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FINAL PHASE I RCRA FACILITY INVESTIGATION REPORT SWMU 67 – FORMER GAS STATION

For NAVAL ACTIVITY PUERTO RICO
EPA I.D. No. PR2170027203
CEIBA, PUERTO RICO

Prepared for:

Department of the Navy
NAVFAC SOUTHEAST
North Charleston, South Carolina

Prepared by:

Baker

Michael Baker Jr., Inc.
Moon Township, PA

Contract No. N62470-10-D-3000
DO JM01

June 2, 2011

IQC for A/E Services for Multi-Media Environmental Compliance Engineering Support

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DELIVERY ORDER JM01

Prepared by:

MICHAEL BAKER JR., INC.
Moon Township, Pennsylvania

I certify under penalty of law that I have examined and am familiar with the information submitted in this document and all attachments and that this document and its attachments were prepared either by me personally or under my direction or supervision in a manner designed to ensure that qualified and knowledgeable personnel properly gather and present the information contained therein. I further certify, based on my personal knowledge or on my inquiry of those individuals immediately responsible for obtaining the information, that the information is true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowingly and willfully submitting a materially false statement.

Signature: Mark E. Davidson

Name: **Mark E. Davidson**

Title: **BRAC Env. Coordinator**

Date: **June 2, 2011**

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LIST OF ACRONYMS AND ABBREVIATIONS

AET	Apparent Effects Threshold
AFWTF	Atlantic Fleet Weapons Training
APA	Aerial Photography Analysis
Baker	Michael Baker Jr., Inc.
bgs	below ground surface
BRAC	Base Realignment and Closure
CADD	Computer Aided Design and Drafting
CCC	Continuous Criteria Concentration
CCME	Canadian Council of Ministers of the Environment
CERCLA	Comprehensive Environmental Response, Compensation, and Liabilities Act
CERFA	Community Environmental Response Facilitation Act
CMC	Criteria Maximum Concentration
CRQL	Contract Required Quantitation Limit
CSF	Cancer Slope Factors
DGPS	Differential Global Positioning System
DI	Deionized
DMMP	Dredged Material Management Program
DO	Delivery Order
DPT	Direct Push Technology
DRO	Diesel Range Organics
EC_{50}	Median Effective Concentration
ECP	Environmental Condition of Property
ECO-SSL	Ecological Soil Screening Level
EPA	Environmental Protection Agency
EqP	Equilibrium Partitioning
ER-L	Effects Range- Low
ER-M	Effects Range- Median
F	Fahrenheit
FCV	Final Chronic Values
f_{oc}	fraction of organic carbon
GIS	Geographic Information System
GPS	Global Positioning System
GRO	Gasoline Range Organics
HQ	Hazard Quotient
HSA	Hollow-Stem Auger
IAS	Initial Assessment Study
IDW	Investigation-Derived Waste
ILCR	Incremental Lifetime Cancer Risk
ISQG	Interim Sediment Quality Guidelines
IUR	Inhalation Unit Risk

LIST OF ACRONYMS AND ABBREVIATIONS

kg	kilograms
LANTDIV	Naval Facilities Engineering Command, Atlantic Division
LC_{50}	Median Lethal Concentration
LCL	Lower Confidence Limit
LEL	Lowest Effect Level
LLPAH	Low-Level Polynuclear Aromatic Hydrocarbon
LNAPL	Light Non-Aqueous Phase Liquids
LOEC	Lowest Observed Effect Concentration
LOEL	Lowest Observable Effect Levels
MATC	Maximum Acceptable Toxicant Concentration
MC	Macro-Core®
MCL	Maximum Contaminant Level
MGD	Million Gallons per Day
MHSPE	Ministry of Housing, Spatial Planning and Environment
MS/MSD	Matrix Spike/Matrix Spike Duplicate
NAD	North American Datum
NAPR	Naval Activity Puerto Rico
NAVFAC	Naval Facilities Engineering Command
NEESA	Naval Energy and Environmental Support Activity
NOAA	National Oceanic and Atmospheric Administration
NOEC	No Observed Effect Concentration
NOEL	No Observed Effect Level
NRWQC	National Recommended Water Quality Criteria
NSRR	Naval Station Roosevelt Roads
OEPA	Ohio Environmental Protection Agency
PEC	Probable Effect Concentration
PEL	Probable Effect Level
PI	Photo Identified
PID	Photoionization Detector
PMO	Program Management Office
PREQB	Puerto Rico Environmental Quality Board
PRWQS	Puerto Rico Water Quality Standard
PRWQSR	Puerto Rico Water Quality Standard Regulation
PSQG	Provincial Sediment Quality Guidelines
QA/QC	Quality Assurance/Quality Control
RAGS	Risk Assessment Guidance for Superfund
RBC	Risk-Based Concentration
RCRA	Resource Conservation and Recovery Act
RfC	Reference Concentration
RfD	Reference Dose
RFI	RCRA Facility Investigation
RTK	Real-Time Kinematic
RWEC, Inc.	Right Way Environmental Contractors, Inc.

LIST OF ACRONYMS AND ABBREVIATIONS

SCV	Secondary Chronic Value
SDG	Sample Delivery Group
SE	Southeast
SL	Screening Level
SOP	Standard Operating Procedure
SQG	Sediment Quality Guidelines
SQAG	Sediment Quality Assessment Guidelines
SQUIRT	Screening Quick Reference Tables
SVOC	Semi-Volatile Organic Compound
SWMU	Solid Waste Management Unit
TCLP	Toxicity Characteristic Leaching Procedure
TEC	Threshold Effect Concentration
TEL	Threshold Effect Level
TOC	Total Organic Carbon
TPH	Total Petroleum Hydrocarbons
USACE	United States Army Corps of Engineers
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
VOC	Volatile Organic Compound

1.0 INTRODUCTION

This document presents the results of the Phase I Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) for Solid Waste Management Unit (SWMU) 67 (Former Gas Station) at Naval Activity Puerto Rico, Ceiba, Puerto Rico. This report has been prepared by Michael Baker Jr., Inc. (Baker), for the Navy Base Realignment and Closure (BRAC) Program Management Office (PMO) Southeast (SE) office under contract with the Naval Facilities Engineering Command (NAVFAC), SE (Contract Number N62470-10-D-3000, Delivery Order [DO] JM01).

In anticipation of operational closure of Naval Station Roosevelt Roads (NSRR), currently designated as Naval Activity Puerto Rico (NAPR), the Naval Facilities Engineering Command, Atlantic Division (LANTDIV) prepared Phase I/Phase II Environmental Condition of Property (ECP) Reports to document the environmental condition of NSRR (LANTDIV, 2005). Section 8132 of the Fiscal Year 2004 Defense Appropriations Act, signed into law on September 30, 2003, directed that NSRR be disestablished within six months, and that the real estate disposal/transfer be carried out in accordance with procedures contained in the BRAC Act of 1990. This legislation requires that base closure be conducted in accordance with the Comprehensive Environmental Response Compensation and Liability Act (CERCLA), as amended by the Community Environmental Response Facilitation Act (CERFA).

The United States Environmental Protection Agency (USEPA) issued a RCRA § 7003 Administrative Order on Consent (Environmental Protection Agency [EPA] Docket No. RCRA-02-2007-7301 [USEPA, 2007]), identifying SWMU 67 (formerly referred to as ECP Site 13) as having documented releases of solid and/or hazardous waste and hazardous constituents, and required the submittal to the USEPA for their approval an acceptable work plan to complete the equivalent of a Phase I RFI investigation. The Final Phase I RFI Work Plan (Baker, 2007) was approved by USEPA on December 20, 2007. This Phase I RFI Report presents the results of the Phase I RFI field investigation conducted during March 2010.

1.1 Purpose of Report

A Phase I RFI is required as outlined in the NAPR RCRA § 7003 Administrative Order on Consent (USEPA, 2007). The RCRA Order provides for the development of a work plan, field investigation, and reporting on the findings of the investigation with recommendations of follow-up actions necessary to ensure protection of human health and the environment. This report has been prepared to document the findings of the March 2010 Phase I RFI field investigation for SWMU 67 and serves as the basis for determining the nature of impacts from the potential release of hazardous constituents at the site.

1.2 Objectives

The objectives of the SWMU 67 RFI are to:

- Further Characterize impacts to the environment through the collection and analyses of soil and groundwater samples as described in the approved 2007 RFI Work Plan (Baker, 2007);

- Perform a surface and subsurface soil sampling program to further characterize and delineate volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs) with low level Low-Level Polynuclear Aromatic Hydrocarbon (LLPAHs),

total petroleum hydrocarbons (TPH) diesel range organics (DRO) and gasoline range organics (GRO) detected during the Phase II ECP investigation;

- Perform a groundwater sampling program to further characterize VOCs, and TPH DRO/GRO, detected during the Phase II ECP investigation;
- Screen for and document potential human health risks posed by the site; and
- Screen for and document potential ecological risks posed by the site.

Specific elements of the 2010 field effort performed to support this RFI include:

- Eight surface soil samples collected from eight boring locations and two surface soil samples collected from within an earthen drainage feature;
- Sixteen subsurface soil samples collected from the eight boring locations;
- Eight groundwater samples collected from eight newly installed permanent monitoring wells;
- Four sediment samples collected from the adjacent estuarine wetland community;
- One sediment sample collected from the adjacent freshwater wetland community; and
- One surface water sample collected from a small pool associated with a culvert outlet, which provides a hydrologic source to the adjacent wetland community.

1.3 Organization of the Phase I RFI Report

This report is organized into eight sections. Section 1.0 of this document discusses the purpose and objectives of this RFI. Section 2.0 presents a brief summary of the background of NAPR and the history and previous investigations at SWMU 67. Section 3.0 discusses the climatology, topography and regional geology, hydrology and hydrogeology for NAPR. The scope of the field investigation is provided in Section 4.0. Section 5.0 presents and discusses the physical characteristics of the study area observed during this Phase I RFI investigation including the site geology and hydrogeology. Section 6.0 presents the laboratory analytical results performed on the environmental samples and quality assurance/quality control (QA/QC) samples collected during the Phase I RFI with a comparison to appropriate human health and ecological screening values and background values. Section 7.0 presents the conclusions and recommendations derived from the RFI and Section 8.0 lists report references.

2.0 SITE BACKGROUND

This section provides the history and description of current conditions at NAPR and SWMU 67. This section also includes a summary of the results of previous investigations conducted at SWMU 67.

2.1 NAPR Description and History

NAPR occupies over 8,800 acres on the northern side of the east coast of Puerto Rico; along Vieques Passage with Vieques Island lying to the east about 10 miles off the harbor entrance (see Figure 2-1). NAPR also occupies the immediately adjacent islands of Piñeros and Cabeza de Perro, as presented on Figure 2-2. 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 (see Figure 2-1).

The facility was commissioned in 1943 as a Naval Operations Base, and re-designated as a Naval Station in 1957. NSRR operated as a Naval Station from 1957 until March 31, 2004. NSRR was one of the largest naval facilities in the world with more than 100 miles of paved roads, approximately 1,300 buildings, a large scale airfield (Ofstie Field), a deep water port and over 30 tenant commands. NSRR played a major role in providing communication support to the Atlantic and Caribbean areas and also served as a major training site for fleet exercises.

Section 8132 of Fiscal Year 2004 Defense Appropriations Act, signed into law on September 30, 2003, directed that NSRR be disestablished within 6 months, and that the real estate disposal/transfer be carried out in accordance with procedures contained in the BRAC Act of 1990. This legislation required that the base closure be conducted in accordance with the CERCLA, as amended by the CERFA. NSRR has undergone operational closure as of March 31, 2004 and has been designated as NAPR. The 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. NAPR will continue until the real estate disposal/transfer is completed.

In anticipation of operational closure of NSRR, the LANTDIV prepared Phase I/Phase II ECP Reports to document the environmental condition of NSRR. The Draft Phase I Environmental Condition of Property Report dated March 31, 2004 (LANTDIV, 2004) identified new sites at NAPR based on the results of a review of records, an analysis of historic aerial photographs, physical site inspections, and interviews with persons familiar with past and current operations and activities. The new ECP sites had not been previously identified or investigated under existing environmental program areas. A Phase II ECP field investigation was performed in 2004 to conduct environmental sampling to determine if a release/disposal actually occurred at any of the Phase I ECP sites recommended for further evaluation in the Phase I ECP and, if so, whether any potential risk to human health was present. The Final Phase I/II Environmental Condition of Property Report recommended additional sampling (to be undertaken as part of the RCRA Program) at several sites to permit a more detailed assessment (LANTDIV, 2005).

The final ECP report recommended completion of RCRA facility investigation of SWMU 67, which was the basis for the Phase I RFI and this report.

2.2 SWMU 67 Description and History

SWMU 67 is approximately 2.5 acres in size and located south of the airfield on the east side of Langley Drive near its intersection with Munda Street. The Offsite Tennis Courts (two courts) lie within the SWMU boundary. The terrain is predominantly level with secondary growth vegetation east of Langley Drive and beyond the tennis courts.

The Phase I ECP (see Section 2.3) identified a small building that was consistent with a gas station; although historical details were not available. A building foundation suspected to be the former gas station is located north of the tennis court (see Figure 2-3). The building foundation includes a garage pit (garage grease pit) approximately six feet below ground surface (bgs). An approximate eight inch drainage pipe is located near the bottom of the north end of the pit. The drainage pipe appears to extend toward the north and is suspected to outfall near the head waters of drainage to the forested estuarine wetland resource (see Section 5.1); although the outfall was not identified. There was no evidence of fuel storage tank(s).

A detailed description of the current site conditions is described later in Section 5.1.

2.3 Previous Investigations

A Phase I ECP was performed to document the environmental condition of NSRR prior to the March 31, 2004 closure and subsequent real estate disposal/transfer actions (LANTDIV, 2004). SWMU 67 was identified and recommended for further evaluation during the Phase I ECP. The aerial photography analysis (APA), presented within the Phase I ECP Report, identified this area as photo identified (PI) Site 18 based on the identification of a small building that could potentially be consistent with a gas station on the 1958 aerial photograph (shown on Figure 2-3). The Phase I ECP records review (historic maps, aerial photograph analysis, interviews, and physical site inspections) confirmed that the structure was a gas station but records were not available regarding history details or location of fuel storage tank(s).

The Phase II ECP investigation for SWMU 67 was conducted in May 2004 to determine whether or not the environment had been impacted by past operations at NAPR (LANTDIV, 2005). During the Phase II ECP investigation, the concrete pad and building foundation were observed north of the tennis courts within the secondary growth vegetation. A down-gradient storm water drainage swale (i.e., the 1958 drainage feature with flow direction shown on Figure 2-3) was observed north of the building structure.

Field activities performed during the Phase II ECP investigation included:

- Three soil borings (13E-SB01 through 13E-SB03) advanced and three subsurface soil samples (13E-SB01-04, 13E-SB02-05, and 13E-SB03-05) collected for analysis of Appendix IX VOCs, SVOCs, metals and TPH DRO and GRO.

- Two temporary monitoring wells (13E-SB02 and 13E-SB03) installed and groundwater samples collected for analysis of Appendix IX VOCs, SVOCs, dissolved inorganics, and TPH DRO and GRO.

Analytical data from the Final Phase I/II ECP Report are presented in Appendix A (Tables 5-45 through 5-48), including comparisons to human health screening criteria used at that time. The tables also include comparison to the applicable facility background levels for metals utilized at that time.

Three VOCs, three SVOCs and TPH DRO were detected at low, estimated concentrations in the subsurface soil samples. Twelve inorganic compounds were also detected in the subsurface soil. Groundwater results indicated that two VOCs and both TPH DRO and GRO were present in fairly low concentrations. Six inorganic compounds were also detected in the groundwater samples. Similar concentrations of most compounds were reported for both samples.

Dibenzo(a,h)anthracene was found in soil at a concentration exceeding the USEPA Region III Residential Risk Based concentration (RBC) at location 13E-SB01. Arsenic at 13E-SB02 and chromium at 13E-SB03 exceeded their USEPA Region III Residential RBCs. Vanadium concentrations in soil at all locations exceeded their USEPA Region III Residential RBCs. However, none of these metals was found in excess of twice the average detected background concentrations that were used for screening purposes for soil at NAPR during the ECP. Mercury and vanadium were also detected in groundwater exceeding their USEPA Region III Tap Water RBCs. The report stated that high naturally occurring vanadium in soil had likely contributed to the reported vanadium concentrations in groundwater.

Based on the results of the Phase II ECP Investigation, it was concluded that this site had been impacted by previous activities at NAPR.

3.0 PHYSICAL CHARACTERISTICS OF STUDY AREA

The physical setting of NAPR was documented in the 1984 Initial Assessment Study (IAS) (Naval Energy and Environmental Support Activity [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 present the description of the geologic, hydrologic, and hydrogeologic conditions across NAPR. These are generally applicable, but may or may not be specifically-applicable, to the SWMU 67 area. Site specific geologic, hydrologic, and hydrogeologic information can be referenced in sections 5.2.1 and 5.2.2.

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 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 the 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 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.

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.

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. 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 water 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 Regional Hydrogeology

In 2004, Baker conducted a Phase II ECP investigation involving 20 sites throughout NAPR (NAVFAC Atlantic, 2005). Some consistent stratigraphic trends were observed during the ECP, which is discussed in this subsection. 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 the 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.

4.0 PHASE I RCRA FACILITY INVESTIGATION ACTIVITIES

This section summarizes the Phase I RFI field work, analytical, and data validation activities that were associated with the March 2010 field investigation. Field activities performed to support this RFI included:

- Eight surface soil samples collected from eight boring locations and two surface soil samples collected from within an earthen drainage feature;
- Sixteen subsurface soil samples collected from the eight boring locations;
- Eight groundwater samples collected from eight newly installed permanent monitoring wells;
- Five sediment samples were collected. Four sediment samples were collected from the adjacent estuarine wetland, and one sediment sample was collected from the adjacent freshwater wetland ; and
- One surface water sample collected from a small pool associated with a culvert outlet, which provides a hydrologic source to the adjacent wetland community.

The investigation was generally conducted in accordance with the Final Phase I RCRA RFI Work Plan for SWMU 67 (Baker, 2007). Deviations from the Work Plan are described within the appropriate subsequent section(s). The sampling program proposed in the approved work plan was implemented in order to further characterize and delineate the site based on the results of the Phase I/II ECP investigations. Refer to Figure 4-1 for surface soil sample, freshwater and estuarine sediment sample, fresh surface water sample, soil boring and monitoring well locations.

The environmental and QA/QC samples collected from the site were analyzed at a fixed-base laboratory (see Section 4.12) and the data was validated by an independent third party (see Section 4.13). A summary matrix listing the primary environmental samples collected and the analyses conducted on each sample is shown in Table 4-1. Field duplicates and matrix spike/matrix spike duplicate (MS/MSD) samples and the analyses conducted on these samples are also shown in Table 4-1. Other QA/QC samples (trip blanks, field blanks, and equipment rinsates) and investigation-derived waste (IDW) samples collected and the analyses conducted on these samples are shown in Table 4-2. The list of analytical parameters under the analytical program and the Contract Required Quantitation Limits (CRQLs) are provided in Table 4-3.

Other field activities were conducted in support of the investigation of this site. These activities consisted of utility clearance, site clearing, surveying, decontamination, and management of investigation derived wastes and are discussed in Sections 4.7 through 4.10.

Field notes containing descriptions of the site activities, site photographs, soil boring and monitoring well construction logs, groundwater sampling forms, and chain-of-custody records are presented in Appendix B. Laboratory analytical results are presented in Appendix C and data validation report summaries are provided in Appendix D. Although not part of the original scope of work for the SWMU 67 Phase I RFI, a wetland delineation was performed as discussed in Section 4.5. The wetland delineation report is provided in Appendix E.

4.1 Surface Soil Sampling

Surface soil samples were collected from the eight soil boring locations (67SB01 through 67SB08) shown on Figure 4-1 as per the Work Plan. One field duplicate (67SB08-00D) was also collected. The surface soil samples associated with the soil boring locations were collected from a depth of 0 to 1 foot bgs using a 4-foot Geoprobe Macro-Core® (MC) Sampler and disposable, clear acetate liners. The MC Sampler was advanced using a track-mounted Direct Push Technology (DPT) rig (Geoprobe 6610 DT rig operated by GeoEnviroTech, Inc., of San Juan, Puerto Rico). In addition, based on reconnaissance and evaluation of SWMU 67, two surface soil samples (67SS01 and 67SS02) were collected from an earthen drainage feature located in the northwestern portion of the site. Surface soil samples 67SS01 and 67SS02 were collected from a depth of 0 to 1 foot bgs using disposable stainless steel spoons. Additional information regarding the earthen drainage feature can be referenced in Section 5.1.

All surface soil samples were transferred directly into pre-labeled, laboratory provided sample jars and placed on ice. The samples were shipped in coolers with chain-of-custody forms (provided in Appendix B) to the fixed-base analytical laboratory for analysis. All surface soil samples were analyzed for VOCs, SVOCs (with LLPAHs), TPH GRO/DRO, and metals as outlined in the Work Plan and on Table 4-1.

4.2 Subsurface Soil Sampling

Subsurface soil samples were collected from the soil boring locations shown on Figure 4-1. Table 4-4 summarizes the soil boring and monitoring well specifications. The soil borings and associated monitoring wells were installed at the locations proposed in the work plan with the exception of 67BS08 (soil boring and monitoring well). Due to refusal at the proposed location, soil boring and monitoring well 67SB08 was moved to a location approximately 50 feet west-northwest of the proposed location. Site conditions and general health and safety (i.e., overhead electrical lines, etc.) were evaluated in order to decide where the relocated soil boring and monitoring well would be advanced.

Soil borings were advanced using a track-mounted DPT rig, and samples were collected using a 4-foot Geoprobe MC Sampler and disposable, clear acetate liners, as previously discussed in Section 4.1. Soil boring logs are presented in Appendix B.

Soil samples were field-screened for non-specific, total VOCs using a photoionization detector (PID) equipped with an 11.7 eV probe and calibrated to isobutylene. The PID readings were recorded on the drilling logs for each boring (Appendix B). The field screening procedure for soils collected using the DPT MC Sampler involved making a longitudinal cut along the entire length of the MC liner, separating the two edges of the liner, and screening the entire length of the soil core with a PID at approximately 0.5 foot intervals. Measurable organic vapors above background levels were not observed in any of the eight boreholes or during the general PID air monitoring.

Two subsurface soil samples were collected from each boring for a total of 16 environmental samples. In addition, two field duplicates (67SB01-01D and 67SB06-01D) and one MS/MSD (67SB04-01MS/MSD) were collected. Since impacts were not evident based on the PID, olfactory or visual screening, one sample was collected in the shallow subsurface from the 1 to 3 foot interval bgs and the second sample was collected above the anticipated water table interface from either the 3 to 5, 5 to 7, 7 to 9, or 9 to 11 foot interval bgs. The samples were transferred directly into pre-labeled, laboratory provided sample jars, immediately after cutting the liner and screening the sample and placed on ice. The samples were shipped in coolers with chain-of-

custody forms (provided in Appendix B) to the fixed-base analytical laboratory for analysis. All subsurface soil samples were analyzed for VOCs, SVOCs (with LLPAHs), TPH GRO/DRO, and metals as outlined in the Work Plan and on Table 4-1.

4.3 Monitoring Well Installation and Groundwater Sampling

Monitoring wells were installed in all eight (67SB01 through 67SB08) soil borings using hollow-stem augers (HSAs). Refer to Figure 4-1 for soil boring and monitoring well locations and Table 4-4 for soil boring and monitoring well specifications. The monitoring well array was proposed in order to delineate potential impacts to groundwater from former SWMU 67 activities. The monitoring wells were installed at the locations proposed in the work plan with the exception of 67BS08. The rationale for relocating 67SB08 was previously discussed in Section 4.2.

Monitoring wells were constructed of 2.0-inch ID, Schedule 40 PVC, with flush joint threads. Each well was constructed with a 10-foot long well screen and attempts were made to install the screens to straddle the water table. The well screen and bottom cap were set at the bottom of the borehole and the screen was connected to a threaded, flush-joint, riser. The annular space around the well screen was backfilled with a well-graded, fine to medium sand as the augers were withdrawn from the borehole. The sand was extended to approximately two feet above the top of the screened interval. An approximately two-foot thick sodium bentonite seal was placed above the sand pack. The bentonite was hydrated with potable water. The annular space above the bentonite seal was backfilled with a cement/bentonite grout to prevent surface water from infiltrating into the screened groundwater monitoring zone. An expandable water tight locking cap with a vent hole was placed at the top of the casing. The wells were completed at the surface with approximately three feet of four-inch square protective casing. The protective casing was placed over the riser and surrounded by an approximate 2 feet by 2 feet (length x width) and 6 inches thick concrete pad. Bollards, painted yellow to aid in visibility, were installed around all of the concrete pads.

Monitoring well development consisted of surge and bail using a decontaminated bailer. A minimum of three well volumes were bailed from each of the newly installed wells meeting the development criteria. Wells 67SB02 and 67SB05 were identified as low yield during development. These wells required a period of recharge between development to remove the required three well volumes.

The groundwater was sampled using a decontaminated bladder pump and low-flow sampling techniques at each well with the exception of wells 67GW02 and 67GW05, due to insufficient groundwater yield observed during development. Wells 67GW02 and 67GW05 were sampled using a decontaminated bladder pump once they recovered sufficiently from development dewatering. For the wells sampled using low-flow techniques, field parameters of pH, temperature, turbidity, conductivity, dissolved oxygen, and oxidation-reduction potential were measured and recorded on individual Well Detail and Sample Logs, which can be referenced in Appendix B. The sampling criteria were met as there were no significant deviations of the required sample purge field parameters (turbidity at 67SB04 was slightly outside the suggested 10 percent range). The groundwater samples were filtered in the field for the dissolved metals analyses. The groundwater sample designations correspond to the representative soil boring location. For example, the groundwater sample collected from soil boring location 67SB01 was designated 67GW01. Following completion of sampling and surveying, each well was secured with a padlock.

Eight groundwater monitoring wells (67SB01 through 67SB08) were sampled. The samples were transferred directly into pre-labeled, laboratory provided sample jars and placed on ice. The samples were shipped in coolers with chain-of-custody forms (provided in Appendix B) to the fixed-base analytical laboratory for analysis. All groundwater samples were analyzed for VOCs, SVOCs (with LLPAHs), TPH DRO/GRO, and total and dissolved metals as outlined in the Work Plan and on Table 4-1.

