3.63E-07	(o) Skin / CVS	0.002	--	0.0003	0.002
			Copper	--	--	--	--	--	(o) GIS	0.004	--	0.0002	0.004
			Vanadium	--	--	--	--	--	(o) GIS / Kidney	0.02	--	0.04	0.06
			Chemical Total	3.2E-07	--	3.9E-08		3.63E-07		0.03	--	0.04	0.07
		Exposure Point Total						3.63E-07					0.07
	Exposure Medium Total							3.63E-07					0.07
Sediment Total								**3.63E-07**					**0.07**
Adult Trespassers Total								**3.63E-07**					**0.07**

Notes:
Target Organ Abbreviations:
CVS = Cardiovascular System
GIS = Gastrointestinal System
RsS = Respiratory System

(o) Oral exposure
(i) Inhalation exposure

Total Risk Across Sediment	3.6E-07
Total Risk Across All Media and All Exposure Routes	3.6E-07

Total Hazard Index Across Sediment	0.07
Total Hazard Index Across All Media and All Exposure Routes	0.07

Oral and Dermal Exposure Routes:

Oral / Dermal Gastrointestinal System HI =	0.07
Oral / Dermal Cardiovascular System HI =	0.002
Oral / Dermal Skin HI =	0.002
Oral / Dermal Kidney HI =	0.06

Ingestion Pathway Intake:
CDI (mg/kg-day) = C x IR x CF x Fi x EF x ED x 1/BW x 1/AT

Dermal Pathway Intake:
CDI (mg/kg-day) = C x CF x SA x AF x ABS x EF x ED x 1/BW x1/AT

Carcinogenic Risk =
ILCR = ∑CDI*CSF

Noncarcinogenic Risk =
HQ = ∑CDI/RfD