4.4 Groundwater Level Measurements

Depth to groundwater measurements were collected from each of the newly installed monitoring wells shortly after installation and prior to and after well development and sampling activities using an oil water interface meter. Light non-aqueous phase liquids (LNAPL) were not observed at any well. Additionally, groundwater measurements were collected from the eight newly installed monitoring wells at the end of the field investigation on Wednesday March 31, 2010, and on April 25, 2010 during the SWMU 59 field investigation to allow for groundwater level equilibration in the wells. All groundwater level measurements are listed in the field notes provided in Appendix B. The March 31 and April 25, 2010 measurements are also summarized on Table 4-4.

Groundwater levels were measured from the top of PVC riser and the groundwater elevations were calculated from the surveyed elevation of the top of riser. A discussion of the survey activities is provided in Section 4.10. The groundwater level measurements were used during well development and sampling activities (e.g., calculate well volumes and monitor draw down) and to develop a potentiometric surface/groundwater contour map. The potentiometric surface map for SWMU 67 was developed using the April 25, 2010 groundwater level data and is discussed in Section 5.2.2.

4.5 Sediment Sampling

The sampling and analysis program proposed as part of the approved Phase I RFI Work Plan (Baker, 2007) included the collection and analysis of drainage ditch soil samples to be used to determine if the drainage ditch/swale (shown on Figure 3-1 in the approved Work Plan) represents a potential transport pathway for the migration of chemicals associated with the former gas station to the E2SS3 (estuarine, intertidal, scrub-shrub, broad-leaved evergreen) wetland unit.

However, site conditions observed during the March 2010 investigation revealed a different scenario with regard to the aquatic resource(s) associated with SWMU 67 resulting in the proposed drainage ditch surface soil samples being designated as sediment samples, as discussed in the following paragraphs.

An initial field inspection of the wetland boundary in the vicinity of SWMU 67 was conducted on March 22, 2010, while locating proposed environmental sampling points. A field delineation of the wetland boundary was deemed necessary after the field team noted discrepancies in the December 1999 delineation by GeoMarine. The field delineation was conducted on March 24 and May 25, 2010, and the wetland delineation report (including photographs) is presented in Appendix E.

The previous delineation by GeoMarine identified one unit, E2SS3 with the boundary approximately 250 feet northeast of the SWMU boundary. The result of the 2010 field delineation identified an E2FO3 (estuarine, intertidal, forested, broad-leaved evergreen) wetland resource immediately adjacent to SWMU 67 (with a very small portion [0.01 acre] located within the SWMU boundary). Prior to entering the field, the E2FO3 area was originally considered upland habitat. The 2010 field delineation (E2FO3) and the E2SS3 boundaries can be referenced on Figure 4-1, with each community type being depicted for comparison purposes. The E2SS3 community type was not verified during the 2010 field delineation, as the objective of the field delineation was to identify and revise the wetland resource boundary (and identify the associated community type) as it relates to SWMU 67.

Reclassification of upland habitat to the E2F03 wetland community type necessitates redesignating the proposed drainage ditch surface soil samples (67SS01, 67SS02, 67SS03, 67SS04, and 67SS05) as sediment samples (67SD01, 67SD02, 67SD03, 67SD04, and 67SD05) as the areas where these samples were collected have the ability to support lower trophic level receptors, such as benthic macroinvertebrates, fish, or amphibians.

As part of the Phase I RFI, four estuarine sediment samples (67SD01, 67SD02, 67SD04, and 67SD05 plus one field duplicate [67SD01D] and one MS/MSD [67SD01MS/MSD]) were collected from the forested estuarine wetland. These four sediment samples were collected at the same locations originally designated for the drainage ditch/swale soil samples proposed in the approved work plan. One freshwater sediment sample (67SD03) was collected at the storm water outfall upgradient of the forested estuarine wetland. All sediment samples were analyzed for Appendix IX VOCs, SVOCs (with LLPAHs), TPH DRO/GRO, total organic carbon (TOC), and Appendix IX metals.

All sediment samples were collected using a disposable stainless steel spoon. Sediment characteristics such as texture and saturation were noted in the field logbook. Sediment was homogenized following the removal of debris and VOC and GRO sample collection, and a portion was transferred into pre-labeled glass jars and placed on ice.

Samples were shipped in coolers with chain-of-custody forms (presented in Appendix B), which included the requested analyses for the samples. Table 4-1 provides a summary of the sediment samples collected at SWMU 67.

4.6 Surface Water Sampling

One freshwater surface water sample (61SW03) was collected from a small pool just beyond a 36” culvert outlet, and was analyzed for Appendix IX VOCs, SVOCs (with LLPAHs), TPH DRO/GRO, and Appendix IX metals. Although surface water samples were not proposed in the approved work plan, this sample was collected as a means to further evaluate and understand possible contaminant migration to (and within) the site. The stormwater effluent from the 36” culvert outlet sampled at SWMU 67 originates upgradient (west) of SWMU 67, along Oriskany Road. A number of structures are located in this area of NAPR including Building 207 (SWMU 80), which is located approximately 1,800 feet northwest SWMU 67. However, it does not appear that any surface water drainage ditches or stormwater features from SWMU 80 are directly linked or associated with SWMU 67 and the 36” culvert. Regardless, during persistent rainfall events, the 36” culvert can receive a significant amount of water, which originates mostly from unknown and upgradient sources; which was the justification for the field team to collect the surface water sample at this location. No other SWMUs or Areas of Concern (AOC) were identified upgradient (west) of SWMU 67.

There were no other areas within SWMU 67 or the E2FO3 wetland with standing water that warranted the collection of additional surface water samples. The small pool represents an intermittent aquatic habitat that has the potential to support lovwer trophic level receptorssuch as benthic macroinvertebrates, fish, or amphibians. However, it is important to note the location where surface water sample 67SW03 and sediment sample 67SD03 was collected originates from a culvert that is draining from upgradient sources (predominately precipitation and related runoff) into a depression forming the pool of water, therefore is classified as a freshwater source.

The surface water sample was collected from the location shown on Figures 4-1. The sample was collected using the direct-dip method from an appropriate water depth determined in the field. The direct dip uses a 1-liter laboratory certified clean, unpreserved amber glass bottle. The

surface water was then decanted into appropriate laboratory supplied containers and placed on ice for laboratory-based chemical analysis. The dissolved metal sample was field filtered into the appropriate container, and placed on ice prior to shipment.

Samples were shipped in coolers with chain-of-custody forms (presented in Appendix B), which included the requested analyses for the samples. Table 4-1 provides a summary of the surface water sample collected at SWMU 67.

4.7 Utility Clearance

As per the approved work plan, all proposed boring locations were first checked for the presence of subsurface utilities. Base utility mapping did not indicate the presence of utilities within the SWMU 67 boundary or vicinity. The sampling locations were field-located using a Global Positioning System (GPS), and the absence of subsurface utilities was field verified. Interference from underground utilities was not encountered during drilling activities.

4.8 Site Clearing

Once utility clearance was achieved and the proposed sample points were located using a GPS unit, site clearing activities were performed to provide access routes for the drill rig to the proposed sample locations. Due to the dense vegetation present on site, an ASV RC-100 skid steer equipped with a Magnum Systems Inc. mulcher (operated by Right Way Environmental Contractors, Inc. [RWEC Inc.]) was used for site clearing. The proposed sample points were located and marked with wooden stakes and survey flagging.

4.9 Decontamination and Investigation Derived Waste

Disposable sampling tools were used to the extent practicable in order to minimize the generation of liquid IDW from decontamination. As previously noted in sections 4.1 and 4.5, surface soil samples (67SS01 and 67SS02) and all sediment samples were collected using disposable stainless steel spoons. Non-disposable groundwater sampling equipment (stainless steel bladder pump components and Teflon bladders) involved both daily and between well decontamination procedures according to the decontamination procedures described in the USEPA groundwater sampling procedures for low flow purging and sampling (USEPA, 1998). It should also be noted that portions of the Standard Operating Procedure (SOP) F502 Decontamination of Sampling and Monitoring Equipment was also used for daily decontamination. Specifically, 10 percent nitric acid solution (followed by a deionized water rinse) and pesticide grade methanol rinses (followed by a deionized water rinse) were used after the pump was completely disassembled.

IDW associated with soil sampling and monitoring well installation, including soil cuttings, groundwater, and decontamination fluids, was containerized and stored in 55-gallon drums. Two IDW samples were collected. One composite soil sample (67IDW01) was collected from drums containing drill cuttings, and one composite aqueous sample (67IDW02) was collected from drums containing decontamination fluid (from sampling equipment and drill rig). The soil and water IDW samples were analyzed for toxicity characteristic leaching procedure (TCLP) VOCs and metals, ignitability, reactive sulfide, reactive cyanide, and pH. The IDW analytical data is presented in Appendix C. The drums were moved and stored at a secure location on base following the field work completion. Arrangements to remove and properly dispose of the IDW by an approved vendor were ongoing at the submittal of this report.

4.10 Surveying

Prior to entering the field, an electronic "shape file" (which included each proposed soil boring location) was uploaded to the GPS data collector. Once in the field, the GPS unit was used to

navigate to each sample location. Each sample location was flagged and identified using the numbering system as described in the soil sampling and analysis section of the work plan.

Certain features identified during the investigation including the earthen drainage feature and a portion of the estuarine wetland boundary were surveyed using a mapping grade Differential Global Positioning System (satellite DGPS corrections from Omnistar or "real-time") unit. In addition, corners of the tennis court and centerline of Langley Drive were also recorded as additional points of reference during the investigation. The coordinate system used to record these positions was U.S. State Plane 1983, Puerto Rico/Virgin Island 5200, and the North American Datum (NAD) 1983, with units in feet.

As a sub-consultant to Baker, Transystem Corporation conducted a multi-site survey at NAPR on March 30, 31, and April 1, 2010 at SWMUs 57, 61, 67, and 75. At SWMU 67, after the permanent monitoring wells were installed, their coordinates were more accurately surveyed using a combination (where appropriate) of Real-Time Kinematic (RTK) GPS and conventional survey methods. RTK GPS surveying employs a GPS base station and a GPS rover that reads satellite carrier phase signals. Where areas of the site were open to satellites, the RTK survey method was utilized. In contrast, conventional survey methods were used where portions of the site were covered by a vegetative canopy and hindered satellite signal. RTK GPS and conventional surveying were selected specifically because of the accuracy of data they provide to produce groundwater contour mapping:

RTK GPS:
+/- 0.08 Vertical
+/- 0.05 Horizontal

Conventional:
+/- 0.01 Vertical
+/- 0.05 Horizontal

Each monitoring well at SWMU 67 was surveyed. An elevation was obtained from the top of PVC riser for water level elevation calculations and a spot ground surface elevation was also obtained. All survey data was submitted to Baker for use in office application software such as Auto Computer Aided Design and Drafting (CADD). Coordinates were obtained and input into a CADD/Geographic Information System (GIS) to produce the maps used in this RFI report.

In addition to the monitoring well survey, surface soil samples 67SS01 and 67SS02, and additional site features such as the tennis court corners, and set of culverts - one on each side of the small parking area (described further in Section 5.1) were also surveyed by Transystem Corporation. The coordinate system used for the survey was U.S. State Plane 1983, Puerto Rico/Virgin Island 5200, and the NAD 1983, with units in U.S. survey feet. Note that the sediment samples and surface water sample were surveyed using the mapping grade differential GPS unit.

4.11 QA/QC Sampling

The following QA/QC samples were collected during the investigation of this site:

- Field Duplicates
- Trip Blanks
- MS/MSDs
- Field Blank

- Equipment Rinsate Blanks

4.11.1 Field Duplicates

Field duplicates were collected at a minimum rate of approximately 10 percent of primary environmental samples in accordance with the work plan. For soil boring samples, one field duplicate surface soil sample (67SB08-00D) was collected corresponding to ten surface soil samples, and two subsurface soil duplicate samples (67SB01-01D and 67SB06-01D) were collected corresponding to 16 subsurface soil samples. Although not proposed in the work plan, two additional surface soil samples (67SS01 and 67SS02) were collected as part of this investigation. However, based on the duplicate surface soil sample collected as part of the soil boring program (surface soil samples (67SB08-00D), no additional duplicate sample collection was necessary. One field duplicate sediment sample (67SD01D) was collected corresponding to five sediment samples. Although these samples were originally proposed as surface soil, field conditions warranted that the samples to be evaluated as sediment. One field duplicate groundwater sample (67GW08D) was collected corresponding to eight groundwater samples. Field duplicates were analyzed for the same parameters as the primary samples and the results were used to evaluate the field sampling methodology. A surface water duplicate was not collected since only one surface water sample was collected.

4.11.2 Trip Blanks

One trip blank sample was included in each cooler containing the samples from the site intended for VOC and/or TPH GRO analysis to evaluate whether cross contamination occurred during shipping of samples. A total of five trip blanks (67TB01, 67TB02, 67TB03, 67TB04, 67TB05) accompanied samples from this site. All trip blank samples were analyzed for Appendix IX VOCs and TPH GRO.

4.11.3 Matrix Spike/Matrix Spike Duplicates

Matrix spike and matrix spike duplicates (MS/MSD) were collected at a minimum rate of approximately 5 percent of primary environmental samples from the surface and subsurface soil, sediment, and groundwater samples. For soil boring samples, one set of MS/MSD (67SB02-00MS/MSD) was collected corresponding to 10 surface soil samples, and one set of MS/MSD (67SB04-01MS/MSD) was collected corresponding to 16 subsurface soil samples. One MS/MSD groundwater sample (67GW08MS and MSD) was collected corresponding to eight groundwater samples. One MS/MSD sediment sample (67SD01MS/MSD) was collected corresponding to five sediment samples. Although these samples were originally proposed as surface soil, field conditions warranted the samples to be evaluated as sediment. The MS/MSD samples were analyzed for the same parameters as the primary environmental samples and the results were used to evaluate the effect of each type of matrix on the analytical method. A surface water MS/MSD was not collected since only one surface water sample was collected

4.11.4 Field Blanks

One field blank sample (67FB01) was collected from laboratory-grade deionized (DI) water used as the source water for the equipment rinsate samples. Store bought distilled water was also used during this investigation for decontamination purposes, so an additional field blank (67FB02) was collected. The field blank samples were analyzed for Appendix IX VOCs, Appendix IX Low-Level SVOCs, TPH GRO and DRO, and metals, to determine whether the water used for generating the equipment rinsates and for decontamination was free of chemicals at levels of concern for the site.

4.11.5 Equipment Rinsates

One equipment rinsate was collected per day for one piece of sampling equipment (i.e., stainless steel spoon, macro core liner, or groundwater sampling tubing) and the selected analysis for the rinsate samples corresponds to the sampling and analytical program developed for SWMU 67. Equipment rinsate samples 67ER01 and 67ER08 were collected from disposable stainless steel spoons used on March 22 and 30, 2010 for surface soil and sediment sample collection. Equipment rinsate samples 67ER02, 67ER03, 67ER04, and 67ER05 were collected from disposable macro core liners used on March 23, 24, 25, and 26, 2010 for soil boring samples. Equipment rinsate samples 67ER06 and 67ER07 were collected from Teflon lined groundwater sampling tubing used on March 27 and 28, 2010. Equipment rinsate samples were analyzed for Appendix IX VOCs, Appendix IX SVOCs (with LLPAHs), TPH GRO and DRO, and metals.

4.12 Laboratory Analysis

Fixed-base laboratory analysis was conducted by CompuChem Laboratories, Cary, North Carolina. The list of parameters under the analytical program and the CRQLs are provided in Table 4-3. Laboratory analytical results for the environmental and QA/QC samples collected during the Phase I RFI are presented in Appendix C.

4.13 Data Validation

All fixed-base laboratory data was validated by Data Qual Environmental Services, LLC. of St. Louis Missouri, an independent third party. The USEPA Region II Data Validation Standard Operating Procedures were followed. Data Validation Summaries and Puerto Rican Chemist Certifications are provided with this RFI as Appendix D.

5.0 PHYSICAL RESULTS

The following sections provide a brief discussion of the current site conditions at SWMU 67 at the time of the Phase I RFI field investigation, conducted from March 22 to March 31, 2010. The site geology and hydrogeology, as ascertained from the soil boring program and other available information, is described herein.

5.1 Current Conditions

SWMU 67 is approximately 2.5 acres in size and includes a small parking area and tennis court. The tennis court is surrounded by secondary growth vegetation to the north, east, and south. Langley Drive abuts the SWMU to the west. The entire SWMU is relatively flat, with elevation increasing slightly south of the SWMU. An earthen drainage feature and a forested wetland system are also associated with the site and described below.

Upgradient (or roadway) runoff along the eastern side of Langley Drive is conveyed through SWMU 67. A set of culverts; one on each side of the small parking area divert runoff below ground. The culvert located on the northwestern portion of the SWMU outlets to an earthen drainage feature (see Photo 6, Appendix E). This feature is approximately 165 linear feet and transports precipitation runoff in a northerly direction. However, beyond 165 feet, there were no characteristics of a defined swale that would suggest the direct movement of water further down-gradient. This drainage feature was dry at the time of the investigation and contained little or no substrate. Although it does not appear that this feature can continually support aquatic organisms based on the periodic movement and collection of water; "snail" (i.e., the group of mollusks-gastropods) shells were observed during surface soil sample collection at locations 67SS01 and 67SS02. This feature does not appear to provide a surface water connection to any other resource (stream, wetland, or ditch) adjacent to SWMU 67. Vegetative species such as white lead tree (*Leucaena leucocephala*), white indigo berry *(Randia aculeate*, and guinea grass (*Urochloa maxima*) were observed adjacent to and within this drainage feature.

Additional dominant vegetative species identified throughout SWMU 67 include ocean blue morning glory (*Ipomea indica*), golden leather fern (*Acrostichum aureum*), bread and cheese *(Paullinia pinnata)*, Puerto Rico royal palm (*Roystonea borinquena)*, and black mangrove (*Avicennia germinans*).

An initial field inspection of the wetland boundary in the vicinity of SWMU 67 was conducted on March 22, 2010, while locating proposed environmental sampling points. A field delineation of the wetland boundary was deemed necessary after the field team noted discrepancies in the December 1999 delineation by GeoMarine. The field delineation was conducted on March 24 and May 25, 2010, and the wetland delineation report (including photographs) is given in Appendix E.

The previous delineation by GeoMarine identified one unit, E2SS3 (estuarine, intertidal, scrub-shrub, broad-leaved evergreen) with the boundary approximately 250 feet northeast of the SWMU boundary. The result of the 2010 field delineation identified an E2FO3 (estuarine, intertidal, forested, broad-leaved evergreen) wetland resource immediately adjacent to SWMU 67 (with a very small portion [0.01 acre] located within the SWMU boundary). Prior to entering the field, the E2FO3 area was originally considered upland habitat. The 2010 field delineation (E2FO3) and the E2SS3 boundaries can be referenced on Figure 4-1, with each community type being depicted for comparison purposes. The E2SS3 community type was not verified during the 2010 field delineation, as the objective of the field delineation was to identify and revise the

wetland resource boundary (and identify the associated community type) as it relates to SWMU 67.

5.2 Geology/Hydrogeology

The following sections discuss the geology and hydrogeology in the vicinity of SWMU 67.

5.2.1 Geology

SWMU 67 is located south of the airfield in the inland flat land area within the Langley Drive Area of the base. The inland flat land area generally encompasses the airfield and golf course areas. The inland flat land areas are typically underlain by relatively thick residuum that consists predominately of clay. Fill material overlays the residuum in some areas, particularly the airfield and including SWMU 67, and generally consists of sand and gravel with lesser amounts of silt and clay.

Eight soil borings were advanced at SWMU 67 during the Phase I RFI field investigation to profile surface and subsurface conditions (see Figure 4-1). Geologic cross sections were prepared to depict the shallow subsurface conditions at SWMU 67. The cross section locations are provided on Figure 5-1 and cross sections A-A' and B-B' are shown on Figures 5-2 and 5-3, respectively. Boring logs are provided in Appendix B. Note that the datum plan used is the Mean Low Water plus 100.00 foot as established by the U.S. Navy Survey Section (November 1941).

SWMU 67 is underlain by fill material including varying combinations of clay to gravel with some lifts of beach sand including coral and shells. The fill thickness ranged between approximately 1.6 feet at 67SB06 and 9.0 feet at 67SB08. Weathered bedrock was observed beneath the fill; residuum, typical of the inland flat land areas, was not identified. The presence of fill materials and apparent lack of residuum is not unusual considering the close proximity of SWMU 67 to the airfield and the cut and fill construction methods typically employed at NAPR.

Groundwater was observed within the fill materials only at well 67SB02. Otherwise, the potentiometric surface exists in the weathered bedrock.

5.2.2 Hydrogeology

The collection of groundwater measurement for SWMU 67 is discussed in Section 4.4. A groundwater contour map developed from the April 20, 2010 groundwater level data is shown on Figure 5-4. Note that the datum plan used is the Mean Low Water plus 100.00 foot as established by the U.S. Navy Survey Section (November 1941). The groundwater flow at SWMU 67 is toward the east with a gentle hydraulic gradient of approximately 0.004 feet per foot. The groundwater flow direction is consistent with the anticipated flow for SMWU 67; toward the forested estuarine wetland resource. The depth to groundwater ranges between approximately 13 feet bgs (well 67SB08) in the western portion of SMWU 67 to approximately seven feet bgs in the north central portion (67SB02). Groundwater is anticipated to be shallower in the northeast portion of SWMU 67 as the ground surface slopes toward the estuarine wetland.

6.0 ANALYTICAL RESULTS

This section discusses the analytical results of environmental samples collected from SWMU 67 during the March 2010 Phase I RFI investigation. The validated analytical data tables for the Phase I RFI field effort are included in Appendix C. Relevant portions of the data validation reports for the Phase I RFI Sample Delivery Groups (SDGs) are provided in Appendix D.

6.1 Screening Values

Detected compounds for each media are compared to applicable regulatory and background criteria. The rationale for using criteria for a specific medium are described in detail below.

6.1.1 Human Health Screening Values

Applicable human health criteria for soils include USEPA Regional Industrial Screening Levels (SLs) and USEPA Regional Residential SLs (USEPA, 2010), while applicable human health criteria for groundwater are USEPA Regional Tap Water SLs, Federal Drinking Water Maximum Contaminant Levels (MCLs) (USEPA, 2010a), and the Puerto Rico Water Quality Standards (PRWQS) (Puerto Rico Environmental Quality Board [PREQB], 2010). TPH GRO/DRO results will be screened using the PREQB guideline standard of 100 mg/kg for soil and 50 µg/L for groundwater.

6.1.1.1 Regional Screening Levels

The Regional SLs were developed by the USEPA to support the risk assessment screening process, while improving consistency across USEPA Regions and incorporating updated guidance in a timely manner. The Regional SL Table was developed with the Department of Energy's Oak Ridge National Laboratory under an Interagency Agreement as an update of the individual screening tables that had previously been maintained by Regions 3, 4, and 9. As recommended by the USEPA, these Regional SLs are to replace all other screening values.

The Regional SL Table contains risk-based screening levels derived from standardized equations (representing ingestion, dermal contact, and inhalation exposure pathways), calculated using the latest toxicity values, default exposure assumptions and physical and chemical properties. The SLs contained in the Regional SL Table are generic; they are calculated without site-specific information. Regional SLs should be viewed as Agency guidelines, not legally enforceable standards. The SLs for potentially carcinogenic chemicals are based on a target Incremental Lifetime Cancer Risk (ILCR) of $1x10^{-06}$. The SLs for noncarcinogens are based on a target hazard quotient (HQ) of 1.0. However, in order to account for cumulative risk from multiple chemicals in a medium, the noncarcinogenic SLs were divided by a factor of ten, yielding a target HQ of 0.1. For potential carcinogens, the toxicity criteria applicable to the derivation of SL values are oral Cancer Slope Factors (CSFs) and inhalation unit risk (IUR) factors; for noncarcinogens, they are chronic oral reference doses (RfDs) and inhalation reference concentrations (RfCs). These toxicity criteria are subject to change as more updated information and results from the most recent toxicological/epidemiological studies become available. The Regional SL Table is updated periodically to reflect such changes. It should be noted that the most recent Regional SL Table update available at this time is from May 2010 (USEPA, 2010).

6.1.1.2 Federal Drinking Water MCLs

Federal Drinking Water MCLs are enforceable standards for public water supplies promulgated under the Safe Drinking Water Act and are designed for the protection of human health. MCL

Goals are calculated based on laboratory or epidemiological studies and apply to drinking water supplies consumed by a minimum of 25 persons. They are designed for prevention of human health effects associated with a lifetime exposure (70-year lifetime) of an average adult (70 kilograms [kg]) consuming 2 liters of water per day. MCLs consider both the MCL Goal and the technical feasibility of removing the contaminant from the public water supply. Accordingly, MCLs are established as close to the MCL Goal as technically feasible (USEPA, 2010a).

6.1.1.3 Puerto Rico Water Quality Standards (PRWQS)

PRWQS are regulations designed to enhance maintain and preserve the quality of the waters of Puerto Rico. Rule 1303 establishes water quality standards and use classifications promulgated for the protection of the uses assigned to the classifications of the coastal, surface, estuarine, wetlands, and ground waters of the Commonwealth. In Rules 1303.1 (I) (1) through 1303.1 (I) (5) specific substances are identified for which numeric water quality standards have been established (PREQB, 2010).

Puerto Rico Water Quality Standards for Class SG (groundwater intended for use as a source of drinking water supply and agricultural uses including irrigation) listed in the PRWQS regulation amended March 31, 2010 are also included as groundwater screening values. PRWQS values will be used in place of the Federal Drinking Water Quality Standards, when more stringent.

6.1.2 Ecological Screening Values

The sections that follow describe the various criteria and toxicological benchmarks that were used as ecological-based media-specific screening values for chemicals in soil (surface and subsurface soil) and groundwater.

6.1.2.1 Soil Screening Values

USEPA ecological soil screening levels (Eco-SSLs) (documentation available at http://www.epa.gov/ecotox/ecossl/) were preferentially used as soil screening values. Eco-SSLs have been developed for eight receptor groups: plants, soil invertebrates, avian herbivores, avian ground insectivores, avian carnivores, mammalian herbivores, mammalian ground insectivores, and mammalian carnivores. For a given chemical, the lowest Eco-SSL value for plants, soil invertebrates, avian herbivores, avian ground insectivores, avian carnivores, mammalian herbivores was selected as the soil screening value. Eco-SSLs for mammalian ground insectivores were not considered for soil screening value development because there are no mammalian ground insectivores in Puerto Rico (mammalian insectivores are limited to aerial insectivores [i.e., bats]). As discussed in Guidelines for Developing Ecological Soil Screening Levels (USEPA, 2005), aerial and arboreal insectivorous birds and mammals were excluded from Eco-SSL development because they are considered inappropriate (i.e., they do not have a clear or indirect exposure pathway link to soil [indirect exposure pathways involve ingestion of prey that have direct contact with soil]). Eco-SSLs for mammalian carnivores also were not considered for soil screening value development because there are no carnivorous mammals on Puerto Rico. With the exception of bats, the terrestrial mammals represented by potentially complete exposure pathways are limited to nonindigenous, nuisance species (i.e., Norway rat, black rat, and mongoose) that have been implicated in the decline of native reptilian and bird populations (Mac et al., 1998 and United States Fish and Wildlife Service [USFWS], 1996). Eco-SSLs for mammalian herbivores are considered appropriate for soil screening value development based on the presence of fruit-eating and nectivorous bats in Puerto Rico.

For those chemicals lacking plant, soil invertebrate, avian herbivore, avian ground insectivore, avian carnivore, or mammalian herbivore Eco-SSLs, 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)

Identical to the Eco-SSLs, when more than one screening value was available for a given chemical from Efroymson et al. (1997a and 1997b), the lowest value was selected as the soil screening value. For those chemicals lacking plant, soil invertebrate, avian herbivore, avian ground insectivore, avian carnivore, or mammalian herbivore Eco-SSL and 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)
- Canadian soil quality guidelines (agricultural land use) developed by the Canadian Council of Ministers of the Environment (CCME, 2007)

Soil screening values based on MHSPE soil standards represent an average of the target and intervention soil standards. Values are based on a default organic carbon content of 2.0 percent, which represents the minimum adjustment range (2.0 to 30.0 percent). Soil screening values developed by CCME soil quality guidelines were given the lowest preference since many are background-based interim guidelines that do not represent effect-based concentrations.

6.1.2.2 Groundwater Screening Values

As discussed in Section 5.2.2, the groundwater flow direction at SWMU 67 is east toward an estuarine wetland system comprised of E2FO3 and E2SS3 wetland units. Because this estuarine wetland system represents a potential discharge point for SWMU 67 groundwater, the available groundwater data, collected during the March 2010 field investigation, were screened against saltwater toxicological thresholds. PRWQS for Class SB coastal and estuarine waters listed in the Puerto Rico Water Quality Standards Regulation (PRWQSR) dated March 31, 2010 (PREQB, 2010) were preferentially used as ground water screening values. PRWQS for Class SB coastal and estuarine waters were selected based on the classifications contained within Rule 1302.1 of the PRWQSR. For those chemicals lacking PRWQS for Class SB coastal and estuarine waters, groundwater screening values were identified from the following information listed in their order of decreasing preference:

- Chronic saltwater National Ambient Water Quality Criteria (NAWQC) (USEPA, 2009a)
- Final Chronic Values (FCVs) for saltwater contained in ECO Update Volume 3, Number 2 (USEPA, 1996)

- USEPA Region 4 chronic screening values for saltwater contained in Ecological Risk Assessment Bulletins – Supplement to Risk Assessment Guidance for Superfund (RAGS) (USEPA 2001)

- Minimum chronic toxicity test endpoints (No Observed Effect Concentration [NOEC], No Observed Effect Level [NOEL], and Maximum Acceptable Toxicant Concentration [MATC] values) for marine species reported in the ECOTOX Database System (USEPA, 2007a)

- Chronic Lowest Observable Effect Levels (LOELs) for saltwater contained in National Oceanic and Atmospheric Administration (NOAA) Screening Quick Reference Tables (SQUIRTs) (Buchman, 2008) with a safety factor of 10 (Wentsel et al., 1996)

The order of preference was selected based on their level of protection. For example NAWQC and 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 the above-mentioned NAWQC, FCVs, USEPA Region 4 chronic screening values, chronic test endpoints (NOECs, NOELs, and MATCs), and chronic LOELs, screening values were derived from the literature-based acute saltwater values listed below:

- Acute LOELs for saltwater contained in NOAA SQUIRTs (Buchman, 2008)

- Acute toxicity test endpoints (NOEC, NOEL, LOEL, Lowest Observed Effect Concentration [LOEC], median lethal concentration [LC_{50}], and median effective concentration [EC_{50}] values) for marine species contained in the ECOTOX Database System (USEPA, 2007a)

- LC_{50} values for marine species contained in Superfund Chemical Matrix (USEPA, 2004)

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

- A safety factor of 30 was used to convert an acute NOEC or NOEL a chronic-based screening value (Wentsel et al., 1996)

- A safety factor of 50 was used to convert an Acute LOEC or LOEL to a chronic-based screening value (Wentsel et al., 1996)

- A safety factor of 100 was used to convert an EC_{50} or LC_{50} to a chronic-based screening value (Wentsel et al., 1996)

When acute toxicity data were used to extrapolate a chronic screening value, NOECs/NOELs 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.

The screening values selected for arsenic, cadmium, chromium, copper, lead, nickel, selenium, silver, and zinc are PRWQS for Class SB coastal and estuarine waters, while the screening value selected for mercury is a USEPA saltwater NAWQC (i.e., continuous criteria concentrations [CCC]). Although PRWQS for all metals are expressed only as total recoverable concentrations, USEPA saltwater CCC values for many metals, including arsenic, cadmium, chromium, copper, lead, mercury, nickel, selenium, and zinc, can be expressed as total recoverable or dissolved concentrations (USEPA, 2009a).

Because the SWMU 67 groundwater samples were analyzed for total recoverable and dissolved metals, USEPA saltwater NAWQC for arsenic, cadmium, chromium, copper, lead, mercury, nickel, selenium, and zinc, expressed as dissolved concentrations, were used as dissolved groundwater screening values for these nine metals.
Total recoverable screening values were conservatively used to screen the dissolved analytical data for those metals lacking screening values expressed as dissolved concentrations (i.e., antimony, barium, beryllium, cobalt, silver, thallium, tin, and vanadium).
For those chemicals lacking saltwater toxicological thresholds and literature values, groundwater screening values were identified or developed from freshwater values using the sources and procedures discussed in Section 6.1.2.3.

6.1.2.3 Surface Water Screening Values

PRWQS for Class SD surface waters listed in the PRWQSR dated March 31, 2010 (PREQB, 2010) were preferentially selected as surface water screening values. PRWWS for Class SD surface waters were selected based on the classifications contained within Rule 1302.2 of the PRWQSR. For those chemicals lacking a freshwater PRWQS for Class SD surface waters, screening values were identified from the following information listed in their order of decreasing preference:

- Chronic freshwater NAWQC (USEPA, 2009a)
- Final Chronic Values (FCVs) for freshwater contained in ECO Update Volume 3, Number 2 (USEPA, 1996).
- USEPA Region 4 chronic screening values for freshwater contained in Ecological Risk Assessment Bulletins – Supplement to RAGS (USEPA, 2001) and USEPA Region 5 ecological screening levels (ESLs) (http://www.epa.gov/reg5rcra/ca/ESL.pdf) (USEPA, 2003).
- Minimum chronic toxicity test endpoints (NOEC, NOEL, and MATC values based on reproduction, growth, or survival) for freshwater species reported in the ECOTOX Database System (USEPA, 2007a).
- Great Lakes basin Tier II SCVs listed in the Great Lakes Initiative Toxicity Data Clearinghouse (http://www.epa.gov/gliclearinghouse/) (USEPA, 2010b).
- Chronic LOELs for freshwater species contained in NOAA SQUIRTs (Buchman, 2008) with a safety factor of 10 (Wentsel et al., 1996).

The order of preference was selected based on their level of protection. For example NAWQC and FCVs would be expected to offer a greater degree of protection than a single species NOEC, NOEL, MATC, or LOEL value since their derivation considers a larger toxicological database. It

is noted that USEPA Region 4 and Region 5 screening values were given equal preference. When a value was available from both sources, the minimum value was selected as the surface water screening value. In the absence of the above-mentioned freshwater FCVs, freshwater USEPA Region 4 and Region 5 screening values, freshwater chronic test endpoints (NOECs, NOELs, and MATCs), and freshwater chronic LOELs, screening values were derived from the acute literature-based freshwater values listed below:

- Acute LOELs for freshwater contained in NOAA SQUIRTs (Buchman, 2008).
- Acute toxicity test endpoints (NOEC, NOEL, LOEL, LOEC, LC_{50}, and EC_{50}) values for freshwater species contained in the ECOTOX Database System (USEPA, 2007a).
- LC_{50} values for freshwater species contained in Superfund Chemical Matrix (USEPA, 2004).

Chronic-based screening values were extrapolated from acute NOEC, NOEL, LOEC, LOEL, LC_{50}, and EC_{50} values using the following safety factors:

- A safety factor of 30 was used to convert an acute NOEC or NOEL to a chronic-based screening value (Wentsel et al., 1996).
- A safety factor of 50 was used to convert an acute LOEC or LOEL to a chronic-based screening value (Wentsel et al., 1996).
- A safety factor of 100 was used to convert an EC_{50} or LC_{50} to a chronic-based screening value (Wentsel et al., 1996).

When acute toxicity data were used to extrapolate a chronic screening value, NOECs/NOELs 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.

The total recoverable screening values selected for cadmium, chromium, copper, lead, nickel, selenium, silver, and zinc are PRWQS for Class SD surface waters. In addition the screening value selected for beryllium is a Great Lakes Basin Tier II chronic criterion (i.e., SCV) developed by the Ohio Environmental Protection Agency (OEPA). The screening values for these eight metals are expressed as total recoverable concentrations. PRWQS for cadmium, chromium, copper, lead, nickel, silver, and zinc, as well as the OEPA SCV for beryllium are further expressed as a function of water hardness (PREQB, 2010 and USEPA, 2009b). A hardness-dependent, total recoverable SCV for beryllium and hardness-dependent, total recoverable PRWQS for cadmium, chromium, copper, lead, nickel, silver, and zinc were derived for use as surface water screening values using the following regression equations (PREQB, 2010 and USEPA 2009b):

- Beryllium: exp[2.528(*ln* hardness)-10.77]
- Cadmium: exp[0.7409(*ln* hardness)-4.719]
- Chromium: exp[0.8191(*ln* hardness)+0.6848]
- Copper: exp[0.8545(*ln* hardness)-1.702]
- Lead: exp[1.273(*ln* hardness)-4.705]
- Nickel: exp[0.8460(*ln* hardness)+0.0584]

- Silver: exp[1.72(*ln* hardness)-6.59]
- Zinc: exp[0.8473(*ln* hardness)+0.884]

In these equations, hardness concentrations are expressed in units of mg/L as calcium carbonate ($CaCO_3$). The Water Resources Division of the United States Geological Survey (USGS), in cooperation with local and Federal agencies, obtains data pertaining to the water resources of Puerto Rico each year. Data are available in the National Water Information System water quality database available at http://waterdata.usgs.gov/nwis. A USGS monitoring station (i.e., 50071000) has been identified within a stream located approximately 4 miles northwest of NAPR. From February 21, 1961 to August 10, 2004, a total of 231 hardness measurements were taken at this station. Hardness concentrations ranged from 4 mg/L to 61 mg/L as $CaCO_3$, with an arithmetic mean concentration of 32.2 mg/L as $CaCO_3$, a 95 percent lower confidence limit (LCL) of the mean concentration of 31.35 mg/L as $CaCO_3$ (derived using Scout Version 1.00.1 software [USEPA, 2008]), and a 95 percent upper confidence limit (UCL) of the mean concentration of 32.86 mg/L $CaCO_3$ (derived using USEPA ProUCL Version 4.00.02 software [USEPA, 2007b]). Because NAPR and USGS monitoring station 50071000 are located within the same hydrologic unit (21010005), hardness data for the USGS monitoring station will represent reasonable estimates of surface water hardness within the drainage ditch. Therefore, the 95 percent LCL concentration (i.e., 31.35 mg/L as $CaCO_3$) will be used to derive the surface water screening values for beryllium, cadmium, chromium, copper, lead, nickel, silver, and zinc.

The screening values selected for arsenic and mercury are USEPA freshwater NAWQC (i.e. criteria continuous concentrations [CCC]). The CCC values for these two metals are expressed as dissolved concentrations (USEPA, 2009a). Total recoverable CCC values for arsenic and mercury were derived for use as surface water screening values by dividing the dissolved CCC values (150 µg/L and 0.77 µg/L, respectively) by the following freshwater conversation factors (USEPA, 2009):

- Arsenic: 1.000
- Mercury: 0.850

Because surface water samples collected as SWMU 67 were analyzed for total recoverable and dissolved metals, dissolved screening values also were identified from the literature. PRWQS expressed in terms of the dissolved metal in the water column are not available from the PRWQSR. The PRWQSR has adopted USEPA total recoverable NAWQC as PRWQS for cadmium, chromium, copper, lead, nickel, silver, selenium, and zinc (the PRWQSR hardness-dependent regression equations for these eight metals are identical to the hardness-dependent regression equations contained in National Recommended Water Quality Criteria [USEPA 2009a]). Therefore, dissolved screening values for these eight metals were derived by multiplying the total recoverable PRWQS (based on a water hardness of 31.35 mg/L as $CaCO_3$) by the USEPA freshwater conversion factors listed below (USEPA, 2009a):

- Cadmium: 1.101672 – [(*ln* hardness)(0.0418380)]
- Chromium: 0.860 (conversion factor for trivalent chromium)
- Copper: 0.960
- Lead: 1.46203 – [(*ln* hardness)(0.145712)]
- Nickel: 0.998
- Selenium: 0.922
- Silver: 0.850
- Zinc: 0.986

It is noted that total recoverable screening values were conservatively used to screen dissolved analytical data for those metals lacking screening values expressed as dissolved concentrations (i.e., antimony, barium, beryllium, cobalt, silver, thallium, tin, and vanadium).
For those chemicals lacking freshwater toxicological thresholds and literature values from the sources listed and described above, surface water screening values were identified or developed from saltwater values using the sources and procedures discussed in Section 6.1.2.2.

6.1.2.4 Marine Estuarine Sediment Screening Values

The marine and estuarine bulk sediment toxicological benchmarks listed below were preferentially used as sediment screening values:

- Effects-Range low (ER-L) marine and estuarine sediment quality guidelines (SQGs) (Long and Morgan, 1991 and Long et al., 1995)

- Threshold Effects Level (TEL) marine sediment quality assessment guidelines (SQAGs) (MacDonald, 1994)

- Apparent Effects Threshold (AET) marine SQGs (Buchman, 2008)

A description of ER-L, TEL, and AET values and the methods used in their derivation are provided in the paragraphs that follow.

ER-L marine and estuarine SQGs. Long and Morgan (1991) developed effects-based SQGs using literature-based data from EqP modeling, spiked-sediment toxicity tests, and matched sediment chemistry and biological effects measures. For a given chemical, the data were arranged in ascending order of concentration with each data entry assigned an "effects" or "no effects" descriptor, and the 10th percentile and 50th percentile concentrations of the ‘effects” data were calculated. The 10th and 50th percentiles of the “effects” data represent the ER-L and Effects Range-Median (ER-M), respectively. The ER-L and the ER-M delineate three concentration ranges for a given chemical. The concentration range below the ER-L value represents a minimal effects range (i.e., the concentration range in which effects would be rarely observed). Concentrations equal to or greater than the ER-L but less than the ER-M represent a possible effects range within which effects would occasionally occur, while concentrations greater than the ER-M represent a probable-effects range within which effects would frequently occur. The ER-L and ER-M values were recalculated by Long et al. (1995) after omitting a small amount of freshwater data included in the original calculations (Long and Morgan 1991) and incorporating more recent marine and estuarine data from the literature. Only ER-Ls were considered for use as sediment screening values.

TEL marine SQAGs for Florida coastal waters. The updated and revised data set used by Long et al. (1995) also was used by MacDonald (1994) to calculate SQAGs for Florida coastal waters (TELs and Probable Effect Levels [PELs]). Unlike the methodology used by Long et al. (1991) to derive ER-L and ER-M values, the derivation of TELs and PELs took into consideration the "no effects" data set. Specifically, TELs were derived by calculating the geometric mean of the 15th percentile in the "effects" data set and the 50th percentile in the "no effects" data set, while PELs were derived by calculating the geometric mean of the 50th percentile in the “effects” data set and the 85th percentile in the “no effects” data set.

Identical to ER-Ls and ER-Ms, TELs and PELs delineate three concentration ranges for a given chemical. The TEL represents the upper limit of the range of sediment concentrations dominated by "no effects" data. Within this range, concentrations are not considered to represent significant

hazards to sediment-associated biota. The PEL represents the lower limit of the range of sediment concentrations that are usually or always associated with adverse biological effects. The range of concentrations that could be associated with biological effects is delineated by the TEL and PEL. Within this range of concentrations, adverse biological effects are possible. Only TELs were considered for use as sediment screening values

AET marine SQGs. The AET method, developed by Tetra Tech, Inc (1986), associates chemical concentrations in sediments with adverse biological effects (lethal and sub-lethal toxicity as measured using sediment toxicity tests or changes in benthic macroinvertebrate abundance and community structure as measured by *in situ* biological surveys). For a given chemical and measurement of biological effect (biological indicator), the AET value represents the sediment concentration above which statistically significant biological effects are always observed. The AET values shown in Table 4-3 represent minimum AET value from a suite of seven biological indicators (amphipod mortality, oyster larval abnormality, Microtox luminescence, benthic macroinvertebrate abundance, bivalve larvae mortality/abnormality, Echinoderm larvae mortality/abnormality, and juvenile polychaete growth). It is noted that the AET values developed by Buchman (2008) are interim values subject to change.

Minimum, chemical-specific AET values are used by the Washington Department of Ecology (1995) as sediment management standards for Puget Sound. Minimum AET values also are used by the United States Army Corps of Engineers (USEPA/USACE, 1998) as “reason to believe” guidance for screening levels for the Dredged Material Management Program (DMMP). The DMMP screening levels are implemented for use in Puget Sound and Grays Harbor/Willapa Bay in the State of Washington. Current Washington State Department of Ecology sediment management standards and USACE DMMP screening levels do not reflect the interim AET values reported by Buchman (2008).

For a given chemical, when more than one toxicological threshold was available from the sources listed above (i.e., Long et al., 1995, MacDonald, 1994, and Buchman, 2008), the minimum value was conservatively selected as the sediment screening value. For those organic chemicals lacking literature-based marine and estuarine toxicological benchmarks, equilibrium partitioning (EqP)-based screening values were either developed using USEPA methodology (USEPA, 1993 and 1996 [see Appendix E] or identified from the literature (Di Toro and McGrath, 2000). For a given chemical, when an EqP-based value was derived in accordance with USEPA (1993 and 1996) methodology and a value also was available from Di Toro and McGrath (2000), the minimum value was selected as the sediment screening value. It is noted that consideration was given to the following literature-based freshwater toxicological thresholds for chemicals lacking marine and estuarine values: (1) consensus-based SQGs for freshwater (MacDonald et al., 2000), (2) SQAGs for Florida inland waters (MacDonald et al., 2003), (3) Ontario Ministry of the Environment Lowest Effect Level (LEL) Provincial sediment quality guidelines (PSQGs) (Persaud et al., 1993), and (4) Canadian interim freshwater sediment quality guidelines (ISQGs) (CCME, 2002]. However, no values were available from these sources.

6.1.2.5 Freshwater Sediment Screening Values

MacDonald et al. (2000) developed consensus-based sediment quality guidelines (SQGs) for freshwater using existing SQGs established for the protection of sediment-dwelling organisms. The consensus-based SQGs (Threshold Effect Concentrations [TECs] and Probable Effect Concentrations [PECs]) were derived by calculating the geometric mean of existing SQGs. TECs are intended to identify contaminant concentrations below which harmful effects on sediment-dwelling organisms are not expected, while PECs are intended to identify contaminant

concentrations above which harmful effects are expected to occur frequently. The TECs developed by MacDonald et al. (2000) were preferentially selected for use as sediment screening values (see Table 7-7). For those chemicals lacking a consensus-based TEC from MacDonald et al. (2000), sediment screening values were identified from the freshwater toxicological benchmarks listed and described below:

- **Sediment quality assessment guidelines (SQAGs) for Florida inland waters.** The consensus-based SQGs (i.e., TECs and PECs) derived by MacDonald et al. (2000) were adopted for use as SQAGs for Florida inland waters (MacDonald et al., 2003). SQAGs also were identified for twenty additional chemicals using effects-based guidelines promulgated in other jurisdictions. Identical to the consensus-based SQGs developed by MacDonald et al. (2000), only TEC-based SQAGs guidelines were used as sediment screening values.

- **Ontario Ministry of the Environment Lowest Effect Level (LEL) Provincial sediment quality guidelines (PSQGs).** The Ontario Ministry of the Environment (Persaud et al., 1993) developed PSQGs expressed as LELs and Severe Effect Levels (SELs). The LEL and SEL PSQGs are based on matched sediment chemistry and biological effects measures (co-occurrence analysis) from a wide range of geographical areas within the province. The LEL represents the chemical concentration at which actual ecotoxicological effects become apparent (e.g., species absence), while the SELs represent chemical concentrations that could potentially eliminate most benthic organisms. Only LELs were selected as sediment screening values.

- **Canadian interim freshwater sediment quality guidelines (ISQGs).** The CCME (2002) developed ISQGs using literature-based data from models (i.e., equilibrium partitioning [EqP]) spiked sediment toxicity tests, and field studies (co-occurrence data consisting of matching sediment chemistry and biological effect data). This information was used to establish associations between concentrations of chemicals in sediments and adverse biological effects.

For a given chemical, when more than one toxicological threshold was available from the sources listed above (i.e., MacDonald et al., 2003, Persaud et al., 1993, and CCME, 2002), the minimum value was conservatively selected as the sediment screening value. For those chemicals lacking a consensus-based SQG, SQAG, PSQG, and ISQG, the marine and estuarine toxicological benchmarks listed and described below were used as sediment screening values:

- **Effects Range-Low (ER-L) marine and estuarine SQGs.** Long and Morgan (1991) developed effects-based SQGs using literature-based data from EqP modeling, spiked-sediment toxicity tests, and matched sediment chemistry and biological effects measures. For a given chemical, the data were arranged in ascending order of concentration with each data entry assigned an "effects" or "no effects" descriptor, and the 10th percentile and 50th percentile concentrations of the “effects” data were calculated. The 10th and 50th percentiles of the “effects” data represent the ER-L and Effects Range-Median (ER-M), respectively. The ER-L and the ER-M delineate three concentration ranges for a given chemical. The concentration range below the ER-L value represents a minimal effects range (i.e., the concentration range in which effects would be rarely observed). Concentrations equal to or greater than the ER-L but less than the ER-M represent a possible effects range within which effects would occasionally occur, while concentrations greater than the ER-M represent a probable-effects range within which effects would frequently occur. The ER-L and ER-M values were recalculated by Long

et al. (1995) after omitting a small amount of freshwater data included in the original calculations (Long and Morgan 1991) and incorporating more recent marine and estuarine data from the literature. Only ER-Ls were selected as sediment screening values in this screening level ERA.

- **Threshold Effect Level (TEL) SQAGs for Florida coastal waters.** The updated and revised data set used by Long et al. (1995) also was used by MacDonald (1994) to calculate SQAGs for Florida coastal waters (TELs and Probable Effect Levels [PELs]). Unlike the methodology used by Long et al. (1991) to derive ER-L and ER-M values, the derivation of TELs and PELs took into consideration the "no effects" data set. Specifically, TELs were derived by calculating the geometric mean of the 15th percentile in the "effects" data set and the 50th percentile in the "no effects" data set, while PELs were derived by calculating the geometric mean of the 50th percentile in the “effects” data set and the 85th percentile in the “no effects” data set.

  Identical to ER-Ls and ER-Ms, TELs and PELs delineate three concentration ranges for a given chemical. The TEL represents the upper limit of the range of sediment concentrations dominated by "no effects" data. Within this range, concentrations are not considered to represent significant hazards to sediment-associated biota. The PEL represents the lower limit of the range of sediment concentrations that are usually or always associated with adverse biological effects. The range of concentrations that could be associated with biological effects is delineated by the TEL and PEL. Within this range of concentrations, adverse biological effects are possible.

- **Apparent Effects Threshold (AET) marine SQGs.** The AET method, developed by Tetra Tech, Inc (1986), associates chemical concentrations in sediments with adverse biological effects (lethal and sub-lethal toxicity as measured using sediment toxicity tests or changes in benthic macroinvertebrate abundance and community structure as measured by in situ biological surveys). For a given chemical and measurement of biological effect (biological indicator), the AET value represents the sediment concentration above which statistically significant biological effects are always observed. The AET values shown in Table 7-7 represent the lowest AET value from a suite of seven biological indicators (amphipod mortality, oyster larval abnormality, Microtox® luminescence, benthic macroinvertebrate abundance, bivalve larvae mortality/abnormality, Echinoderm larvae mortality/abnormality, and juvenile polychaete growth). It is noted that the AET values included within Table 7-7 are interim values subject to change (Buchman 2008).

  Minimum, chemical-specific AET values are used by the Washington State Department of Ecology (1995) as sediment management standards for Puget Sound. Minimum AET values also are used by the USACE (USEPA/USACE, 1998) as “reason to believe” guidance for screening levels for the Dredged Material Management Program (DMMP). The DMMP screening levels are implemented for use in Puget Sound and Grays Harbor/Willapa Bay in the State of Washington. Current Washington State Department of Ecology sediment management standards and USACE DMMP screening levels do not reflect the interim AET values reported by Buchman (2008).

Identical to the freshwater toxicological benchmarks, when more than one marine and estuarine toxicological benchmark is available from the sources listed above, the minimum value is conservatively selected as the sediment screening value. For those organic chemicals lacking bulk sediment freshwater and marine/estuarine toxicological benchmarks, EqP-based screening values are either developed using the USEPA EqP approach (USEPA, 1993 and 1996 [see Appendix B]) or identified from the literature (Di Toro and McGrath, 2000). For a given

chemical, when an EqP-based value is derived in accordance with USEPA (1993 and 1996) methodology and also is available from Di Toro and McGrath (2000), the minimum value is selected as the sediment screening value. As discussed in Appendix B, EqP-based screening values developed in accordance with USEPA (1993 and 1996) methodology are based, in part, on the fraction of organic carbon (f_{oc}) in sediment. The EqP-based values presented in Table 4-3 were derived using a default f_{oc} of 0.01 (one percent TOC). However, as sediment samples collected during the Phase I RFI field investigation will be analyzed for TOC, EqP-based sediment screening values will be revised to reflect the minimum f_{oc} measured in sediment samples collected from the estuarine forested wetland downgradient from SWMU 67.

6.1.3 Background Screening Values

For a given medium (e.g., soil and groundwater), analytical data for inorganic chemicals exceeding one or more of the screening values (human health or ecological) will be compared to NAPR background screening values (i.e., upper limit of the mean [ULM] background concentrations). The ULM background concentrations used in the evaluations are those derived from the inorganic data sets contained in the Revised Final II Summary Report for Environmental Background Concentrations of Inorganic Compounds, (Baker, 2010). The ULM background concentrations, as well as the ecological and human health screening values, will be compared to the Phase I RFI analytical data to determine if the proposed sampling effort confirmed site contamination detected during the Phase I/II ECP. Note that the freshwater sediment sample (67SD03) was compared to the NAPR basewide background non-airfield freshwater drainage ditch sediment screening values. The other sediment samples (67SD01, 67SD02, 67SD04 and 67SD05) were compared to the estuarine wetland background sediment screening values.

6.2 <u>Surface Soil</u>

Ten surface soil samples and one field duplicate sample (67SB08-00D) were collected and analyzed during the Phase I RFI. All surface soil samples were analyzed for Appendix IX VOCs, SVOCs (with LLPAHs), TPH GRO/ DRO, and metals. A detected results table for the surface soil data set is presented in Table 6-1. Results are compared to appropriate media specific criteria as described in Section 6.1.

Nine VOCs (2-butanone [MEK], acetone, benzene, carbon disulfide, chloroform, chloromethane, methyl iodide, methylene chloride, and m&p-xylene) were detected in the surface soil at lowconcentrations, well below the listed criteria. Note that 2-butanone [MEK] and acetone are common laboratory contaminants.

Seventeen SVOCs (with LLPAHs) were detected in the surface soil at SWMU 67; none exceeded the screening criteria. Total low and high molecular weight PAHs also did not exceed screening criteria.

DRO was detected in surface soil samples 67SB02-00, 67SB05-00, and 67SB08-00 (including the duplicate sample 67SB08-00D) with DRO and total TPH exceeding the PREQB standard of 100 mg/kg at 67SB05-00. There were no GRO detections in any of the surface soil samples collected. Figure 6-1 presents the locations of organic parameters that exceeded human health screening values for the 2010 Phase I RFI data.

Sixteen inorganic compounds were detected in the surface soil at SWMU 67. Ten inorganic parameters exceeded one or more of the screening criteria:

- Arsenic
- Barium

- Chromium
- Cobalt
- Copper
- Lead
- Mercury
- Selenium
- Vanadium
- Zinc

Arsenic exceeded the regional screening level for residential soil at seven of the ten locations; arsenic also exceeded the regional screening level for industrial soil and background screening criteria at 67SS01 and 67SS02. Barium exceeded the NAPR basewide background concentration at one location - 67SB03-00. No other screening criteria for barium were exceeded. Chromium exceeded the selected ecological surface soil screening values at seven locations (67SS01, 67SS02, 67SB01, 67SB02, 67SB03, 67SB04, and 67SB08). Cobalt exceeded the residential SL at all locations; the industrial SL at only one location; and the selected ecological soil screening value at seven of eight surface soil sample locations (excluding 67SB08-00). Copper was detected in all samples at a concentration in excess of the selected ecological surface soil screening value; and exceeded the background screening value in surface soil sample 67SB02-00. Lead exceeded the selected ecological surface soil screening values at four locations (67SS01, 67SS02, 67SB01, and 67SB02); and at three of those four locations (67SS01, 67SS02, and 67SB02) background screening values were also exceeded. The selected ecological surface soil and background screening value for mercury were exceeded in sample 67SB08-00D. Six surface soil sample locations (67SS01, 67SS02, 67SB01, 67SB02, 67SB03, and 67SB08) exceeded the ecological screening values for selenium. Two of those eight locations (67SB02 and 67SB08 [including the duplicate sample 67SB08-00D]) also exceeded background. Vanadium exceeded the ecological and human health screening criteria at all ten sample locations. The background screening criteria for vanadium was exceeded at one surface soil sample location (67SB08-00, including its duplicate sample – 67SB08-00D). At seven locations, zinc exceeded only the selected ecological soil screening values.

Antimony, beryllium, cadmium, nickel, silver, and thallium did not exceed any of the screening criteria or background. Figure 6-2 presents the locations of inorganic parameters that exceeded human health and/or ecological and NAPR basewide background values for the 2010 Phase I RFI data.

Based on the exceedences of background and regulatory screening criteria in the surface soil, it appears that metals contamination may have occurred in the surface soil. However, the source of contamination has not been determined.

6.3 Subsurface Soil

Sixteen primary subsurface soil samples were collected and analyzed during the Phase I RFI for Appendix IX VOCs, SVOCs (with LLPAHs), TPH DRO/GRO, and metals. Detected results for the subsurface soil data set are presented in Table 6-2.

Eight VOCs (2-butanone[MEK], 2-hexanone[MBK], acetone, benzene, carbon disulfide, chloromethane, methyl iodide, and m&p-xylene) were detected in the subsurface soil at low, estimated concentrations, well below the listed criteria. In addition, 2-butanone [MEK] and acetone were reported for several samples at low concentrations well below the listed criteria. Note that acetone and carbon disulfide are known laboratory contaminants.

A total of 16 SVOCs were detected at low, estimated concentrations as part of the subsurface soil sampling program. However, no SVOCs (with LLPAHs) exceeded any of the established screening criteria.

TPH DRO was detected in six of 16 samples, but none exceeded any screening criteria. GRO was not detected in any of the subsurface soil samples.

Sixteen inorganic compounds were detected in the subsurface soil at SWMU 67. Fourteen inorganic parameters exceeded one or more of the criteria. They are:

- Arsenic
- Barium
- Beryllium
- Cadmium
- Chromium
- Cobalt
- Copper
- Lead
- Mercury
- Nickel
- Selenium
- Thallium
- Vanadium
- Zinc

Arsenic exceeded the regional screening level for residential soil in nine primary subsurface soil samples; arsenic also exceeded the regional screening level for industrial soil and the NAPR basewide background screening criteria in subsurface soil sample 67SB06-01. Barium exceeded only the NAPR basewide background concentration in three subsurface soil samples (67SB01-03, 67SB02-01, and 67SB02-02). Beryllium was detected at a concentration in excess of background at four locations (67SB01-03, 67SB02-01, and 67SB06-01, and 67SB07-05); beryllium did not exceed any of the other screening criteria. Cadmium exceeded the NAPR basewide background concentrations at 67SB01-03; cadmium did not exceed any of the other screening criteria. Chromium was detected in excess of only the selected ecological soil screening values in four subsurface soil sample locations; while 67SB01-03 exceeded only background screening values. For cobalt, residential and/or industrial soil SLs, background, and ecological soil screening values were exceeded at seven of the eight locations (although the residential SL was exceeded in sample 67SB05-01; background or ecological soil screening values were not exceeded in any subsurface soil samples taken from 67SB05). Copper exceeded only the selected ecological subsurface soil screening values in eight primary subsurface soil samples (and including the two duplicate samples 67SB01-01D and 67SB06-01D). For subsurface soil samples 67SB01-03 and 67SB07-05, copper exceeded the residential SL, and background screening criteria. Lead exceeded the background screening criteria in five samples; 67SB01-03, 67SB02-02, 67SB04-01, 67SB06-01, and 67SB08-01. However, lead only exceeded two screening criteria (ecological and background) at 67SB08-01. The ecological soil and background screening criteria for mercury were each exceeded at 67SB05-01, and 67SB06-01; while the background screening criteria in subsurface soil sample 67SB04-03 exceeded only background screening criteria. Nickel exceeded the Regional SL and NAPR basewide background concentration in samples 67SB01-03. Samples 67SB07-05 and 67SB02-01 exceeded only background. Selenium was detected in excess of the selected ecological soil screening values at five subsurface soil sample locations; but none exceeded any other screening criteria. Vanadium exceeded the regional and industrial

screening levels at all sample locations. Ten of the sixteen subsurface soil samples (including all duplicate samples) exceeded selected ecological soil screening values. In subsurface soil samples 67SB01-03 and 67SB07-05, vanadium exceeded the background screening concentrations. Zinc exceeded the selected ecological soil screening values in eight subsurface soil samples (which includes duplicate sample 67SB01-01D). Of those eight samples, one (67SB02-01) also exceeded background. For two other samples (67SB01-03 and 67SB07-05) zinc exceeded only background screening concentrations.

Antimony and silver did not exceed any of the screening criteria or background. Figure 6-3 presents the locations of inorganic parameters that exceeded human health and/or ecological and NAPR basewide background values for the 2010 Phase I RFI data.

Based on the exceedences of background and regulatory screening concentrations in the subsurface soil, it appears that arsenic, cobalt, copper, lead, mercury, nickel, vanadium, and zinc contamination may have occurred in the subsurface soil, although the source has not been determined.

6.4 Groundwater

Eight groundwater samples (67GW01, 67GW02, 67GW03, 67GW04, 67GW05, 67GW06, 67GW07, and 67GW08) and one duplicate sample (67GW08D) were collected and analyzed during the 2010 Phase I RFI investigation at SWMU 67. All groundwater samples were analyzed for VOCs, SVOCs (with LLPAHs), TPH DRO/GRO, and total and dissolved metals as outlined on Table 4-1. The detected results for the groundwater data set are provided in Table 6-3. Figure 6-4 presents the location of detected organic compounds above the Regional Tap Water SL, or the ecological groundwater screening values; while Figure 6-5 presents the location of detected inorganic compounds above the Regional Tap Water SL, and/or the ecological groundwater screening values, and the NAPR basewide background values. The complete data set is provided in Appendix C.

Five VOCs were detected, although none exceeded the established screening criteria.

Twelve SVOCs were detected; however only one (naphthalene) low molecular weight PAH exceeded the regional tap water screening level in groundwater sample 67GW07.

TPH DRO/GRO was not detected in any of the groundwater samples collected.

Twelve dissolved metals were detected in the groundwater samples. Seven exceeded one or more of the criteria including:

- Arsenic
- Cobalt
- Copper
- Nickel
- Selenium
- Vanadium
- Zinc

As shown on Table 6-3, dissolved arsenic exceeded only the regional tap water SL at all locations (including the duplicate sample 67GW08D). Excluding sample 67GW07; dissolved cobalt exceeded the regional tap water SL in all sample locations (including the duplicate sample

67GW08D). Dissolved copper exceeded the ecological screening criteria at all sample locations, including 67GW08D; and also exceeding background in four samples (67GW01, 67GW04, 67GW05, and 67GW06). Dissolved nickel exceeded only the selected ecological groundwater screening values in one sample (67GW05). Dissolved selenium exceeded only the regional tap water SL in sample 67GW04. Dissolved vanadium exceeded the regional tap water SL, ecological and background screening criteria in samples 67GW03, 67GW04, 67GW07, and 67GW08 (and the duplicate sample 67GW08D); the regional tap water SL and ecological screening values were exceeded in sample 67GW06, while only the regional tap water SL was exceeded in sample 67GW05. Dissolved zinc exceeded only the ecological groundwater screening value in sample 67GW05.

Thirteen total metals were detected in the groundwater samples. Six exceeded one or more of the criteria including:

- Arsenic
- Cobalt
- Copper
- Mercury
- Selenium
- Vanadium

As shown on Table 6-3, arsenic exceeded its tap water regional SL at all samples locations (including the duplicate sample at 67GW08D). No other groundwater screening criteria for arsenic were exceeded. Total cobalt exceeded its tap water regional SL in all groundwater samples except 67GW07. Total copper exceeded the selected ecological groundwater screening values in all samples. Total mercury (in sample 67GW01) and total selenium (in sample 67GW04) exceeded the tap water regional SL and their background screening criteria. The regional tap water SL and ecological groundwater screening criteria were exceeded for dissolved vanadium in five groundwater samples (including the duplicate 67GW08D).Dissolved copper was detected above the basewide background screening value and the ecological screening criteria in four samples, as shown on Figure 6-5.

Groundwater samples collected during this investigation resulted in the exceedence of one organic constituent (naphthalene at 67GW07) and inorganic exceedences of human health and/or ecological and background screening criteria in the following samples: 67GW01, 67GW03, 67GW04, 67GW06, 67GW07, and 67GW08 (plus the duplicate sample 67GW08D). The inorganic constituents exceeding one or more of the screening criteria included total mercury and selenium and dissolved copper and vanadium Based on organic and inorganic exceedences, contamination in the groundwater has not been delineated.

6.5 Surface Water

One fresh surface water sample (67SW03) was collected and analyzed during the 2010 Phase I RFI investigation at SWMU 67. Analysis for this sample included for VOCs, SVOCs (with LLPAHs), TPH DRO, and total and dissolved metals as outlined on Table 4-1. The detected results for the surface water data set are provided in Table 6-4. The complete data set is provided in Appendix C.

It should be noted that estuarine wetland surface water screening values were used for comparison because NAPR basewide background values have not been established for fresh surface water.

There were no VOCs or TPH DRO/GRO detections in surface water sample 67SW03.

Although naphthalene was detected in 67SW03 it did not exceed any of the established screening criteria.

Ten dissolved metals were detected in the surface water samples. Three exceeded one of the criteria including:

- Barium (exceeded background screening criteria)
- Copper (exceeded ecological surface water screening criteria)
- Vanadium (exceeded regional tap water screening levels)

Eleven total metals were detected in the surface water samples. Three exceeded one of the criteria including:

- Arsenic (exceeded regional tap water screening levels)
- Copper (exceeded ecological surface water screening criteria)
- Vanadium (exceeded regional tap water screening levels)

The fresh surface water sample collected during this investigation resulted in both total and dissolved inorganic exceedences.

Surface water sample 67SW03 was taken within a small pool just beyond a 36" culvert outlet, which served as the only location (within or adjacent to SWMU 67) feasible for such a sample to be collected. Although surface water samples were not proposed in the approved work plan, this sample was collected as a means to further evaluate and understand possible contaminant migration to (and within) the site. The small pool represents an intermittent aquatic habitat that does not support lower trophic level receptors, such as benthic macroinvertebrates, fish, or amphibians (no such aquatic organisms were noted during sample collection).

6.6 Estuarine Sediment

Four estuarine sediment samples (67SD01, 67SD02, 67SD04, and 67SD05) and one duplicate sample (67SD01D) were collected from the adjacent estuarine wetland and analyzed during the 2010 Phase I RFI investigation at SWMU 67. All sediment samples were analyzed for VOCs, SVOCs (with LLPAHs), TPH DRO/GRO, total metals, and TOC as outlined on Table 4-1. The detected results for the sediment sample data set are provided in Table 6-5, while the complete data set is provided in Appendix C. Figure 6-6 presents the location of detected organic compounds above the human health and/or ecological screening values; while Figure 6-7 presents the location of detected inorganic compounds above the human health and/or ecological and NAPR basewide background screening values for estuarine sediment.

Analysis of the four sediment samples (including the duplicate sample 67SD01-D) resulted in the detection of six volatiles (2-butanone, acetone, carbon disulfide, chloromethane, methyl iodide, and m&p-xylene). Acetone exceeded the selected ecological sediment screening values in all samples including the duplicate sample 67SD01D. Carbon disulfide exceeded the selected ecological sediment screening values in two samples (67SD01D and 67SD04). No other detected volatiles exceeded any of the established screening criteria.
Ten SVOCs (with LLPAHs) were detected in the sediment samples. In sample 67SD05, benzo(a)pyrene exceeded the regional SL for residential soil, while dibenz(a,h)anthracene exceeded the residential SL and the ecological sediment screening values.

DRO and total TPH were detected in all of the estuarine sediment samples, but none exceeded the established screening criteria.

Nine metals exceeded one or more of the criteria including:

- Arsenic
- Barium
- Cadmium
- Cobalt
- Copper
- Lead
- Selenium
- Vanadium
- Zinc

Arsenic was detected at concentrations exceeding the residential soil SL at all locations. No other screening criteria were exceeded for arsenic. Barium exceeded the background and ecological screening criteria in all sediment samples (excluding 67SD02 – where only background was exceeded). Cadmium exceeded the ecological screening values in samples 67SD01, 67SD01D, and 67SD05. Cobalt exceeded all established screening criteria for all estuarine sediment samples (including 67SD01D) collected. Copper and selenium exceeded the ecological screening value in all four samples, and also exceed the background screening value at 67SD05. Lead exceeded the ecological and background screening values in all but one sample (67SD04). Selenium exceeded the ecological screening criteria for all estuarine sediment samples collected; the background screening criteria for selenium was exceeded in one sample, 67SD05. Vanadium exceeded all screening criteria in samples 67SD01, 67SD02, and 67SD04; samples 67SD01D and 67SD05 exceeded residential and industrial soil SLs, and selected ecological sediment screening values. Zinc exceeded only the background screening criteria in sediment sample 67SD05.

Based on the exceedences of background and regulatory screening concentrations in estuarine sediment, it appears that barium, cobalt, copper, lead, selenium, vanadium, and zinc contamination may have occurred, although the source has not been determined.

The reported TOC concentrations for samples 67SD02, 67SD04, and 67SD05 were 25,400; 25,600; and 47,770 mg/kg, respectively. Note that sample 67SD01 was not analyzed for TOC. It is suspected that the laboratory inadvertently did not analyze sample 67SD01 since it was directed not to analyze the duplicate and MS/MSD associated with this sample.

6.7 Freshwater Sediment

One freshwater sediment sample (67SD03) was collected from near a storm water outfall upgradient of the forested estuarine wetland boundary and analyzed for VOCs, SVOCs (with LLPAHs), TPH DRO/GRO, total metals, and TOC as outlined on Table 4-1. The detected results for the sediment sample data set are provided in Table 6-6 as compared to non-airfield background freshwater drainage ditch sediment (see Section 6.1.3), while the complete data set is provided in Appendix C. Figure 6-8 presents the location of detected organic compounds above the human health and/or ecological screening values.

Analysis resulted in the detection of five volatiles (2-butanone, acetone, carbon disulfide, methyl iodide, and m&p-xylene). Acetone exceeded only the selected ecological sediment screening values for freshwater sediment sample 67SD03. No other volatile organic constituents exceeded any of their established screening criteria.

Benzo(g,h,i)perylene was detected in 67SD03, but did not exceed any of the established screening values.

DRO and total TPH was detected in 67SD03, but did not exceed the established screening criteria.

Five metals exceeded one or more of the criteria including:

- Arsenic exceeded regional screening levels for residential soil
- Barium exceeded ecological screening levels
- Cobalt exceeded the regional screening levels for residential and industrial soil Copper exceeded selected ecological sediment screening values
- Vanadium exceeded the selected ecological sediment screening value and regional screening levels for residential and industrial soil

None of the detected concentrations of these metals exceeded background. Additionally, detected concentrations in freshwater sediment sample 67SD03 did not exceed any screening criteria or background: beryllium, cadmium, chromium, lead, mercury, nickel, selenium, thallium, or zinc.

The reported TOC concentration for sample 67SD03 was 14,030 mg/kg.

6.8 Laboratory Data Validation Summary

A discussion of the compounds detected in the field QA/QC samples is presented in Section 6.8.1. A summary of the data validation findings is provided in Section 6.8.2. Data validation reports are included in Appendix D. In addition, the Puerto Rican Chemist Certification for each STL SDG also is presented in Appendix E.

6.8.1 Summary of Detected Compounds in Field QA/QC Samples

Field generated QA/QC samples for the Phase I RFI field effort consisted of field blanks, trip blanks, and equipment rinsates. Trip blanks were only analyzed for VOCs and/or GRO. Other blanks were analyzed for all fractions requested in this investigation including VOCs, SVOCs (with LLPAHs), TPH DRO/GRO, and total metals. Table 6-7 presents the detected compounds found in the trip blanks, equipment rinsates, and field blanks.

Detections in field blank FB01 included four VOCs (acetone, chloroform, methylene chloride, and toluene), two PAHs (2-methylnaphthalene, and naphthalene), GRO, and one inorganic (zinc). Detections in field blank FB02 included two VOCs (acetone and toluene), GRO, and four metals (copper, lead, nickel, and zinc).

GRO was detected in all of the QA/QC samples (equipment rinsates, field blanks, and trip blanks) ranging from 0.029 µg/L in equipment rinsate sample 67ER03, to 0.037 ug/L in equipment rinsate sample 67ER05.

Analysis of the eight equipment rinsate samples resulted in the detection of ten VOCs (2-butanone, acetone, benzene, bromodichloromethane, chloroform, methylene chloride, toluene,

m&p-xylene,o-xylene, and total xylene), three PAHs (2-methylnaphthalene, naphthalene, and benzo(k)fluoranthene), gasoline range organics, and four metals (copper, lead, nickel, and zinc).

It should be noted that rejected data was evident for the volatile 2-butanone in the following samples: 67ER01, 67ER02, 67ER05, 67FB01, 67FB02, and all trip blank samples. Acetone was also rejected in all trip blank samples.

6.8.2 Validation Summary

Laboratory analyses were performed by CompuChem, a Division of Liberty Analytical Corporation located in Cary, North Carolina. Validation services were provided by DataQual Environmental Services, LLC located in St. Louis, Missouri. Validation conclusions are provided in Appendix D. The validation indicted that all sample preparation and analysis was performed within Region II and/or method holding time requirements. Changes in the results due to the application of the data validation objectives are not expected to significantly compromise the data quality objectives for this SDG. Consequently, the data, as qualified by the validator is acceptable for its intended use.

7.0 CONCLUSIONS AND RECOMMENDATIONS

7.1 Conclusions

The results of the Phase I RFI investigation for SWMU 67 indicate the presence of contaminants in surface soil, subsurface soil, groundwater and estuarine sediment. However, the extent of the identified contamination in these media has not been delineated. The following summarizes the findings of the Phase I RFI investigation by media:

- **Surface Soil** - VOCs, SVOCs (with LLPAHs) and TPH GRO were not detected at concentrations that exceeded screening criteria. TPH DRO exceeded screening criteria at one location approximately 125 feet southeast of the former gas station foundation. Arsenic, copper, lead, mercury, selenium and vanadium were detected in the surface soil at various locations at concentrations above both the applicable screening criteria and background.

- **Subsurface Soil** - VOCs, SVOCs (with LLPAHs), TPH GRO and TPH DRO were not detected at concentrations that exceeded screening criteria. Arsenic, cobalt, copper, lead, mercury, nickel, vanadium and zinc were detected in the subsurface soil at various locations at concentrations above both the applicable screening criteria and background.

- **Groundwater** – VOCs, TPH GRO and TPH DRO were not detected at concentrations that exceeded the established screening criteria. One SVOC, naphthalene was detected in well 67SB07 at a concentration in excess of the regional tap water screening value; however, this sample was located side-gradient and approximately 200 feet south of the former gas station foundation. Dissolved copper, dissolved vanadium, total mercury and total selenium were detected at various locations at concentrations in excess of applicable screening criteria and background.

- **Fresh Surface Water** – VOCs, TPH GRO and TPH DRO were not detected in the fresh surface water sample. SVOCs were not detected at concentrations that exceeded the applied estuarine wetland surface water screening criteria. Dissolved barium, copper and vanadium, and total arsenic, copper and vanadium exceeded at least one of the estuarine wetland surface water screening criteria. No NAPR basewide fresh surface water background has been established.

- **Estuarine Sediment** – Detected concentrations of acetone and carbon disulfide exceeded the established screening criteria for estuarine sediment; no other VOCs exceeded the screening criteria. Benzo(a)pyrene and dibenz(a,h)anthracene exceeded the established screening criteria for estuarine sediment; no other SOVCs exceeded the screening criteria. TPH GRO and TPH DRO were not detected at concentrations exceeding the established screening criteria. Barium, cobalt, copper, lead, selenium, vanadium and zinc were detected at various locations at concentrations in excess of applicable screening criteria and background.

- **Freshwater Sediment** – Acetone was the only VOC detected in excess of established screening values. SVOCs were not detected at concentrations in excess of the established screening value. TPH GRO and TPH DRO were not detected at concentrations exceeding the established screening criteria. Metals were not detected above established screening criteria and background.

7.2 Recommendations

The results of the Phase I RFI investigation indicate the presence of contaminants at concentrations in excess of screening criteria and background in surface soil, subsurface soil, groundwater and estuarine sediment. A Full RFI Investigation is recommended to characterize the nature and extent of contamination in these media. Recommended analyses for these media include VOCs, SVOCs, TPH GRO, TPH DRO and metals. Additionally, characterization of the surface and shallow subsurface soil of the former parking/lay down area currently underlying the tennis courts should be considered.

8.0 REFERENCES

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TABLES

TABLE 4-1

Revised: June 2, 2011

SUMMARY OF SAMPLING AND ANALYTICAL PROGRAM - ENVIRONMENTAL SAMPLES
SWMU 67 - FORMER GAS STATION
PHASE I RFI REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

					Analysis Requested							
Sample Media	**Site ID**	**Sample ID**	**Sample Depth (ft. bgs)**	**Sample Date**	App IX VOCs	App IX SVOCs (with LLPAHs)	App IX Metals (Total)	App IX Metals (Dissolved)	Total Organic Carbon (TOC)	TPH DRO	TPH GRO	**Comment**
Surface Soil	67SB01	67SB01-00	0.0 - 1.0	3/24/10	X	X	X			X	X	
	67SB02	67SB02-00	0.0 - 1.0	3/25/10	X	X	X			X	X	
		67SB02-00MS/MSD	0.0 - 1.0	3/25/10	X	X	X			X	X	Matrix Spike/Matrix Spike Duplicate
	67SB03	67SB03-00	0.0 - 1.0	3/26/10	X	X	X			X	X	
	67SB04	67SB04-00	0.0 - 1.0	3/25/10	X	X	X			X	X	
	67SB05	67SB05-00	0.0 - 1.0	3/24/10	X	X	X			X	X	
	67SB06	67SB06-00	0.0 - 1.0	3/23/10	X	X	X			X	X	
	67SB07	67SB07-00	0.0 - 1.0	3/23/10	X	X	X			X	X	
	67SB08	67SB08-00	0.0 - 1.0	3/22/10	X	X	X			X	X	
		67SB08-00D	0.0 - 1.0	3/22/10	X	X	X			X	X	Duplicate
	67SS01	67SS01	0.0 - 1.0	3/30/10	X	X	X			X	X	
	67SS02	67SS01	0.0 - 1.0	3/30/10	X	X	X			X	X	
Subsurface Soil	67SB01	67SB01-01	1.0 - 3.0	3/24/10	X	X	X			X	X	
		67SB01-01D	1.0 - 3.0	3/24/10	X	X	X			X	X	Duplicate
		67SB01-03	5.0 - 7.0	3/24/10	X	X	X			X	X	
	67SB02	67SB02-01	1.0 - 3.0	3/25/10	X	X	X			X	X	
		67SB02-02	3.0 - 5.0	3/25/10	X	X	X			X	X	
	67SB03	67SB03-01	1.0 - 3.0	3/26/10	X	X	X			X	X	
		67SB03-04	7.0 - 9.0	3/26/10	X	X	X			X	X	
	67SB04	67SB04-01	1.0 - 3.0	3/25/10	X	X	X			X	X	
		67SB04-01MS/MSD	1.0 - 3.0	3/25/10	X	X	X			X	X	Matrix Spike/Matrix Spike Duplicate
		67SB04-03	5.0 - 7.0	3/25/10	X	X	X			X	X	
	67SB05	67SB05-01	1.0 - 3.0	3/24/10	X	X	X			X	X	
		67SB05-05	9.0 - 11.0	3/24/10	X	X	X			X	X	
	67SB06	67SB06-01	1.0 - 3.0	3/23/10	X	X	X			X	X	
		67SB06-01D	1.0 - 3.0	3/23/10	X	X	X			X	X	Duplicate

TABLE 4-1

Revised: June 2, 2011

SUMMARY OF SAMPLING AND ANALYTICAL PROGRAM - ENVIRONMENTAL SAMPLES
SWMU 67 - FORMER GAS STATION
PHASE I RFI REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

					Analysis Requested							
Sample Media	**Site ID**	**Sample ID**	**Sample Depth (ft. bgs)**	**Sample Date**	App IX VOCs	App IX SVOCs (with LLPAHs)	App IX Metals (Total)	App IX Metals (Dissolved)	Total Organic Carbon (TOC)	TPH DRO	TPH GRO	**Comment**
Subsurface Soil (cont.)	67SB06	67SB06-05	9.0 - 11.0	3/23/10	X	X	X			X	X	
	67SB07	67SB07-01	1.0 - 3.0	3/23/10	X	X	X			X	X	
		67SB07-05	9.0 - 11.0	3/23/10	X	X	X			X	X	
	67SB08	67SB08-01	1.0 - 3.0	3/22/10	X	X	X			X	X	
		67SB08-05	9.0 - 11.0	3/22/10	X	X	X			X	X	
Groundwater	67SB01	67GW01	NA	3/27/10	X	X	X	X		X	X	
	67SB02	67GW02	NA	3/28/10	X	X	X	X		X	X	
	67SB03	67GW03	NA	3/30/10	X	X	X	X		X	X	
	67SB04	67GW04	NA	3/28/10	X	X	X	X		X	X	
	67SB05	67GW05	NA	3/27/10	X	X	X	X		X	X	
	67SB06	67GW06	NA	3/27/10	X	X	X	X		X	X	
	67SB07	67GW07	NA	3/26/10	X	X	X	X		X	X	
	67SB08	67GW08	NA	3/26/10	X	X	X	X		X	X	
		67GW08D	NA	3/26/10	X	X	X	X		X	X	Duplicate
		67GW08MS	NA	3/26/10	X	X	X	X		X	X	Matrix Spike
		67GW08MSD	NA	3/26/10	X	X	X	X		X	X	Matrix Spike Duplicate
Estuarine Sediment	67SD01	67SD01	0.0 - 0.5	3/22/10	X	X	X		X	X	X	
		67SD01D	0.0 - 0.5	3/22/10	X	X	X			X	X	Duplicate
		67SD01MS/MSD	0.0 - 0.5	3/22/10	X	X	X			X	X	Matrix Spike/Matrix Spike Duplicate
	67SD02	67SD02	0.0 - 0.5	3/22/10	X	X	X		X	X	X	
	67SD04	67SD04	0.0 - 0.5	3/22/10	X	X	X		X	X	X	
	67SD05	67SD05	0.0 - 0.5	3/22/10	X	X	X		X	X	X	
Freshwater Sediment	67SD03	67SD03	0.0 - 0.5	3/22/10	X	X	X		X	X	X	
Freshwater Surface Water	67SW03	67SW03	NA	3/22/10	X	X	X	X		X	X	

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

TABLE 4-2

SUMMARY OF SAMPLING AND ANALYTICAL PROGRAM - QA/QC AND IDW SAMPLES
SWMU 67 - FORMER GAS STATION
PHASE I RFI REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

			Analysis Requested								
Media	**Sample ID**	**Sample Date**	App IX VOCs	App IX SVOCs (with LLPAHs)	App IX Metals (Total)	TPH DRO	TPH GRO	TCLP VOCs	TCLP Metals	RCI	**Comment**
Trip Blanks	67TB01	3/22/2010	X				X				
	67TB02	3/24/2010	X				X				
	67TB03	3/26/2010	X				X				
	67TB04	3/26/2010	X				X				
	67TB05	3/30/2010	X				X				
Equipment Rinsate Blanks	67ER01	3/22/2010	X	X	X	X	X				Stainless Steel Spoon
	67ER02	3/23/2010	X	X	X	X	X				Macro Core Liner
	67ER03	3/24/2010	X	X	X	X	X				Macro Core Liner
	67ER04	3/25/2010	X	X	X	X	X				Macro Core Liner
	67ER05	3/26/2010	X	X	X	X	X				Macro Core Liner
	67ER06	3/27/2010	X	X	X	X	X				Groundwater sample tubing
	67ER07	3/28/2010	X	X	X	X	X				Groundwater sample tubing
	67ER08	3/30/2010	X	X	X	X	X				Stainless Steel Spoon
Field Blanks	67FB01	3/23/2010	X	X	X	X	X				Lab Grade Deionized Water
	67FB02	3/25/2010	X	X	X	X	X				Store Bought Distilled Warer
IDW	67IDW01	3/30/2010						X	X	X	Solid
	67IDW02	3/30/2010						X	X	X	Aqueous

TABLE 4-3

Revised: June 2, 2011

METHOD PERFORMANCE LIMITS
APPENDIX IX COMPOUND LIST AND CONTRACT REQUIRED QUANTITATION LIMITS (CRQL)
SWMU 67 -FORMER GAS STATION
PHASE I RFI REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Volatiles	Quantitation Limits*		Method Number	Preparation Methods		Method Description
	Water (µg/L)	Low Soil (µg/kg)		Water	Soil	
Acetone	25	50	8260B (5030B)(low level)	5030 B	5035	GC / MS
Acetonitrile	40	200	8260B (5030B)(low level)	5030 B	5035	GC / MS
Acrolein	20	100	8260B (5030B)(low level)	5030 B	5035	GC / MS
Acrylonitrile	20	100	8260B (5030B)(low level)	5030 B	5035	GC / MS
Benzene	1.0	5.0	8260B (5030B)(low level)	5030 B	5035	GC / MS
Bromodichloromethane	1.0	5.0	8260B (5030B)(low level)	5030 B	5035	GC / MS
Bromoform	1.0	5.0	8260B (5030B)(low level)	5030 B	5035	GC / MS
Bromomethane	1.0	10	8260B (5030B)(low level)	5030 B	5035	GC / MS
Carbon Disulfide	1.0	5.0	8260B (5030B)(low level)	5030 B	5035	GC / MS
Carbon Tetrachloride	1.0	5.0	8260B (5030B)(low level)	5030 B	5035	GC / MS
Chlorobenzene	1.0	5.0	8260B (5030B)(low level)	5030 B	5035	GC / MS
Chloroethane	1.0	10	8260B (5030B)(low level)	5030 B	5035	GC / MS
Chloroform	1.0	5.0	8260B (5030B)(low level)	5030 B	5035	GC / MS
Chloromethane	1.0	10	8260B (5030B)(low level)	5030 B	5035	GC / MS
Chloroprene	1.0	5.0	8260B (5030B)(low level)	5030 B	5035	GC / MS
3-Chloro-1-propene	1.0	5.0	8260B (5030B)(low level)	5030 B	5035	GC / MS
1,2-Dibromo-3-chloropropane	1.0	10	8260B (5030B)(low level)	5030 B	5035	GC / MS
Dibromochloromethane	1.0	5.0	8260B (5030B)(low level)	5030 B	5035	GC / MS
1,2-Dibromoethane	1.0	5.0	8260B (5030B)(low level)	5030 B	5035	GC / MS
Dibromomethane	1.0	5.0	8260B (5030B)(low level)	5030 B	5035	GC / MS
trans-1,4-Dichloro-2-butene	2.0	10	8260B (5030B)(low level)	5030 B	5035	GC / MS
Dichlorodifluoromethane	1.0	5.0	8260B (5030B)(low level)	5030 B	5035	GC / MS
1,1-Dichloroethane	1.0	5.0	8260B (5030B)(low level)	5030 B	5035	GC / MS
1,2-Dichloroethane	1.0	5.0	8260B (5030B)(low level)	5030 B	5035	GC / MS
trans-1,2-dichloroethene	1.0	5.0	8260B (5030B)(low level)	5030 B	5035	GC / MS
1,1-Dichloroethene	1.0	5.0	8260B (5030B)(low level)	5030 B	5035	GC / MS
Methylene Chloride	5.0	5.0	8260B (5030B)(low level)	5030 B	5035	GC / MS
1,2-Dichloropropane	1.0	5.0	8260B (5030B)(low level)	5030 B	5035	GC / MS
cis-1,3-Dichloropropene	1.0	5.0	8260B (5030B)(low level)	5030 B	5035	GC / MS
trans-1,3-Dichloropropene	1.0	5.0	8260B (5030B)(low level)	5030 B	5035	GC / MS
Ethyl benzene	1.0	5.0	8260B (5030B)(low level)	5030 B	5035	GC / MS
Ethyl methacrylate	1.0	5.0	8260B (5030B)(low level)	5030 B	5035	GC / MS
2-Hexanone	10	25	8260B (5030B)(low level)	5030 B	5035	GC / MS
Iodomethane	5.0	5.0	8260B (5030B)(low level)	5030 B	5035	GC / MS
Isobutanol	40	200	8260B (5030B)(low level)	5030 B	5035	GC / MS
Methacrylonitrile	20	100	8260B (5030B)(low level)	5030 B	5035	GC / MS
2-Butanone	10	25	8260B (5030B)(low level)	5030 B	5035	GC / MS
Methyl methacrylate	1.0	5.0	8260B (5030B)(low level)	5030 B	5035	GC / MS
4-Methyl-2-pentanone	10	25	8260B (5030B)(low level)	5030 B	5035	GC / MS
Pentachloroethane	5.0	25	8260B (5030B)(low level)	5030 B	5035	GC / MS
Propionitrile	20	100	8260B (5030B)(low level)	5030 B	5035	GC / MS
Stryene	1.0	5.0	8260B (5030B)(low level)	5030 B	5035	GC / MS
1,1,1,2-Tetrachloroethane	1.0	5.0	8260B (5030B)(low level)	5030 B	5035	GC / MS
Tetrachloroethene	1.0	5.0	8260B (5030B)(low level)	5030 B	5035	GC / MS
Toluene	1.0	5.0	8260B (5030B)(low level)	5030 B	5035	GC / MS
1,1,1-Trichloroethane	1.0	5.0	8260B (5030B)(low level)	5030 B	5035	GC / MS
1,1,2-Trichloroethane	1.0	5.0	8260B (5030B)(low level)	5030 B	5035	GC / MS

TABLE 4-3

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Volatiles (Cont.)	Quantitation Limits* Water (µg/L)	Quantitation Limits* Low Soil (µg/kg)	Method Number	Preparation Methods Water	Preparation Methods Soil	Method Description
Trichloroethene	1.0	5.0	8260B (5030B)(low level)	5030 B	5035	GC / MS
Trichlorofluoromethane	1.0	5.0	8260B (5030B)(low level)	5030 B	5035	GC / MS
1,2,3-Trichloropropane	1.0	5.0	8260B (5030B)(low level)	5030 B	5035	GC / MS
Vinyl Acetate	2.0	10	8260B (5030B)(low level)	5030 B	5035	GC / MS
Vinyl Chloride	1.0	10	8260B (5030B)(low level)	5030 B	5035	GC / MS
Xylene	2.0	10	8260B (5030B)(low level)	5030 B	5035	GC / MS
Semivolatiles	**Low Level Quantitation Limits* Water (µg/L)**	**Low Level Quantitation Limits* Low Soil (µg/kg)**	**Method Number**	**Preparation Methods Water**	**Preparation Methods Soil**	**Method Description**
Acenaphthene	0.2	6.7	8270D	3520 C	3550 B	GC/ MS
Acenaphthylene	0.2	6.7	8270D	3520 C	3550 B	GC/ MS
Acetophenone	1	33	8270D	3520 C	3550 B	GC/ MS
2-Acetylaminofluorene	1	33	8270D	3520 C	3550 B	GC/ MS
4-Aminobiphenyl	5	66	8270D	3520 C	3550 B	GC/ MS
Aniline	2	66	8270D	3520 C	3550 B	GC/ MS
Anthracene	0.2	6.7	8270D	3520 C	3550 B	GC/ MS
Aramite	1.5	66	8270D	3520 C	3550 B	GC/ MS
Benzo(a)anthracene	0.2	6.7	8270D	3520 C	3550 B	GC/ MS
Benzo(b)fluoranthene	0.2	6.7	8270D	3520 C	3550 B	GC/ MS
Benzo(k)fluoranthene	0.2	6.7	8270D	3520 C	3550 B	GC/ MS
Benzo(g,h,i)perylene	0.2	6.7	8270D	3520 C	3550 B	GC/ MS
Benzo(a)pyrene	0.2	6.7	8270D	3520 C	3550 B	GC/ MS
Benzyl alcohol	1	33	8270D	3520 C	3550 B	GC/ MS
Bis(2-chloroethoxyl)methane	1	33	8270D	3520 C	3550 B	GC/ MS
Bis(2-chloroethyl)ether	1	33	8270D	3520 C	3550 B	GC/ MS
Bis(2-ethylhexyl)phthalate	2	33	8270D	3520 C	3550 B	GC/ MS
4-Bromophenyl phenyl ether	1	33	8270D	3520 C	3550 B	GC/ MS
Butylbenzylphthalate	1	33	8270D	3520 C	3550 B	GC/ MS
4-Chloroaniline	2	66	8270D	3520 C	3550 B	GC/ MS
4-Chloro-3-methylphenol	1	33	8270D	3520 C	3550 B	GC/ MS
2-Chloronaphthalene	1	33	8270D	3520 C	3550 B	GC/ MS
2-Chlorophenol	1	33	8270D	3520 C	3550 B	GC/ MS
4-Chlorophenyl phenyl ether	1	33	8270D	3520 C	3550 B	GC/ MS
Chrysene	0.2	6.7	8270D	3520 C	3550 B	GC/ MS
3&4 Methylphenol	2	33	8270D	3520 C	3550 B	GC/ MS
2-Methylphenol	2	33	8270D	3520 C	3550 B	GC/ MS
Diallate	1	33	8270D	3520 C	3550 B	GC/ MS
Dibenzofuran	1	33	8270D	3520 C	3550 B	GC/ MS
Di-n-butyl phthalate	1	170	8270D	3520 C	3550 B	GC/ MS
Dibenzo(a,h)anthracene	0.2	6.7	8270D	3520 C	3550 B	GC/ MS
o-Dichlorobenzene	1	33	8270D	3520 C	3550 B	GC/ MS
m-Dichlorobenzene	1	33	8270D	3520 C	3550 B	GC/ MS
p-Dichlorobenzene	1	33	8270D	3520 C	3550 B	GC/ MS
3,3'-Dichlorobenzidine	20	66	8270D	3520 C	3550 B	GC/ MS
2,4-Dichlorophenol	1	33	8270D	3520 C	3550 B	GC/ MS
2,6-Dichlorophenol	1	33	8270D	3520 C	3550 B	GC/ MS
Diethylphthalate	1	33	8270D	3520 C	3550 B	GC/ MS

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Semivolatiles (Cont.)	Low Level Quantitation Limits*		Method Number	Preparation Methods		Method Description
	Water (µg/L)	Low Soil (µg/kg)		Water	Soil	
p-(Dimethylamino)azobenzene	5	33	8270D	3520 C	3550 B	GC/ MS
7,12-Dimethyl benz(a)anthracen	1	33	8270D	3520 C	3550 B	GC/ MS
3,3-Dimethyl benzidine	20	660	8270D	3520 C	3550 B	GC/ MS
2,4-Dimethylphenol	2	66	8270D	3520 C	3550 B	GC/ MS
alpha, alpha-Dimethylphenethyla	10	67,000	8270D	3520 C	3550 B	GC/ MS
Dimethyl phthalate	1	33	8270D	3520 C	3550 B	GC/ MS
m-Dinitrobenzene	1	33	8270D	3520 C	3550 B	GC/ MS
4,6-Dinitro-2-methylphenol	5	170	8270D	3520 C	3550 B	GC/ MS
2,4-Dinitrophenol	10	330	8270D	3520 C	3550 B	GC/ MS
2,4-Dinitrotoluene	1	33	8270D	3520 C	3550 B	GC/ MS
2,6-Dinitrotoluene	1	33	8270D	3520 C	3550 B	GC/ MS
Di-n-octylphthalate	1	33	8270D	3520 C	3550 B	GC/ MS
1,4-Dioxane	2	33	8270D	3520 C	3550 B	GC/ MS
Dinoseb	2	66	8270D	3520 C	3550 B	GC/ MS
Ethylmethanesulfonate	2	66	8270D	3520 C	3550 B	GC/ MS
Fluoranthene	0.2	6.7	8270D	3520 C	3550 B	GC/ MS
Fluorene	0.2	6.7	8270D	3520 C	3550 B	GC/ MS
Hexachlorobenzene	1	33	8270D	3520 C	3550 B	GC/ MS
Hexachlorobutadiene	1	33	8270D	3520 C	3550 B	GC/ MS
Hexachlorocyclopentadiene	2	66	8270D	3520 C	3550 B	GC/ MS
Hexachloroethane	1	33	8270D	3520 C	3550 B	GC/ MS
Hexachlorophene	500	17,000	8270D	3520 C	3550 B	GC/ MS
Hexachloropropene	1	33	8270D	3520 C	3550 B	GC/ MS
Indeno(1,2,3-cd)pyrene	0.2	6.7	8270D	3520 C	3550 B	GC/ MS
Isophorone	1	33	8270D	3520 C	3550 B	GC/ MS
Isosafrole	1	33	8270D	3520 C	3550 B	GC/ MS
Methapyrilene	200	6,700	8270D	3520 C	3550 B	GC/ MS
3-Methylcholanthrene	1	33	8270D	3520 C	3550 B	GC/ MS
Methyl methanesulfonate	2	33	8270D	3520 C	3550 B	GC/ MS
2-Methylnaphthalene	0.2	6.7	8270D	3520 C	3550 B	GC/ MS
Naphthalene	0.2	6.7	8270D	3520 C	3550 B	GC/ MS
1,4-Naphthoquinone	1	33	8270D	3520 C	3550 B	GC/ MS
1-Naphthylamine	5	66	8270D	3520 C	3550 B	GC/ MS
2-Naphthylamine	10	330	8270D	3520 C	3550 B	GC/ MS
2-Nitroaniline	1	170	8270D	3520 C	3550 B	GC/ MS
3-Nitroaniline	5	170	8270D	3520 C	3550 B	GC/ MS
4-Nitroaniline	5	170	8270D	3520 C	3550 B	GC/ MS
Nitrobenzene	1	33	8270D	3520 C	3550 B	GC/ MS
2-Nitrophenol	1	33	8270D	3520 C	3550 B	GC/ MS
4-Nitrophenol	5	170	8270D	3520 C	3550 B	GC/ MS
4-Nitroquinoline-1-oxide	2	33	8270D	3520 C	3550 B	GC/ MS
n-Nitrosodi-n-butylamine	1	33	8270D	3520 C	3550 B	GC/ MS
n-Nitrosodiethylamine	1	33	8270D	3520 C	3550 B	GC/ MS
n-Nitrosodimethylamine	1	33	8270D	3520 C	3550 B	GC/ MS
n-Nitrosodiphenylamine	1	33	8270D	3520 C	3550 B	GC/ MS
n-Nitrosodi-n-propylamine	1	33	8270D	3520 C	3550 B	GC/ MS

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Semivolatiles (Cont.)	Low Level Quantitation Limits* Water (µg/L)	Low Level Quantitation Limits* Low Soil (µg/kg)	Method Number	Preparation Methods Water	Preparation Methods Soil	Method Description
n-Nitrosomethylethylamine	2	33	8270D	3520 C	3550 B	GC/ MS
n-Nitrosomorpholine	1	33	8270D	3520 C	3550 B	GC/ MS
n-Nitrosopiperidine	1	33	8270D	3520 C	3550 B	GC/ MS
n-Nitrosopyrrolidine	1	33	8270D	3520 C	3550 B	GC/ MS
5-Nitro-o-toluidine	1	33	8270D	3520 C	3550 B	GC/ MS
bis-(2-chloroisopropyl)ether	1	33	8270D	3520 C	3550 B	GC/ MS
Pentachlorobenzene	1	33	8270D	3520 C	3550 B	GC/ MS
Pentachloronitrobenzene	1	33	8270D	3520 C	3550 B	GC/ MS
Pentachlorophenol	5	170	8270D	3520 C	3550 B	GC/ MS
Phenacetin	1	33	8270D	3520C	3550B	GC/ MS
Phenanthrene	0.2	6.7	8270D	3520C	3550B	GC/ MS
Phenol	1	33	8270D	3520C	3550B	GC/ MS
1,4-Phenylenediamine	20	170	8270D	3520C	3550B	GC/ MS
2-Picolin	2	66	8270D	3520C	3550B	GC/ MS
Pronamide	1	33	8270D	3520C	3550B	GC/ MS
Pyrene	0.2	6.7	8270D	3520C	3550B	GC/ MS
Pyridine	5	33	8270D	3520C	3550B	GC/ MS
Safrole	1	33	8270D	3520C	3550B	GC/ MS
1,2,4,5-Tetrachlorobenzene	1	33	8270D	3520C	3550B	GC/ MS
2,3,4,6-Tetrachlorophenol	1	33	8270D	3520C	3550B	GC/ MS
o-Toluidine	1	33	8270D	3520C	3550B	GC/ MS
1,2,4-Trichlorobenzene	1	33	8270D	3520C	3550B	GC/ MS
2,4,5-Trichlorophenol	1	33	8270D	3520C	3550B	GC/ MS
2,4,6-Trichlorophenol	1	33	8270D	3520C	3550B	GC/ MS
1,3,5-Trinitrobenzene	1	33	8270D	3520C	3550B	GC/ MS
Inorganics	**Quantitation Limits* Water (µg/L)**	**Quantitation Limits* Low Soil (mg/kg)**	**Method Number**	**Preparation Methods Water**	**Preparation Methods Soil**	**Method Description**
Antimony	20	2.0	6020A	3005A	3050B	ICP/MS
Arsenic	10	1.0	6020A	3005A	3050B	ICP/MS
Barium	10	1.0	6020A	3005A	3050B	ICP/MS
Beryllium	4.0	0.4	6020A	3005A	3050B	ICP/MS
Cadmium	5.0	0.5	6020A	3005A	3050B	ICP/MS
Chromium	10	1.0	6020A	3005A	3050B	ICP/MS
Cobalt	10	1.0	6020A	3005A	3050B	ICP/MS
Copper	20	2.0	6020A	3005A	3050B	ICP/MS
Lead	5.0	0.5	6020A	3005A	3050B	ICP/MS
Mercury	0.2	0.02	7470A/7471A	7470A	7471A	Cold Vapor AA
Nickel	40	4.0	6020A	3005A	3050B	ICP/MS
Selenium	10	1.0	6020A	3005A	3050B	ICP/MS
Silver	10	1.0	6020A	3005A	3050B	ICP/MS
Thallium	10	1.0	6020A	3005A	3050B	ICP/MS
Tin	10	5.0	6010B	3005A	3050B	ICP-AES
Vanadium	10	1.0	6020A	3005A	3050B	ICP/MS
Zinc	20	2.0	6020A	3005A	3050B	ICP/MS

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	Quantitation Limits*			Preparation Methods		
Total Petroleum Hydrocarbons	**Water (µg/L)**	**Low Soil (µg/kg)**	**Method Number**	**Water**	**Soil**	**Method Description**
TPH DRO	100	3300	8015C	5030B	5035	GC
TPH GRO	50	250	8015C	3520C	3550B	GC
	Quantitation Limits*			**Preparation Methods**		
Total Organic Carbon	**Water (mg/L)**	**Soil (mg/kg)**	**Method Number**	**Water**	**Soil**	**Method Description**
TOC	NA	1	9060A	NA	NA	Lloyd Kahn
	Quantitation Limits*			**Preparation Methods**		
TCLP Metals	**Soil (mg/L)**	**Water (µg/L)**	**Method Number**	**Water**	**Soil**	**Method Description**
Arsenic	1.0	10	6010C(3050B/3010A)	NA	1311/3010A	ICP
Barium	1.0	10	6010C(3050B/3010A)	NA	1311/3010A	ICP
Cadmium	0.50	5	6010C(3050B/3010A)	NA	1311/3010A	ICP
Chromium	1.0	10	6010C(3050B/3010A)	NA	1311/3010A	ICP
Lead	0.50	5.0	6010C(3050B/3010A)	NA	1311/3010A	ICP
Mercury	0.020	0.20	7470A/7471A	NA	1311/7470A	Cold Vapor AA
Selenium	1.0	10	6010C(3050B/3010A)	NA	1311/3010A	ICP
Silver	1.0	10	6010C(3050B/3010A)	NA	1311/3010A	ICP
	Quantitation Limits*			**Preparation Methods**		
Toxicity Characteristic Leaching Procedure	**Water (µg/L)**	**Soil (µg/L)**	**Method Number**	**Water**	**Soil**	**Method Description**
Benzene	NA	20	1311 / 8260B	NA	1311/5030B	GC/MS
Carbon tetrachloride	NA	20	1311 / 8260B	NA	1311/5030B	GC/MS
Chlorobenzene	NA	20	1311 / 8260B	NA	1311/5030B	GC/MS
Chloroform	NA	20	1311 / 8260B	NA	1311/5030B	GC/MS
1,2-Dichloroethane	NA	20	1311 / 8260B	NA	1311/5030B	GC/MS
1,1-Dichloroethene	NA	20	1311 / 8260B	NA	1311/5030B	GC/MS
2-Butanone (MEK)	NA	20	1311 / 8260B	NA	1311/5030B	GC/MS
Tetrachloroethene	NA	20	1311 / 8260B	NA	1311/5030B	GC/MS
Trichloroethene	NA	20	1311 / 8260B	NA	1311/5030B	GC/MS
Vinyl chloride	NA	20	1311 / 8260B	NA	1311/5030B	GC/MS

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Reactivity, Corrosivity, Ignitability	Quantitation Limits*		Method Number	Preparation Methods		Method Description
	Water (mg/L)	Low Soil (mg/kg)		Water	Soil	
Reactive Cyanide	1	1	9014	9012A	9012A	Titrimetric
Flashpoint/Ignitability	NA	NA	1010	NA	NA	Pensky-Martens Closed Cup Tester
pH (s.u.)	NA	NA	9040B	NA	NA	Electrometric
Reactive Sulfide	1	10	9034	NA	9030B	Titrimetric

Notes:

* 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.
mg/L - milligrams per liter
GC - Gas Chromotography
GC/MS - Gas Chromotography/Mass Spectrometry
ICP - Inductively Coupled Plasma
ICP/MS - Inductively Coupled Plasma - Mass Spectrometry

TABLE 4-4

SUMMARY OF SOIL BORING AND MONITORING WELL SPECIFICATIONS
SWMU 67 - FORMER GAS STATION
PHASE I RFI REPORT
NAVAL ACTIVITY PUERTO RICO
CEIBA, PUERTO RICO

Soil Boring Monitoring Well Designation	Date Installed	Ground Elevation (ft. datum)	Top of PVC Elevation (ft. datum)	Borehole Depth		Well Depth		Screened Interval		Groundwater Level March 31, 2010		Groundwater Level April 25, 2010	
				Feet (approx. bgs)	Elev. (ft. datum)	Feet (approx. bgs)	Elev. (ft. datum)	Feet (approx. bgs)	Elev. (ft. datum)	Feet (below top of PVC casing)	Elev. (ft. datum)	Feet (below top of PVC casing)	Elev. (ft. datum)
67SB01	3/24/2010	112.3	115.5	16.0	96.3	13.0	99.3	3-13	109.3 to 99.3	9.21	106.25	9.27	106.19
67SB02	3/25/2010	113.0	116.0	16.0	97.0	13.0	100.0	3-13	110.0 to 100.0	10.68	105.31	10.21	105.78
67SB03	3/26/2010	114.8	117.7	16.0	98.8	15.0	99.8	5-15	109.8 to 99.8	11.34	106.39	11.41	106.32
67SB04	3/25/2010	116.4	119.4	16.0	100.4	16.0	100.4	6-16	110.4 to 100.4	13.00	106.38	13.05	106.33
67SB05	3/24/2010	114.0	117.0	16.0	98.0	16.0	98.0	6-16	108.0 to 98.0	11.92	105.12	11.67	105.37
67SB06	3/23/2010	115.7	118.5	20.0	95.7	18.0	97.7	8-18	107.7 to 97.7	14.88	103.57	12.84	105.61
67SB07	3/23/2010	118.2	121.0	20.0	98.2	20.0	98.2	10-20	108.2 to 98.2	14.94	106.10	15.03	106.01
67SB08	3/22/2010	119.3	122.1	20.0	99.3	20.0	99.3	10-20	109.3 to 99.3	15.28	106.85	15.45	106.68

Notes:
bgs = Below Ground Surface
The datum plan used is the Mean Low Water + 100.00 foot as established by the U.S. Navy Survey Section (November 1941).
SWMU 67 Phase I RFI field program implemented March 22 through March 30, 2010.

TABLE 6-1

SUMMARY OF DETECTED LABORATORY RESULTS - SURFACE SOIL
SWMU 67 - FORMER GAS STATION
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Site ID Sample ID Sample Date Sample Depth (ft bgs)	**Regional Screening Levels Residential Soil**	*Regional Screening Levels Industrial Soil*	Selected Ecological Soil Screening Values	NAPR Basewide Background [1]	67SS01 67SS01 3/30/2010 0.0 - 1.0	67SS02 67SS02 3/30/2010 0.0 - 1.0	67SB01 67SB01-00 3/24/2010 0.0 - 1.0	67SB02 67SB02-00 3/25/2010 0.0 - 1.0
Volatiles (µg/kg)								
2-Butanone	2,800,000 [2]	20,000,000 [2]	NE	NE	14 U	14 U	19	19 U
Acetone	6,100,000 [2]	63,000,000 [2]	NE	NE	14 R	14 R	240	220
Benzene	1,100	5,400	101 [9][10]	NE	5.5 U	5.7 U	3.8 U	4.2 U
Carbon Disulfide	82,000 [2]	370,000 [2]	NE	NE	5.5 U	5.7 U	3.8 U	4.2 U
Chloroform	290	1,500	1,002 [9][10]	NE	5.5 U	5.7 U	3.8 U	4.2 U
Chloromethane	12,000 [2]	50,000 [2]	NE	NE	5.5 UJ	5.7 UJ	3.8 U	4.2 U
Methyl Iodide	NE	NE	NE	NE	5.5 U	5.7 U	1.9 J	0.7 J
Methylene Chloride	11,000	53,000	1,040 [9][10]	NE	5.5 U	5.7 U	3.8 U	4.2 U
Xylene, m/p-	63,000 [2][3]	270,000 [2][3]	NE	NE	11 U	11 U	7.6 U	0.12 J
Semivolatiles (µg/kg)								
2-Methylnaphthalene	31,000 [2]	410,000 [2]	NE	NE	9.5 U	9.5 U	9.4 U	0.81 J
Acenaphthene	340,000 [2]	3,300,000 [2]	NE	NE	1.1 J	0.75 J	9.4 U	9.8 U
Acenaphthylene	340,000 [2][4]	3,300,000 [2][4]	NE	NE	3.6 J	1.9 J	9.4 U	1.2 J
Anthracene	1,700,000 [2]	17,000,000 [2]	NE	NE	2.5 J	1.5 J	0.5 J	0.69 J
Benzo(a)anthracene	150	2,100	NE	NE	11	8.6 J	1.2 J	2.7 J
Benzo(a)pyrene	15.0	210	NE	NE	11	10	1.6 J	9.8 U
Benzo(b)fluoranthene	150	2,100	NE	NE	6.7 J	6.5 J	1.4 J	4.1 J
Benzo(g,h,i)perylene	170,000 [2][5]	1,700,000 [2][5]	NE	NE	9.2 J	8.8 J	1.7 J	3.4 J
Benzo(k)fluoranthene	1,500	21,000	NE	NE	8 J	6.6 J	1.9 J	3.1 J
Bis(2-ethylhexyl)phthalate	35,000	120,000	6,010 [9][11]	NE	100 J	64 J	190 U	200 U
Chrysene	15,000	210,000	NE	NE	10	7.4 J	1.5 J	3.5 J
Dibenz(a,h)anthracene	15.0	210	NE	NE	2 J	1.6 J	0.5 J	9.8 UJ
Di-n-butylphthalate	610,000 [2]	6,200,000 [2]	200,000 [12]	NE	200 U	200 U	190 U	200 U
Fluoranthene	230,000 [2]	2,200,000 [2]	NE	NE	17	15	9.4 U	5.9 J
Indeno(1,2,3-cd)pyrene	150	2,100	NE	NE	8.8 J	9.6	2 J	4.5 J
Phenanthrene	170,000 [2][5]	1,700,000 [2][5]	NE	NE	8.2 J	6 J	9.4 U	2.8 J
Pyrene	170,000 [2]	1,700,000 [2]	NE	NE	16	16	1 J	4.7 J

TABLE 6-1

SUMMARY OF DETECTED LABORATORY RESULTS - SURFACE SOIL
SWMU 67 - FORMER GAS STATION
PHASE I RFI REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Site ID Sample ID Sample Date Sample Depth (ft bgs)	**Regional Screening Levels Residential Soil**	*Regional Screening Levels Industrial Soil*	Selected Ecological Soil Screening Values	NAPR Basewide Background [1]	67SS01 67SS01 3/30/2010 0.0 - 1.0	67SS02 67SS02 3/30/2010 0.0 - 1.0	67SB01 67SB01-00 3/24/2010 0.0 - 1.0	67SB02 67SB02-00 3/25/2010 0.0 - 1.0
PAH totals (µg/kg)								
Low molecular weight PAHs	NE	NE	29,000 [13][14]	NE	60.9	53.65	66.3	40.8
High molecular weight PAHs	NE	NE	18,000 [13][15]	NE	82.7	75.1	12.8	45.6
TPH (mg/kg)								
Diesel Range Organics	100 [6]	100 [6]	NE	NE	11 U	11 U	11 U	12
Total TPH	100 [6]	100 [6]	NE	NE	11.57 U	11.57 U	11.57 U	12.59
Inorganics (mg/kg)								
Antimony	3.10 [2]	41.0 [2]	10.0 [16]	3.17	0.21 J	0.17 J	1.1 UJ	0.52 J
Arsenic	0.390	1.60	18.0 [17]	2.65	***2.9***	***5***	0.23 J	**1**
Barium	1,500 [2]	19,000 [2]	330 [18]	199	116	108	127	130
Beryllium	16.0 [2]	200 [2]	21.0 [19]	0.590	0.34 J	0.3 J	0.29 J	0.35 J
Cadmium	7.0 [2]	80.0 [2]	0.770 [20]	1.02	0.35 J	0.35 J	0.26 J	0.36 J
Chromium	12,000 [2][7]	150,000 [2][7]	26.0 [21]	49.8	28 J	47.9 J	41.8	41.3 J
Cobalt	2.30 [2]	30.0 [2]	13.0 [22]	46.2	**28.9**	**25.7**	**23.2** J	***38.1*** J
Copper	310 [2]	4,100 [2]	28.0 [23]	168	102	150	115 J	277 J
Lead	400 [8]	800 [8]	11.0 [24]	22.0	23.8	31.5	13.4 J	62.4
Mercury	0.560 [2]	3.40 [2]	0.10 [25]	0.109	0.081	0.054	0.041	0.066
Nickel	150 [2]	2,000 [2]	38.0 [26]	20.7	11.2	16.6	13.6	16.3 J
Selenium	39.0 [2]	510 [2]	0.520 [27]	1.48	1.3 J	1 J	1.2 J	1.5 J
Silver	39.0 [2]	510 [2]	4.20 [28]	NE	0.077 J	0.049 J	0.57 U	0.082 J
Thallium	NE	NE	1.0 [29]	NE	0.075 J	0.051 J	0.085 J	0.3 J
Vanadium	0.550 [2]	7.20 [2]	7.80 [30]	259	***227***	***149***	***147*** J	***213*** J
Zinc	2,300 [2]	31,000 [2]	46.0 [31]	115	71.5 J	63.8 J	46.3	85.7 J

TABLE 6-1

SUMMARY OF DETECTED LABORATORY RESULTS - SURFACE SOIL
SWMU 67 - FORMER GAS STATION
PHASE I RFI REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Site ID Sample ID Sample Date Sample Depth (ft bgs)	**Regional Screening Levels Residential Soil**	*Regional Screening Levels Industrial Soil*	Selected Ecological Soil Screening Values	NAPR Basewide Background [1]	67SB03 67SB03-00 3/26/2010 0.0 - 1.0	67SB04 67SB04-00 3/25/2010 0.0 - 1.0	67SB05 67SB05-00 3/24/2010 0.0 - 1.0	67SB06 67SB06-00 3/23/2010 0.0 - 1.0
Volatiles (µg/kg)								
2-Butanone	2,800,000 [2]	20,000,000 [2]	NE	NE	12	5.6 J	13 U	11 U
Acetone	6,100,000 [2]	63,000,000 [2]	NE	NE	140	63	79	110
Benzene	1,100	5,400	101 [9][10]	NE	3.5 U	4.4 U	5.1 U	4.2 U
Carbon Disulfide	82,000 [2]	370,000 [2]	NE	NE	3.5 U	0.92 J	5.1 U	4.2 U
Chloroform	290	1,500	1,002 [9][10]	NE	0.24 J	0.3 J	5.1 U	4.2 U
Chloromethane	12,000 [2]	50,000 [2]	NE	NE	3.5 U	4.4 U	5.1 U	0.42 J
Methyl Iodide	NE	NE	NE	NE	1.1 J	4.4 U	5.1 U	1.6 J
Methylene Chloride	11,000	53,000	1,040 [9][10]	NE	0.35 J	4.4 U	5.1 U	4.2 U
Xylene, m/p-	63,000 [2][3]	270,000 [2][3]	NE	NE	7 U	8.8 U	10 U	8.5 U
Semivolatiles (µg/kg)								
2-Methylnaphthalene	31,000 [2]	410,000 [2]	NE	NE	8.9 U	8.8 U	9.5 U	9.5 U
Acenaphthene	340,000 [2]	3,300,000 [2]	NE	NE	8.9 U	8.8 U	9.5 U	9.5 U
Acenaphthylene	340,000 [2][4]	3,300,000 [2][4]	NE	NE	8.9 U	1.4 J	9.5 U	9.5 U
Anthracene	1,700,000 [2]	17,000,000 [2]	NE	NE	0.72 J	1.4 J	9.5 U	9.5 U
Benzo(a)anthracene	150	2,100	NE	NE	3.8 J	4.7 J	9.5 U	1 J
Benzo(a)pyrene	15.0	210	NE	NE	4.8 J	6.9 J	0.6 J	1.6 J
Benzo(b)fluoranthene	150	2,100	NE	NE	5.1 J	5.2 J	9.5 UJ	2.5 J
Benzo(g,h,i)perylene	170,000 [2][5]	1,700,000 [2][5]	NE	NE	3.7 J	4.9 J	0.47 J	1.6 J
Benzo(k)fluoranthene	1,500	21,000	NE	NE	8.9 U	8.8 U	0.55 J	1.6 J
Bis(2-ethylhexyl)phthalate	35,000	120,000	6,010 [9][11]	NE	360 U	39 J	200 U	200 U
Chrysene	15,000	210,000	NE	NE	3.1 J	6.8 J	9.5 U	0.96 J
Dibenz(a,h)anthracene	15.0	210	NE	NE	0.81 J	1.2 J	9.5 U	9.5 UJ
Di-n-butylphthalate	610,000 [2]	6,200,000 [2]	200,000 [12]	NE	360 U	180 U	200 U	200 U
Fluoranthene	230,000 [2]	2,200,000 [2]	NE	NE	5.9 J	17	9.5 U	9.5 U
Indeno(1,2,3-cd)pyrene	150	2,100	NE	NE	3.6 J	6.9 J	0.62 J	1.9 J
Phenanthrene	170,000 [2][5]	1,700,000 [2][5]	NE	NE	2.7 J	6.1 J	9.5 U	1.6 J
Pyrene	170,000 [2]	1,700,000 [2]	NE	NE	6 J	13	9.5 U	1.2 J

TABLE 6-1

SUMMARY OF DETECTED LABORATORY RESULTS - SURFACE SOIL
SWMU 67 - FORMER GAS STATION
PHASE I RFI REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Site ID Sample ID Sample Date Sample Depth (ft bgs)	**Regional Screening Levels Residential Soil**	*Regional Screening Levels Industrial Soil*	Selected Ecological Soil Screening Values	NAPR Basewide Background [1]	67SB03 67SB03-00 3/26/2010 0.0 - 1.0	67SB04 67SB04-00 3/25/2010 0.0 - 1.0	67SB05 67SB05-00 3/24/2010 0.0 - 1.0	67SB06 67SB06-00 3/23/2010 0.0 - 1.0
PAH totals (µg/kg)								
Low molecular weight PAHs	NE	NE	29,000 [13][14]	NE	53.82	61.1	76	68.1
High molecular weight PAHs	NE	NE	18,000 [13][15]	NE	39.81	58.4	49.74	21.86
TPH (mg/kg)								
Diesel Range Organics	100 [6]	100 [6]	NE	NE	11 U	11 U	***110***	11 U
Total TPH	100 [6]	100 [6]	NE	NE	11.54 U	11.53 U	***110.57***	11.57 U
Inorganics (mg/kg)								
Antimony	3.10 [2]	41.0 [2]	10.0 [16]	3.17	0.14 J	0.26 J	1.1 UJ	1.2 UJ
Arsenic	0.390	1.60	18.0 [17]	2.65	0.52 U	**0.99**	**0.49** J	0.57 U
Barium	1,500 [2]	19,000 [2]	330 [18]	199	203	94.7	56.2	31.8
Beryllium	16.0 [2]	200 [2]	21.0 [19]	0.590	0.4 J	0.25 J	0.19 J	0.14 J
Cadmium	7.0 [2]	80.0 [2]	0.770 [20]	1.02	0.17 J	0.24 J	0.18 J	0.13 J
Chromium	12,000 [2][7]	150,000 [2][7]	26.0 [21]	49.8	47.4 J	33.6 J	13	16.4 J
Cobalt	2.30 [2]	30.0 [2]	13.0 [22]	46.2	**24.7**	**26.5**	**21** J	**15.6** J
Copper	310 [2]	4,100 [2]	28.0 [23]	168	50.7	99.2	80.1 J	55.7 J
Lead	400 [8]	800 [8]	11.0 [24]	22.0	4.3	9.3	2.2 J	2.1
Mercury	0.560 [2]	3.40 [2]	0.10 [25]	0.109	0.037	0.037	0.011 J	0.038 U
Nickel	150 [2]	2,000 [2]	38.0 [26]	20.7	11.5	15.2	6.7	12 J
Selenium	39.0 [2]	510 [2]	0.520 [27]	1.48	0.58 J	0.42 J	0.43 J	0.34 J
Silver	39.0 [2]	510 [2]	4.20 [28]	NE	0.52 U	0.057 J	0.56 U	0.57 U
Thallium	NE	NE	1.0 [29]	NE	0.037 J	0.047 J	0.022 J	0.57 U
Vanadium	0.550 [2]	7.20 [2]	7.80 [30]	259	***150***	***170***	***177*** J	***88.5*** J
Zinc	2,300 [2]	31,000 [2]	46.0 [31]	115	32.8 J	67.1 J	61.2	36.8 J

TABLE 6-1

SUMMARY OF DETECTED LABORATORY RESULTS - SURFACE SOIL
SWMU 67 - FORMER GAS STATION
PHASE I RFI REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Site ID Sample ID Sample Date Sample Depth (ft bgs)	**Regional Screening Levels Residential Soil**	*Regional Screening Levels Industrial Soil*	Selected Ecological Soil Screening Values	NAPR Basewide Background [1]	67SB07 67SB07-00 3/23/2010 0.0 - 1.0	67SB08 67SB08-00 3/22/2010 0.0 - 1.0	67SB08 67SB08-00D 3/22/2010 0.0 - 1.0
Volatiles (µg/kg)							
2-Butanone	2,800,000 [2]	20,000,000 [2]	NE	NE	20 J	6.8 J	13
Acetone	6,100,000 [2]	63,000,000 [2]	NE	NE	280 J	110	170
Benzene	1,100	5,400	101 [9][10]	NE	0.59 J	5.2 U	4.6 U
Carbon Disulfide	82,000 [2]	370,000 [2]	NE	NE	6.4 UJ	5.2 U	4.6 U
Chloroform	290	1,500	1,002 [9][10]	NE	6.4 UJ	5.2 U	4.6 U
Chloromethane	12,000 [2]	50,000 [2]	NE	NE	6.4 UJ	5.2 U	4.6 U
Methyl Iodide	NE	NE	NE	NE	6.4 UJ	1.8 J	2.9 J
Methylene Chloride	11,000	53,000	1,040 [9][10]	NE	6.4 UJ	5.2 U	4.6 U
Xylene, m/p-	63,000 [2][3]	270,000 [2][3]	NE	NE	13 UJ	10 U	9.2 U
Semivolatiles (µg/kg)							
2-Methylnaphthalene	31,000 [2]	410,000 [2]	NE	NE	10 UJ	11 UJ	11 UJ
Acenaphthene	340,000 [2]	3,300,000 [2]	NE	NE	10 U	11 U	11 U
Acenaphthylene	340,000 [2][4]	3,300,000 [2][4]	NE	NE	10 U	11 U	11 U
Anthracene	1,700,000 [2]	17,000,000 [2]	NE	NE	10 U	11 U	11 U
Benzo(a)anthracene	150	2,100	NE	NE	10 U	11 U	11 U
Benzo(a)pyrene	15.0	210	NE	NE	10 U	11 U	11 U
Benzo(b)fluoranthene	150	2,100	NE	NE	10 UJ	11 UJ	11 UJ
Benzo(g,h,i)perylene	170,000 [2][5]	1,700,000 [2][5]	NE	NE	10 U	11 U	11 U
Benzo(k)fluoranthene	1,500	21,000	NE	NE	10 U	11 U	11 U
Bis(2-ethylhexyl)phthalate	35,000	120,000	6,010 [9][11]	NE	210 U	220 U	220 U
Chrysene	15,000	210,000	NE	NE	10 U	11 U	11 U
Dibenz(a,h)anthracene	15.0	210	NE	NE	10 U	11 U	11 U
Di-n-butylphthalate	610,000 [2]	6,200,000 [2]	200,000 [12]	NE	23 J	220 U	220 U
Fluoranthene	230,000 [2]	2,200,000 [2]	NE	NE	10 U	11 U	11 U
Indeno(1,2,3-cd)pyrene	150	2,100	NE	NE	10 UJ	11 UJ	11 UJ
Phenanthrene	170,000 [2][5]	1,700,000 [2][5]	NE	NE	10 U	11 U	11 U
Pyrene	170,000 [2]	1,700,000 [2]	NE	NE	10 U	11 U	11 U

TABLE 6-1

SUMMARY OF DETECTED LABORATORY RESULTS - SURFACE SOIL
SWMU 67 - FORMER GAS STATION
PHASE I RFI REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Site ID Sample ID Sample Date Sample Depth (ft bgs)	**Regional Screening Levels Residential Soil**	*Regional Screening Levels Industrial Soil*	Selected Ecological Soil Screening Values	NAPR Basewide Background [1]	67SB07 67SB07-00 3/23/2010 0.0 - 1.0	67SB08 67SB08-00 3/22/2010 0.0 - 1.0	67SB08 67SB08-00D 3/22/2010 0.0 - 1.0
PAH totals (µg/kg)							
Low molecular weight PAHs	NE	NE	29,000 [13][14]	NE	80	88	88
High molecular weight PAHs	NE	NE	18,000 [13][15]	NE	90	99	99
TPH (mg/kg)							
Diesel Range Organics	100 [6]	100 [6]	NE	NE	12 U	23	17
Total TPH	100 [6]	100 [6]	NE	NE	12.61 U	23.65	17.63
Inorganics (mg/kg)							
Antimony	3.10 [2]	41.0 [2]	10.0 [16]	3.17	1.2 UJ	1.2 UJ	1.3 UJ
Arsenic	0.390	1.60	18.0 [17]	2.65	**0.73**	**1.4**	**1.4**
Barium	1,500 [2]	19,000 [2]	330 [18]	199	59.1	48.1 J	23.9 J
Beryllium	16.0 [2]	200 [2]	21.0 [19]	0.590	0.19 J	0.38 J	0.2 J
Cadmium	7.0 [2]	80.0 [2]	0.770 [20]	1.02	0.18 J	0.14 J	0.16 J
Chromium	12,000 [2][7]	150,000 [2][7]	26.0 [21]	49.8	24.1	25.2	32.8
Cobalt	2.30 [2]	30.0 [2]	13.0 [22]	46.2	**24.4** J	**10.6** J	**10** J
Copper	310 [2]	4,100 [2]	28.0 [23]	168	78.4 J	44.4 J	37.6 J
Lead	400 [8]	800 [8]	11.0 [24]	22.0	3.7 J	4.2 J	8.7 J
Mercury	0.560 [2]	3.40 [2]	0.10 [25]	0.109	0.011 J	0.015 J	0.17
Nickel	150 [2]	2,000 [2]	38.0 [26]	20.7	9.8	7.4 J	4.1 J
Selenium	39.0 [2]	510 [2]	0.520 [27]	1.48	0.49 J	1.6 J	2.2 J
Silver	39.0 [2]	510 [2]	4.20 [28]	NE	0.59 U	0.61 U	0.63 U
Thallium	NE	NE	1.0 [29]	NE	0.04 J	0.61 U	0.024 J
Vanadium	0.550 [2]	7.20 [2]	7.80 [30]	259	***151*** J	***320*** J	***272*** J
Zinc	2,300 [2]	31,000 [2]	46.0 [31]	115	61.3	25.5	33.3

TABLE 6-1

SUMMARY OF DETECTED LABORATORY RESULTS - SURFACE SOIL
SWMU 67 - FORMER GAS STATION
PHASE I RFI REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Qualifiers/Notes:

U - Undetected at the Method Detection Limit
UJ - Reported quantitation limit is qualified as estimated
J - Estimated: The analyte was positively identified; the quantitation is an estimation
R - Rejected data; data is not usable

ft bgs - feet below ground surface
µg/kg - micrograms per kilogram
mg/kg - milligrams per kilogram
NE - Not Established
NAPR - Naval Activity Puerto Rico
PAH - Polynuclear Aromatic Hydrocarbon
TPH - Total Petroleum Hydrocarbons

(1) NAPR basewide background surface soil screening value Table 2-4 (upper limit of the means concentration [mean plus two standard deviations]) (Baker, 2010)
(2) Noncarcinogenic Regional Screening Levels based on a target hazard quotient of 0.1 for conservative screening purposes.
(3) Value for total used as a surrogate.
(4) Value for acenaphthene used as a surrogate.
(5) Value for pyrene used as a surrogate.
(6) Puerto Rico specific value
(7) Value for chromium III used as a surrogate.
(8) USEPA Residential Soil Action Level
(9) The screening value shown is an average of the target and intervention soil standards for soil remediation. 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).
(10) [MHSPE 2000]
(11) The value represents a total concentration for all phthalates [MHSPE 2000]
(12) Toxicological threshold for plants [Efroymson et al 1997b]
(13) Ecological soil screening level for soil invertebrates [USEPA 2007a]
(14) Low molecular weight PAHs are defined by the USEPA (2007a) as PAH compounds composed of fewer than four rings. The low molecular weight PAH compounds include: 2-methylnaphthalene, acenaphthene, acenaphthylene, anthracene, fluoranthene, fluorene, naphthalene, and phenanthrene.
(15) High molecular weight PAHs are defined by the USEPA (2007a) as PAH compounds composed of four or more rings. The high molecular weight PAH compounds include: benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(g,h,i)perylene, chrysene, dibenz(a,h)anthracene, indeno(1,2,3-cd)pyrene, and pyrene.
(16) Ecological soil screening level for mammalian herbivores [USEPA 2005a]
(17) Ecological soil screening level for plants [USEPA 2005b]
(18) Ecological soil screening level for soil invertebrates [USEPA 2005c]
(19) Ecological soil screening level for mammalian herbivores [USEPA 2005d]
(20) Ecological soil screening level for avian ground insectivores [USEPA 2005e]
(21) Ecological soil screening level for avian ground insectivores [USEPA 2008]
(22) Ecological soil screening level for plants [USEPA 2005f]
(23) Ecological soil screening level for avian ground insectivores [USEPA 2007b]
(24) Ecological soil screening level for avian ground insectivores [USEPA 2005g]
(25) Toxicological threshold for earthworms [Efroymson et al. 1997a]
(26) Ecological soil screening level for plants [USEPA 2007c]
(27) Ecological soil screening level for plants [USEPA 2007d]
(28) Ecological soil screening level for avian ground insectivores [USEPA 2006]
(29) Toxicological threshold for plants [Efroymson et al. 1997b]
(30) Ecological soil screening level for avian ground insectivores [USEPA 2005h]
(31) Ecological soil screening level for avian ground insectivores [USEPA 2007e]

TABLE 6-1

SUMMARY OF DETECTED LABORATORY RESULTS - SURFACE SOIL
SWMU 67 - FORMER GAS STATION
PHASE I RFI REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

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Efroymson, R.A., M.E. Will, G.W. Suter II, and A.C. Wooten. 1997b. Toxicological Benchmarks for Screening Contaminants of Potential Concern for Effects on Terrestrial Plants: 1997 Revisions. Oak Ridge National Laboratory, Oak Ridge, TN. ES/ER/TM-85/R3

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USEPA. 2007a. Ecological Soil Screening Levels for Polycyclic Aromatic Hydrocarbons (PAHs) (Interim Final). Office of Solid Waste and Emergency Response, Washington, D.C. OSWER Directive 9285.7-78.

USEPA. 2007b. Ecological Soil Screening Levels for Copper (Interim Final). Office of Solid Waste and Emergency Response, Washington, D.C. OSWER Directive 9285.7-68.

USEPA. 2007c. Ecological Soil Screening Levels for Nickel (Interim Final). Office of Solid Waste and Emergency Response, Washington, D.C. OSWER Directive 9285.7-76.

USEPA. 2007d. Ecological Soil Screening Levels for Selenium (Interim Final). Office of Solid Waste and Emergency Response, Washington, D.C. OSWER Directive 9285.7-72.

USEPA. 2007e. Ecological Soil Screening Levels for Zinc (Interim Final). Office of Solid Waste and Emergency Response, Washington, D.C. OSWER Directive 9285.7-72.

USEPA. 2006. Ecological Soil Screening Levels for Silver (Interim Final). Office of Solid Waste and Emergency Response, Washington, D.C. OSWEER Directive 9285.7-77.

USEPA. 2005a. Ecological Soil Screening Levels for Antimony (Interim Final). Office of Solid Waste and Emergency Response, Washington, D.C. OSWER Directive 9285.7-61.

USEPA. 2005b. Ecological Soil Screening Levels for Arsenic (Interim Final). Office of Solid Waste and Emergency Response, Washington, D.C.

USEPA. 2005c. Ecological Soil Screening Levels for Barium (Interim Final). Office of Solid Waste and Emergency Response, Washington, D.C. OSWER Directive 9285.7-63.

USEPA. 2005d. Ecological Soil Screening Levels for Beryllium (Interim Final). Office of Solid Waste and Emergency Response, Washington, D.C. OSWER Directive 9285.7-63.

USEPA. 2005e. Ecological Soil Screening Levels for Cadmium (Interim Final). Office of Solid Waste and Emergency Response, Washington, D.C. OSWER Directive 9285.7-62.

USEPA. 2005f. Ecological Soil Screening Levels for Cobalt (Interim Final). Office of Solid Waste and Emergency Response, Washington, D.C. OSWER Directive 9285.7-67

USEPA. 2005g. Ecological Soil Screening Levels for Lead (Interim Final). Office of Solid Waste and Emergency Response, Washington, D.C. OSWER Directive 9285.7-70.

USEPA. 2005h. Ecological Soil Screening Levels for Vanadium (Interim Final). Office of Solid Waste and Emergency Response, Washington, D.C. OSWER Directive 9285.7-75.

TABLE 6-2

SUMMARY OF DETECTED LABORATORY RESULTS - SUBSURFACE SOIL
SWMU 67 - FORMER GAS STATION
PHASE I RFI REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Site ID Sample ID Sample Date Sample Depth (ft bgs)	**Regional Screening Levels Residential Soil**	*Regional Screening Levels Industrial Soil*	Selected Ecological Soil Screening Values	NAPR Basewide Background [1]	67SB01 67SB01-01 3/24/2010 1.0 - 3.0	67SB01 67SB01-01D 3/24/2010 1.0 - 3.0	67SB01 67SB01-03 3/24/2010 5.0 - 7.0	67SB02 67SB02-01 3/25/2010 1.0 - 3.0
Volatiles (µg/kg)								
2-Butanone	2,800,000 [2]	20,000,000 [2]	NE	NE	11 U	9.6 U	13 U	11 U
2-Hexanone	21,000 [2]	140,000 [2]	NE	NE	11 U	9.6 U	13 U	11 U
Acetone	6,100,000 [2]	63,000,000 [2]	NE	NE	130	120	61	54
Benzene	1,100	5,400	101 [9][10]	NE	4.5 U	0.3 J	5.3 U	4.3 U
Carbon Disulfide	82,000 [2]	370,000 [2]	NE	NE	4.5 U	3.8 U	4.9 J	4.3 U
Chloromethane	12,000 [2]	50,000 [2]	NE	NE	4.5 U	3.8 U	0.92 J	0.3 J
Methyl Iodide	NE	NE	NE	NE	1.9 J	1 J	5.3 U	0.78 J
Xylene, m/p-	63,000 [2][3]	270,000 [2][3]	NE	NE	9 U	7.6 U	11 U	8.5 U
Semivolatiles (µg/kg)								
2-Methylnaphthalene	31,000 [2]	410,000 [2]	NE	NE	9 U	8.8 U	10 U	10 U
Acenaphthylene	340,000 [2][4]	3,300,000 [2][4]	NE	NE	9 U	8.8 U	10 U	10 U
Anthracene	1,700,000 [2]	17,000,000 [2]	NE	NE	9 U	0.63 J	10 U	10 U
Benzo(a)anthracene	150	2,100	NE	NE	9 U	1.5 J	10 U	10 UJ
Benzo(a)pyrene	15.0	210	NE	NE	0.45 J	1.6 J	10 U	10 U
Benzo(b)fluoranthene	150	2,100	NE	NE	9 UJ	1.1 J	10 UJ	10 UJ
Benzo(g,h,i)perylene	170,000 [2][5]	1,700,000 [2][5]	NE	NE	9 U	1.5 J	0.56 J	10 U
Benzo(k)fluoranthene	1,500	21,000	NE	NE	0.48 J	1.5 J	10 U	10 U
Bis(2-ethylhexyl)phthalate	35,000	120,000	6,010 [9][11]	NE	180 U	61 J	210 U	200 U
Chrysene	15,000	210,000	NE	NE	9 U	1.3 J	10 U	10 U
Di-n-butylphthalate	610,000 [2]	6,200,000 [2]	200,000 [12]	NE	180 U	180 U	210 U	200 U
Fluoranthene	230,000 [2]	2,200,000 [2]	NE	NE	9 U	8.8 U	10 U	10 U
Indeno(1,2,3-cd)pyrene	150	2,100	NE	NE	0.49 J	1.8 J	0.67 J	10 UJ
Naphthalene	3,600	18,000	NE	NE	9 U	8.8 U	1.4 J	10 U
Phenanthrene	170,000 [2][5]	1,700,000 [2][5]	NE	NE	9 U	8.8 U	10 U	10 U
Pyrene	170,000 [2]	1,700,000 [2]	NE	NE	9 U	1.1 J	0.74 J	0.68 J

TABLE 6-2

SUMMARY OF DETECTED LABORATORY RESULTS - SUBSURFACE SOIL
SWMU 67 - FORMER GAS STATION
PHASE I RFI REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Site ID Sample ID Sample Date Sample Depth (ft bgs)	**Regional Screening Levels Residential Soil**	*Regional Screening Levels Industrial Soil*	Selected Ecological Soil Screening Values	NAPR Basewide Background [1]	67SB01 67SB01-01 3/24/2010 1.0 - 3.0	67SB01 67SB01-01D 3/24/2010 1.0 - 3.0	67SB01 67SB01-03 3/24/2010 5.0 - 7.0	67SB02 67SB02-01 3/25/2010 1.0 - 3.0
PAH totals (µg/kg)								
Low molecular weight PAHs	NE	NE	29,000 [13][14]	NE	72	62.23	71.4	80
High molecular weight PAHs	NE	NE	18,000 [13][15]	NE	55.42	20.2	61.97	80.68
TPH (mg/kg)								
Diesel Range Organics	100 [6]	100 [6]	NE	NE	11 U	11 U	12 U	12 U
Total TPH	100 [6]	100 [6]	NE	NE	11.54 U	11.53 U	12.62 U	12.6 U
Inorganics (mg/kg)								
Antimony	3.10 [2]	41.0 [2]	10.0 [16]	NE	1.1 UJ	1.1 UJ	6.2 UJ	1.2 UJ
Arsenic	0.390	1.60	18.0 [17]	1.59	**0.66**	**0.63**	3.1 U	0.6 U
Barium	1,500 [2]	19,000 [2]	330 [18]	220	114	153	652	251
Beryllium	16.0 [2]	200 [2]	21.0 [19]	0.596	0.32 J	0.35 J	4.9	0.78
Cadmium	7.0 [2]	80.0 [2]	0.770 [20]	0.539	0.22 J	0.2 J	0.85 J	0.2 J
Chromium	12,000 [2][7]	150,000 [2][7]	26.0 [21]	114	34.7	37.6	233	57.6 J
Cobalt	2.30 [2]	30.0 [2]	13.0 [22]	26.9	**27.4** J	***30.7*** J	***472*** J	**28.8** J
Copper	310 [2]	4,100 [2]	28.0 [23]	246	91.4 J	98.2 J	**681** J	138 J
Lead	400 [8]	800 [8]	11.0 [24]	6.29	142 R	7.5 R	12.3 J	4.5
Mercury	0.560 [2]	3.40 [2]	0.10 [25]	0.108	0.024 J	0.027 J	0.041 U	0.02 J
Nickel	150 [2]	2,000 [2]	38.0 [26]	24.7	12.5	14.3	**310**	26.6 J
Selenium	39.0 [2]	510 [2]	0.520 [27]	5.94	0.95 J	0.96 J	5.9 J	1 J
Silver	39.0 [2]	510 [2]	4.20 [28]	NE	0.69	0.53 U	3.1 U	0.6 U
Thallium	NE	NE	1.0 [29]	0.924	0.26 J	0.31 J	4.2	0.58 J
Vanadium	0.550 [2]	7.20 [2]	7.80 [30]	434	***196*** J	***200*** J	***1480*** J	***228*** J
Zinc	2,300 [2]	31,000 [2]	46.0 [31]	88.1	62.8	72	541	97 J

TABLE 6-2

SUMMARY OF DETECTED LABORATORY RESULTS - SUBSURFACE SOIL
SWMU 67 - FORMER GAS STATION
PHASE I RFI REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Site ID Sample ID Sample Date Sample Depth (ft bgs)	**Regional Screening Levels Residential Soil**	*Regional Screening Levels Industrial Soil*	Selected Ecological Soil Screening Values	NAPR Basewide Background [1]	67SB02 67SB02-02 3/25/2010 3.0 - 5.0	67SB03 67SB03-01 3/26/2010 1.0 - 3.0	67SB03 67SB03-04 3/26/2010 7.0 - 9.0	67SB04 67SB04-01 3/25/2010 1.0 - 3.0	67SB04 67SB04-03 3/25/2010 5.0 - 7.0
Volatiles (µg/kg)									
2-Butanone	2,800,000 [2]	20,000,000 [2]	NE	NE	17 U	11 U	8 J	9.3 U	7.2 J
2-Hexanone	21,000 [2]	140,000 [2]	NE	NE	1.5 J	11 U	11 U	9.3 U	11 U
Acetone	6,100,000 [2]	63,000,000 [2]	NE	NE	150	23 J	120 J	19 U	61
Benzene	1,100	5,400	101 [9][10]	NE	0.44 J	0.4 J	4.5 U	0.45 J	4.6 U
Carbon Disulfide	82,000 [2]	370,000 [2]	NE	NE	0.72 J	4.4 U	0.95 J	3.7 U	5
Chloromethane	12,000 [2]	50,000 [2]	NE	NE	4.2 U	4.4 UJ	0.44 J	3.7 U	4.6 U
Methyl Iodide	NE	NE	NE	NE	4.1 J	4.4 U	1.6 J	3.7 U	1.5 J
Xylene, m/p-	63,000 [2][3]	270,000 [2][3]	NE	NE	8.5 U	8.8 U	9.1 U	7.5 U	9.1 U
Semivolatiles (µg/kg)									
2-Methylnaphthalene	31,000 [2]	410,000 [2]	NE	NE	9.3 U	8.9 U	10 U	8.9 U	10 U
Acenaphthylene	340,000 [2][4]	3,300,000 [2][4]	NE	NE	0.67 J	8.9 U	10 U	1.2 J	10 U
Anthracene	1,700,000 [2]	17,000,000 [2]	NE	NE	9.3 U	8.9 U	10 U	1.5 J	10 U
Benzo(a)anthracene	150	2,100	NE	NE	9.3 UJ	0.9 J	0.78 J	4.8 J	10 U
Benzo(a)pyrene	15.0	210	NE	NE	9.3 U	0.66 J	10 U	5.6 J	10 U
Benzo(b)fluoranthene	150	2,100	NE	NE	9.3 UJ	1 JN	0.84 JN	4.6 J	10 U
Benzo(g,h,i)perylene	170,000 [2][5]	1,700,000 [2][5]	NE	NE	9.3 U	8.9 U	10 U	3.6 J	0.79 J
Benzo(k)fluoranthene	1,500	21,000	NE	NE	9.3 U	0.95 JN	0.79 JN	8.9 U	10 U
Bis(2-ethylhexyl)phthalate	35,000	120,000	6,010 [9][11]	NE	190 U	46 J	210 U	49 J	61 J
Chrysene	15,000	210,000	NE	NE	9.3 U	0.8 J	10 U	6.4 J	10 U
Di-n-butylphthalate	610,000 [2]	6,200,000 [2]	200,000 [12]	NE	190 U	180 U	210 U	180 U	210 U
Fluoranthene	230,000 [2]	2,200,000 [2]	NE	NE	9.3 U	8.9 U	10 U	16	10 U
Indeno(1,2,3-cd)pyrene	150	2,100	NE	NE	9.3 UJ	8.9 U	0.55 J	5.4 J	10 U
Naphthalene	3,600	18,000	NE	NE	9.3 U	8.9 U	10 U	8.9 U	10 U
Phenanthrene	170,000 [2][5]	1,700,000 [2][5]	NE	NE	9.3 U	8.9 U	2.2 J	6.3 J	10 U
Pyrene	170,000 [2]	1,700,000 [2]	NE	NE	9.3 U	0.99 J	1.5 J	13	0.73 J

TABLE 6-2

SUMMARY OF DETECTED LABORATORY RESULTS - SUBSURFACE SOIL
SWMU 67 - FORMER GAS STATION
PHASE I RFI REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Site ID Sample ID Sample Date Sample Depth (ft bgs)	**Regional Screening Levels Residential Soil**	*Regional Screening Levels Industrial Soil*	Selected Ecological Soil Screening Values	NAPR Basewide Background [1]	67SB02 67SB02-02 3/25/2010 3.0 - 5.0	67SB03 67SB03-01 3/26/2010 1.0 - 3.0	67SB03 67SB03-04 3/26/2010 7.0 - 9.0	67SB04 67SB04-01 3/25/2010 1.0 - 3.0	67SB04 67SB04-03 3/25/2010 5.0 - 7.0
PAH totals (µg/kg)									
Low molecular weight PAHs	NE	NE	29,000 [13][14]	NE	65.77	71.2	72.2	60.6	80
High molecular weight PAHs	NE	NE	18,000 [13][15]	NE	83.7	32	44.46	61.2	71.52
TPH (mg/kg)									
Diesel Range Organics	100 [6]	100 [6]	NE	NE	13	11 U	13 U	11 U	12 U
Total TPH	100 [6]	100 [6]	NE	NE	13.56	11.54 U	13.62 U	11.53 U	12.61 U
Inorganics (mg/kg)									
Antimony	3.10 [2]	41.0 [2]	10.0 [16]	NE	1.1 UJ	0.14 J	6.1 UJ	1.1 UJ	0.2 J
Arsenic	0.390	1.60	18.0 [17]	1.59	**1.2**	0.37 J	3.1 U	**0.85**	**0.95**
Barium	1,500 [2]	19,000 [2]	330 [18]	220	282	58.8	18.3 J	66.9	139
Beryllium	16.0 [2]	200 [2]	21.0 [19]	0.596	0.55 J	0.19 J	0.32 J	0.18 J	0.57
Cadmium	7.0 [2]	80.0 [2]	0.770 [20]	0.539	0.45 J	0.21 J	3.1 U	0.27 J	0.4 J
Chromium	12,000 [2][7]	150,000 [2][7]	26.0 [21]	114	48.8 J	6.7 J	11.5 J	41.7 J	22.4 J
Cobalt	2.30 [2]	30.0 [2]	13.0 [22]	26.9	***99.2*** J	**27.1**	**15**	**22.7**	***39.5***
Copper	310 [2]	4,100 [2]	28.0 [23]	246	56.2 J	78.4	28.7	92.3	42.1
Lead	400 [8]	800 [8]	11.0 [24]	6.29	8.5	1.1	1.7 J	8.3	4.4
Mercury	0.560 [2]	3.40 [2]	0.10 [25]	0.108	0.098	0.035 U	0.082	0.035 U	0.12
Nickel	150 [2]	2,000 [2]	38.0 [26]	24.7	15.4 J	5.3	4.7	15.8	6.6
Selenium	39.0 [2]	510 [2]	0.520 [27]	5.94	1.7 J	0.22 J	1.4 J	0.37 J	2.2 J
Silver	39.0 [2]	510 [2]	4.20 [28]	NE	0.56 U	0.05 J	3.1 U	0.54 U	0.099 J
Thallium	NE	NE	1.0 [29]	0.924	0.21 J	0.055 J	3.1 U	0.039 J	0.059 J
Vanadium	0.550 [2]	7.20 [2]	7.80 [30]	434	***306*** J	***160***	***176***	***143***	***233***
Zinc	2,300 [2]	31,000 [2]	46.0 [31]	88.1	67.4 J	64.5 J	48.1 J	55.5 J	63.4 J

TABLE 6-2

SUMMARY OF DETECTED LABORATORY RESULTS - SUBSURFACE SOIL
SWMU 67 - FORMER GAS STATION
PHASE I RFI REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Site ID Sample ID Sample Date Sample Depth (ft bgs)	**Regional Screening Levels Residential Soil**	*Regional Screening Levels Industrial Soil*	Selected Ecological Soil Screening Values	NAPR Basewide Background [1]	67SB05 67SB05-01 3/24/2010 1.0 - 3.0	67SB05 67SB05-05 3/24/2010 9.0 - 11.0	67SB06 67SB06-01 3/23/2010 1.0 - 3.0	67SB06 67SB06-01D 3/23/2010 1.0 - 3.0	67SB06 67SB06-05 3/23/2010 9.0 - 11.0
Volatiles (µg/kg)									
2-Butanone	2,800,000 [2]	20,000,000 [2]	NE	NE	12 U	12 U	11 U	9.9 U	12 U
2-Hexanone	21,000 [2]	140,000 [2]	NE	NE	12 U	12 U	11 U	9.9 U	12 U
Acetone	6,100,000 [2]	63,000,000 [2]	NE	NE	47	12 U	88	52	21 U
Benzene	1,100	5,400	101 [9][10]	NE	4.7 U	4.7 U	4.2 U	4 U	4.7 U
Carbon Disulfide	82,000 [2]	370,000 [2]	NE	NE	4.7 U	4.7 U	4.2 UJ	4.7 J	4.7 U
Chloromethane	12,000 [2]	50,000 [2]	NE	NE	4.7 U	4.7 U	4.2 U	4 U	4.7 U
Methyl Iodide	NE	NE	NE	NE	4.7 U	4.7 U	1.3 J	4 U	4.7 U
Xylene, m/p-	63,000 [2][3]	270,000 [2][3]	NE	NE	9.3 U	9.3 U	8.5 U	7.9 U	9.4 U
Semivolatiles (µg/kg)									
2-Methylnaphthalene	31,000 [2]	410,000 [2]	NE	NE	10 U	11 U	9.7 U	9.3 U	0.93 J
Acenaphthylene	340,000 [2][4]	3,300,000 [2][4]	NE	NE	10 U	11 U	9.7 U	9.3 U	10 U
Anthracene	1,700,000 [2]	17,000,000 [2]	NE	NE	10 U	11 U	0.52 J	9.3 U	10 U
Benzo(a)anthracene	150	2,100	NE	NE	10 U	11 U	0.83 J	9.3 U	10 UJ
Benzo(a)pyrene	15.0	210	NE	NE	10 U	11 U	0.47 J	9.3 U	10 U
Benzo(b)fluoranthene	150	2,100	NE	NE	10 UJ	11 UJ	0.79 J	9.3 UJ	10 UJ
Benzo(g,h,i)perylene	170,000 [2][5]	1,700,000 [2][5]	NE	NE	10 U	11 U	1 J	9.3 U	10 U
Benzo(k)fluoranthene	1,500	21,000	NE	NE	10 U	11 U	0.51 J	9.3 U	10 U
Bis(2-ethylhexyl)phthalate	35,000	120,000	6,010 [9][11]	NE	210 U	220 U	200 U	190 U	200 U
Chrysene	15,000	210,000	NE	NE	10 U	11 U	0.74 J	9.3 U	10 U
Di-n-butylphthalate	610,000 [2]	6,200,000 [2]	200,000 [12]	NE	210 U	220 U	200 U	190 U	200 U
Fluoranthene	230,000 [2]	2,200,000 [2]	NE	NE	10 U	11 U	1.6 J	9.3 U	10 U
Indeno(1,2,3-cd)pyrene	150	2,100	NE	NE	10 U	11 U	0.5 J	9.3 U	10 UJ
Naphthalene	3,600	18,000	NE	NE	10 U	11 U	9.7 U	9.3 U	10 U
Phenanthrene	170,000 [2][5]	1,700,000 [2][5]	NE	NE	10 U	11 U	2.2 J	9.3 U	10 U
Pyrene	170,000 [2]	1,700,000 [2]	NE	NE	10 U	11 U	1.4 J	9.3 U	10 U

TABLE 6-2

SUMMARY OF DETECTED LABORATORY RESULTS - SUBSURFACE SOIL
SWMU 67 - FORMER GAS STATION
PHASE I RFI REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Site ID Sample ID Sample Date Sample Depth (ft bgs)	**Regional Screening Levels Residential Soil**	*Regional Screening Levels Industrial Soil*	Selected Ecological Soil Screening Values	NAPR Basewide Background [1]	67SB05 67SB05-01 3/24/2010 1.0 - 3.0	67SB05 67SB05-05 3/24/2010 9.0 - 11.0	67SB06 67SB06-01 3/23/2010 1.0 - 3.0	67SB06 67SB06-01D 3/23/2010 1.0 - 3.0	67SB06 67SB06-05 3/23/2010 9.0 - 11.0
PAH totals (µg/kg)									
Low molecular weight PAHs	NE	NE	29,000 [13][14]	NE	80	88	52.82	74.4	70.93
High molecular weight PAHs	NE	NE	18,000 [13][15]	NE	90	99	15.94	83.7	90
TPH (mg/kg)									
Diesel Range Organics	100 [6]	100 [6]	NE	NE	18	13 U	12 U	11 U	12 U
Total TPH	100 [6]	100 [6]	NE	NE	18.62	13.65 U	12.58 U	11.56 U	12.6 U
Inorganics (mg/kg)									
Antimony	3.10 [2]	41.0 [2]	10.0 [16]	NE	1.2 UJ	1.2 UJ	1.2 UJ	1.1 UJ	1.2 UJ
Arsenic	0.390	1.60	18.0 [17]	1.59	**1.4**	**0.97**	***1.8***	**0.6**	0.28 J
Barium	1,500 [2]	19,000 [2]	330 [18]	220	22.6	55.4	122 J	174 J	4.5 J
Beryllium	16.0 [2]	200 [2]	21.0 [19]	0.596	0.21 J	0.097 J	0.63	0.31 J	0.23 J
Cadmium	7.0 [2]	80.0 [2]	0.770 [20]	0.539	0.13 J	0.59 U	0.38 J	0.21 J	0.068 J
Chromium	12,000 [2][7]	150,000 [2][7]	26.0 [21]	114	20.4	9.6	36.6 J	14.6 J	2.5 J
Cobalt	2.30 [2]	30.0 [2]	13.0 [22]	26.9	**11.6** J	1.9 J	***105*** J	***44*** J	**5.2** J
Copper	310 [2]	4,100 [2]	28.0 [23]	246	34.5 J	29.3 J	44.9 J	37.8 J	13.6 J
Lead	400 [8]	800 [8]	11.0 [24]	6.29	4.7 J	2.1 J	9 J	4.3 J	2.5
Mercury	0.560 [2]	3.40 [2]	0.10 [25]	0.108	0.22	0.043 U	0.13	0.032 J	0.04 U
Nickel	150 [2]	2,000 [2]	38.0 [26]	24.7	3.4	1.3	9.4 J	5.3 J	1.6 J
Selenium	39.0 [2]	510 [2]	0.520 [27]	5.94	2.4 J	1.3 J	2.4 J	1.1 J	0.59 J
Silver	39.0 [2]	510 [2]	4.20 [28]	NE	0.62 U	0.59 U	0.58 U	0.56 U	0.6 U
Thallium	NE	NE	1.0 [29]	0.924	0.061 J	0.035 J	0.2 J	0.076 J	0.6 U
Vanadium	0.550 [2]	7.20 [2]	7.80 [30]	434	***267*** J	***155*** J	***325*** J	***188*** J	***105*** J
Zinc	2,300 [2]	31,000 [2]	46.0 [31]	88.1	19.6	15.6	72.7 J	36.8 J	40 J

TABLE 6-2

SUMMARY OF DETECTED LABORATORY RESULTS - SUBSURFACE SOIL
SWMU 67 - FORMER GAS STATION
PHASE I RFI REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Site ID Sample ID Sample Date Sample Depth (ft bgs)	**Regional Screening Levels Residential Soil**	*Regional Screening Levels Industrial Soil*	Selected Ecological Soil Screening Values	NAPR Basewide Background [1]	67SB07 67SB07-01 3/23/2010 1.0 - 3.0	67SB07 67SB07-05 3/23/2010 9.0 - 11.0	67SB08 67SB08-01 3/22/2010 1.0 - 3.0	67SB08 67SB08-05 3/22/2010 9.0 - 11.0
Volatiles (µg/kg)								
2-Butanone	2,800,000 [2]	20,000,000 [2]	NE	NE	2.2 J	14 U	9.6 UJ	11 U
2-Hexanone	21,000 [2]	140,000 [2]	NE	NE	11 U	14 U	9.6 UJ	11 U
Acetone	6,100,000 [2]	63,000,000 [2]	NE	NE	29	17 U	61 J	11 U
Benzene	1,100	5,400	101 [9][10]	NE	4.3 U	5.5 U	3.8 UJ	4.4 U
Carbon Disulfide	82,000 [2]	370,000 [2]	NE	NE	0.65 J	5.5 U	3.8 UJ	4.4 U
Chloromethane	12,000 [2]	50,000 [2]	NE	NE	4.3 U	5.5 U	3.8 UJ	4.4 U
Methyl Iodide	NE	NE	NE	NE	4.3 U	5.5 U	3.8 UJ	4.4 U
Xylene, m/p-	63,000 [2][3]	270,000 [2][3]	NE	NE	8.5 U	0.32 J	7.7 UJ	8.8 U
Semivolatiles (µg/kg)								
2-Methylnaphthalene	31,000 [2]	410,000 [2]	NE	NE	9.5 UJ	11 UJ	9.7 UJ	11 UJ
Acenaphthylene	340,000 [2][4]	3,300,000 [2][4]	NE	NE	9.5 U	11 U	9.7 U	11 U
Anthracene	1,700,000 [2]	17,000,000 [2]	NE	NE	9.5 U	11 U	9.7 U	11 U
Benzo(a)anthracene	150	2,100	NE	NE	9.5 U	11 U	9.7 U	11 U
Benzo(a)pyrene	15.0	210	NE	NE	9.5 U	11 U	9.7 U	11 U
Benzo(b)fluoranthene	150	2,100	NE	NE	9.5 UJ	11 UJ	9.7 UJ	11 UJ
Benzo(g,h,i)perylene	170,000 [2][5]	1,700,000 [2][5]	NE	NE	9.5 U	11 U	9.7 U	11 U
Benzo(k)fluoranthene	1,500	21,000	NE	NE	9.5 U	11 U	9.7 U	11 U
Bis(2-ethylhexyl)phthalate	35,000	120,000	6,010 [9][11]	NE	200 U	220 U	200 U	220 U
Chrysene	15,000	210,000	NE	NE	9.5 U	11 U	9.7 U	11 U
Di-n-butylphthalate	610,000 [2]	6,200,000 [2]	200,000 [12]	NE	24 J	29 J	21 J	220 U
Fluoranthene	230,000 [2]	2,200,000 [2]	NE	NE	9.5 U	11 U	9.7 U	11 U
Indeno(1,2,3-cd)pyrene	150	2,100	NE	NE	9.5 UJ	11 UJ	9.7 UJ	11 UJ
Naphthalene	3,600	18,000	NE	NE	9.5 U	11 U	9.7 U	11 U
Phenanthrene	170,000 [2][5]	1,700,000 [2][5]	NE	NE	9.5 U	11 U	9.7 U	11 U
Pyrene	170,000 [2]	1,700,000 [2]	NE	NE	9.5 U	11 U	9.7 U	11 U

TABLE 6-2

SUMMARY OF DETECTED LABORATORY RESULTS - SUBSURFACE SOIL
SWMU 67 - FORMER GAS STATION
PHASE I RFI REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Site ID Sample ID Sample Date Sample Depth (ft bgs)	**Regional Screening Levels Residential Soil**	*Regional Screening Levels Industrial Soil*	Selected Ecological Soil Screening Values	NAPR Basewide Background [1]	67SB07 67SB07-01 3/23/2010 1.0 - 3.0	67SB07 67SB07-05 3/23/2010 9.0 - 11.0	67SB08 67SB08-01 3/22/2010 1.0 - 3.0	67SB08 67SB08-05 3/22/2010 9.0 - 11.0
PAH totals (µg/kg)								
Low molecular weight PAHs	NE	NE	29,000 [13][14]	NE	76	88	77.6	88
High molecular weight PAHs	NE	NE	18,000 [13][15]	NE	85.5	99	87.3	99
TPH (mg/kg)								
Diesel Range Organics	100 [6]	100 [6]	NE	NE	14	14	16	20
Total TPH	100 [6]	100 [6]	NE	NE	14.57	14.65	16.58	20.63
Inorganics (mg/kg)								
Antimony	3.10 [2]	41.0 [2]	10.0 [16]	NE	1.1 UJ	5.9 UJ	1.1 UJ	1.2 UJ
Arsenic	0.390	1.60	18.0 [17]	1.59	**0.71**	3 U	**0.95**	0.62 U
Barium	1,500 [2]	19,000 [2]	330 [18]	220	99	87.4	112	58.6
Beryllium	16.0 [2]	200 [2]	21.0 [19]	0.596	0.15 J	1.4 J	0.42 J	0.071 J
Cadmium	7.0 [2]	80.0 [2]	0.770 [20]	0.539	0.16 J	0.31 J	0.33 J	0.15 J
Chromium	12,000 [2][7]	150,000 [2][7]	26.0 [21]	114	7.5	76.9	10.8	7.1
Cobalt	2.30 [2]	30.0 [2]	13.0 [22]	26.9	**29.6** J	***75.2*** J	***58.8*** J	**20.3** J
Copper	310 [2]	4,100 [2]	28.0 [23]	246	71 J	**493** J	36 J	39.5 J
Lead	400 [8]	800 [8]	11.0 [24]	6.29	0.91 J	5.2 J	27.4 J	0.62 U
Mercury	0.560 [2]	3.40 [2]	0.10 [25]	0.108	0.038 U	0.043 U	0.093	0.042 U
Nickel	150 [2]	2,000 [2]	38.0 [26]	24.7	6	26	5	5.6
Selenium	39.0 [2]	510 [2]	0.520 [27]	5.94	0.41 J	2.6 J	1.8 J	0.33 J
Silver	39.0 [2]	510 [2]	4.20 [28]	NE	0.53 U	3 U	0.57 U	0.62 U
Thallium	NE	NE	1.0 [29]	0.924	0.036 J	3 U	0.066 J	0.62 U
Vanadium	0.550 [2]	7.20 [2]	7.80 [30]	434	***161*** J	***821*** J	***174*** J	***196*** J
Zinc	2,300 [2]	31,000 [2]	46.0 [31]	88.1	68.3	298	64.6	56.8

TABLE 6-2

SUMMARY OF DETECTED LABORATORY RESULTS - SUBSURFACE SOIL
SWMU 67 - FORMER GAS STATION
PHASE I RFI REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Qualifiers/Notes:

U - Undetected at the Method Detection Limit
UJ - Reported quantitation limit is qualified as estimated
J - Estimated: The analyte was positively identified; the quantitation is an estimation
JN - Estimated: The analyte was tentatively identified; the quantitation is an estimation
R - Rejected data; data is not usable

ft bgs - feet below ground surface
µg/kg - micrograms per kilogram
mg/kg - milligrams per kilogram
NE - Not Established
NAPR - Naval Activity Puerto Rico
PAH - Polynuclear Aromatic Hydrocarbon
TPH - Total Petroleum Hydrocarbons

(1) NAPR basewide background subsurface clay screening value Table 3-4 (upper limit of the means concentration [mean plus two standard deviations]) (Baker, 2010)
(2) Noncarcinogenic Regional Screening Levels based on a target hazard quotient of 0.1 for conservative screening purposes.
(3) Value for total used as a surrogate.
(4) Value for acenaphthene used as a surrogate.
(5) Value for pyrene used as a surrogate.
(6) Puerto Rico specific value
(7) Value for chromium III used as a surrogate.
(8) USEPA Residential Soil Action Level
(9) The screening value shown is an average of the target and intervention soil standards for soil remediation. 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).
(10) [MHSPE 2000]
(11) The value represents a total concentration for all phthalates [MHSPE 2000]
(12) Toxicological threshold for plants [Efroymson et al 1997b]
(13) Ecological soil screening level for soil invertebrates [USEPA 2007a]
(14) Low molecular weight PAHs are defined by the USEPA (2007a) as PAH compounds composed of fewer than four rings. The low molecular weight PAH compounds include: 2-methylnaphthalene, acenaphthene, acenaphthylene, anthracene, fluoranthene, fluorene, naphthalene, and phenanthrene.
(15) High molecular weight PAHs are defined by the USEPA (2007a) as PAH compounds composed of four or more rings. The high molecular weight PAH compounds include: benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(g,h,i)perylene, chrysene, dibenz(a,h)anthracene, indeno(1,2,3-cd)pyrene, and pyrene.
(16) Ecological soil screening level for mammalian herbivores [USEPA 2005a]
(17) Ecological soil screening level for plants [USEPA 2005b]
(18) Ecological soil screening level for soil invertebrates [USEPA 2005c]
(19) Ecological soil screening level for mammalian herbivores [USEPA 2005d]
(20) Ecological soil screening level for avian ground insectivores [USEPA 2005e]
(21) Ecological soil screening level for avian ground insectivores [USEPA 2008]
(22) Ecological soil screening level for plants [USEPA 2005f]
(23) Ecological soil screening level for avian ground insectivores [USEPA 2007b]
(24) Ecological soil screening level for avian ground insectivores [USEPA 2005g]
(25) Toxicological threshold for earthworms [Efroymson et al. 1997a]
(26) Ecological soil screening level for plants [USEPA 2007c]
(27) Ecological soil screening level for plants [USEPA 2007d]
(28) Ecological soil screening level for avian ground insectivores [USEPA 2006]
(29) Toxicological threshold for plants [Efroymson et al. 1997b]
(30) Ecological soil screening level for avian ground insectivores [USEPA 2005h]
(31) Ecological soil screening level for avian ground insectivores [USEPA 2007e]

TABLE 6-2

SUMMARY OF DETECTED LABORATORY RESULTS - SUBSURFACE SOIL
SWMU 67 - FORMER GAS STATION
PHASE I RFI REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

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USEPA. 2007c. Ecological Soil Screening Levels for Nickel (Interim Final). Office of Solid Waste and Emergency Response, Washington, D.C. OSWER Directive 9285.7-76.

USEPA. 2007d. Ecological Soil Screening Levels for Selenium (Interim Final). Office of Solid Waste and Emergency Response, Washington, D.C. OSWER Directive 9285.7-72.

USEPA. 2007e. Ecological Soil Screening Levels for Zinc (Interim Final). Office of Solid Waste and Emergency Response, Washington, D.C. OSWER Directive 9285.7-72.

USEPA. 2006. Ecological Soil Screening Levels for Silver (Interim Final). Office of Solid Waste and Emergency Response, Washington, D.C. OSWEER Directive 9285.7-77.

USEPA. 2005a. Ecological Soil Screening Levels for Antimony (Interim Final). Office of Solid Waste and Emergency Response, Washington, D.C. OSWER Directive 9285.7-61.

USEPA. 2005b. Ecological Soil Screening Levels for Arsenic (Interim Final). Office of Solid Waste and Emergency Response, Washington, D.C.

USEPA. 2005c. Ecological Soil Screening Levels for Barium (Interim Final). Office of Solid Waste and Emergency Response, Washington, D.C. OSWER Directive 9285.7-63.

USEPA. 2005d. Ecological Soil Screening Levels for Beryllium (Interim Final). Office of Solid Waste and Emergency Response, Washington, D.C. OSWER Directive 9285.7-63.

USEPA. 2005e. Ecological Soil Screening Levels for Cadmium (Interim Final). Office of Solid Waste and Emergency Response, Washington, D.C. OSWER Directive 9285.7-62.

USEPA. 2005f. Ecological Soil Screening Levels for Cobalt (Interim Final). Office of Solid Waste and Emergency Response, Washington, D.C. OSWER Directive 9285.7-67

USEPA. 2005g. Ecological Soil Screening Levels for Lead (Interim Final). Office of Solid Waste and Emergency Response, Washington, D.C. OSWER Directive 9285.7-70.

USEPA. 2005h. Ecological Soil Screening Levels for Vanadium (Interim Final). Office of Solid Waste and Emergency Response, Washington, D.C. OSWER Directive 9285.7-75.

TABLE 6-3

Revised: June 2, 2011

SUMMARY OF DETECTED LABORATORY RESULTS - GROUNDWATER
SWMU 67 - FORMER GAS STATION
PHASE I RFI REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Site ID Sample ID Sample Date	**Regional Tap Water Screening Levels**	*USEPA MCLs* [A]	Selected Ecological Groundwater Screening Values	NAPR Basewide Background [1]	67SB01 67GW01 3/27/2010	67SB02 67GW02 3/28/2010	67SB03 67GW03 3/30/2010	67SB04 67GW04 3/28/2010	67SB05 67GW05 3/27/2010
Volatiles (µg/L)									
2-Butanone	710 [2]	NE	13,333 [7]	NE	2.5 R	2.5 R	2.5 R	2.5 R	5.2 J
Acetone	2,200 [2]	NE	1,000 [8]	NE	11 J	12 J	2.5 R	7.9 J	30 J
Benzene	0.410	5.0	109 [9]	NE	0.031 J	0.5 U	0.5 U	0.5 U	0.11 J
Carbon Disulfide	100 [2]	NE	15.0 [10][11]	NE	0.35 J	0.72	0.32 J	0.87	2.2
Methyl Iodide	NE	NE	NE	NE	0.5 UJ	0.5 UJ	0.5 U	0.5 UJ	0.25 J
Semivolatiles (µg/L)									
2-Methylnaphthalene	15.0 [2]	NE	6.0 [13]	NE	0.042 J	0.033 J	0.21 U	0.037 J	0.22 U
Acenaphthylene	220 [2][3]	990	6.0 [14]	NE	0.2 U	0.046 J	0.21 U	0.21 U	0.22 U
Benzo(a)anthracene	0.0290	0.18	0.0250 [17][11]	NE	0.2 U	0.21 U	0.21 U	0.21 U	0.22 U
Benzo(b)fluoranthene	0.0290	0.18	6.0 [18]	NE	0.2 U	0.21 U	0.21 U	0.21 U	0.22 U
Benzo(k)fluoranthene	0.290	0.18	6.0 [18]	NE	0.2 U	0.21 U	0.21 U	0.21 U	0.22 U
Chrysene	2.90	0.18	10.0 [19]	NE	0.2 U	0.21 U	0.21 U	0.21 U	0.22 U
Fluoranthene	150 [2]	140	11.0 [15]	NE	0.01 J	0.034 J	0.016 J	0.01 J	0.017 J
Fluorene	150 [2]	5,300	10.0 [16]	NE	0.2 U	0.21 U	0.21 U	0.21 U	0.22 U
Naphthalene	0.140	NE	23.5 [9]	NE	0.2 U	0.21 U	0.21 U	0.21 U	0.22 U
Phenanthrene	110 [2][4]	NE	8.30 [15]	NE	0.2 U	0.068 J	0.21 U	0.21 U	0.22 U
Pyrene	110 [2]	4,000	0.248 [20]	NE	0.2 U	***0.019*** J	0.21 U	0.21 U	0.22 U
Pyridine	3.70 [2]	NE	500 [12]	NE	5 U	5.3 U	5.3 U	5.1 U	1.6 J
TPH DRO and GRO (µg/L)									
Not Detected									
Total Inorganics (µg/L)									
Antimony	1.50 [2]	6.0	500 [22]	12.2	2 U	2 U	2 U	2 U	2 U
Arsenic	0.0450	10.0	36.0 [30]	18.9	**2.2**	**2.2**	**2.9**	**9.8**	**3.4**
Barium	730 [2]	2,000	16,667 [24]	686	108	24.2	12.4	65.4	60.5
Cadmium	1.80 [2]	5.0	8.85 [31]	16.6	0.068 J	0.094 J	1 U	0.14 J	0.097 J
Chromium	5,500 [2][5]	100	50 [32]	162	1.7 J	0.52 J	0.37 J	1.4 J	3.6
Cobalt	1.10 [2]	NE	45.0 [27]	633	**10.4**	**4.4**	**4.7**	**5.5**	**6.2**
Copper	150 [2]	1,300	3.73 [31]	324	24.5	7.6	7.4	23.2	16
Mercury	0.0570 [2]	2.0	1.11 [31]	0.153	**0.19** J	0.2 U	0.2 U	0.2 U	0.2 U

TABLE 6-3

Revised: June 2, 2011

SUMMARY OF DETECTED LABORATORY RESULTS - GROUNDWATER
SWMU 67 - FORMER GAS STATION
PHASE I RFI REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Site ID Sample ID Sample Date	**Regional Tap Water Screening Levels**	*USEPA MCLs* [A]	Selected Ecological Groundwater Screening Values	NAPR Basewide Background [1]	67SB01 67GW01 3/27/2010	67SB02 67GW02 3/28/2010	67SB03 67GW03 3/30/2010	67SB04 67GW04 3/28/2010	67SB05 67GW05 3/27/2010
Total Inorganics (µg/L)									
Nickel	73.0 [2]	8.28	8.28 [31]	95.7	***3.9***	***4***	***3.3***	***6.3***	***5.7***
Selenium	18.0 [2]	50.0	71.1 [31]	29.9	7.3	4.5 J	5.3	**37.2**	12.8
Thallium	2.0 [6]	0.47	21.3 [9]	NE	***0.2*** J	***0.37*** J	***0.13*** J	***0.38*** J	***0.16*** J
Vanadium	0.260 [2]	NE	12.0 [11][17]	485	**15**	**9.4**	**87.3**	**38.4**	**10.2**
Zinc	1,100 [2]	85.6	85.6 [31]	548	9.2	13	7.6	15.4	14.3
Dissolved Inorganics (µg/L)									
Antimony	1.50 [2]	6.0	500 [21][22]	11.2	0.48 J	0.35 J	0.41 J	0.48 J	0.84 J
Arsenic	0.0450	10.0	36.0 [23]	14.0	**2.3**	**2.1**	**3.1**	**6.4**	**4.6**
Barium	730 [2]	2,000	16,667 [21][24]	260	84.9	13.6	12.3	36.7	52.7
Cadmium	1.80 [2]	5.0	8.80 [25]	36.4	0.1 J	0.053 J	1 U	0.066 J	0.76 J
Chromium	5,500 [2][5]	100	50 [26]	6.49	0.48 J	2 U	0.28 J	0.6 J	0.77 J
Cobalt	1.10 [2]	NE	45.0 [21][27]	581	**6.6**	**3.3**	**4.5**	**2.6**	**35.7**
Copper	150 [2]	1,300	3.10 [28]	29.1	42.5	19.2	17.5	36.3	31.3
Nickel	73.0 [2]	8.28	8.20 [25]	84.1	*3.3*	3.3	3.7	3.7	*45.8*
Selenium	18.0 [2]	50.0	71.0 [25]	23.9	7.6	4.1 J	6	**23.7**	17.3
Thallium	2.0 [6]	0.47	21.3 [9][21]	NE	0.34 J	0.39 J	0.15 J	0.26 J	0.61 J
Vanadium	0.260 [2]	NE	12.0 [11][17][21]	21.0	**8.6** J	**8.1** J	**90.9** J	**21.4** J	**8.3** J
Zinc	1,100 [2]	85.6	81.0 [29]	361	7.3	6.9	5	5.2	181

TABLE 6-3

Revised: June 2, 2011

SUMMARY OF DETECTED LABORATORY RESULTS - GROUNDWATER
SWMU 67 - FORMER GAS STATION
PHASE I RFI REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Site ID Sample ID Sample Date	**Regional Tap Water Screening Levels**	*USEPA MCLs* [A]	Selected Ecological Groundwater Screening Values	NAPR Basewide Background [1]	67SB06 67GW06 3/27/2010	67SB07 67GW07 3/26/2010	67SB08 67GW08 3/26/2010	67SB08 67GW08D 3/26/2010
Volatiles (µg/L)								
2-Butanone	710 [2]	NE	13,333 [7]	NE	2.5 R	2.5 R	2.5 R	2.5 R
Acetone	2,200 [2]	NE	1,000 [8]	NE	6 J	3.9 R	2.5 R	2.5 R
Benzene	0.410	5.0	109 [9]	NE	0.053 J	0.5 U	0.5 U	0.5 U
Carbon Disulfide	100 [2]	NE	15.0 [10][11]	NE	0.82	0.04 J	0.048 J	0.048 J
Methyl Iodide	NE	NE	NE	NE	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ
Semivolatiles (µg/L)								
2-Methylnaphthalene	15.0 [2]	NE	6.0 [13]	NE	0.21 U	0.22 U	0.21 U	0.21 U
Acenaphthylene	220 [2][3]	990	6.0 [14]	NE	0.21 U	0.22 U	0.21 UJ	0.21 UJ
Benzo(a)anthracene	0.0290	0.18	0.0250 [17][11]	NE	0.21 U	0.22 U	0.21 UJ	0.022 J
Benzo(b)fluoranthene	0.0290	0.18	6.0 [18]	NE	0.21 U	0.22 U	0.21 U	0.014 J
Benzo(k)fluoranthene	0.290	0.18	6.0 [18]	NE	0.21 U	0.22 U	0.21 U	***0.02*** J
Chrysene	2.90	0.18	10.0 [19]	NE	0.21 U	0.22 U	0.21 U	***0.027*** J
Fluoranthene	150 [2]	140	11.0 [15]	NE	0.015 J	0.22 U	0.21 U	0.035 J
Fluorene	150 [2]	5,300	10.0 [16]	NE	0.06 J	0.22 U	0.21 U	0.21 U
Naphthalene	0.140	NE	23.5 [9]	NE	0.21 U	**1**	0.21 U	0.21 U
Phenanthrene	110 [2][4]	NE	8.30 [15]	NE	0.042 J	0.22 U	0.21 U	0.21 U
Pyrene	110 [2]	4,000	0.248 [20]	NE	0.21 U	0.22 U	0.21 U	***0.033*** J
Pyridine	3.70 [2]	NE	500 [12]	NE	5.1 U	5.6 U	5.3 U	5.3 U
TPH DRO and GRO (µg/L)								
Not Detected								
Total Inorganics (µg/L)								
Antimony	1.50 [2]	6.0	500 [22]	12.2	2 U	2 U	0.23 J	2 U
Arsenic	0.0450	10.0	36.0 [30]	18.9	**3**	**1.1**	**1.2**	**1.3**
Barium	730 [2]	2,000	16,667 [24]	686	41.2	9 J	4.6 J	5.1 J
Cadmium	1.80 [2]	5.0	8.85 [31]	16.6	0.12 J	1 U	0.055 J	0.051 J
Chromium	5,500 [2][5]	100	50 [32]	162	1 J	0.45 J	0.44 J	0.46 J
Cobalt	1.10 [2]	NE	45.0 [27]	633	**2.7**	0.66 J	**2.6**	**2.7**
Copper	150 [2]	1,300	3.73 [31]	324	15.5	5.8	5.6	5.1
Mercury	0.0570 [2]	2.0	1.11 [31]	0.153	0.2 U	0.2 U	0.2 U	0.2 U

TABLE 6-3

Revised: June 2, 2011

SUMMARY OF DETECTED LABORATORY RESULTS - GROUNDWATER
SWMU 67 - FORMER GAS STATION
PHASE I RFI REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Site ID Sample ID Sample Date	**Regional Tap Water Screening Levels**	*USEPA MCLs* [A]	Selected Ecological Groundwater Screening Values	NAPR Basewide Background [1]	67SB06 67GW06 3/27/2010	67SB07 67GW07 3/26/2010	67SB08 67GW08 3/26/2010	67SB08 67GW08D 3/26/2010
Total Inorganics (µg/L)								
Nickel	73.0 [2]	8.28	8.28 [31]	95.7	***3.8***	1 U	***1.4***	***1.4***
Selenium	18.0 [2]	50.0	71.1 [31]	29.9	9.6	5.8	7.6	7.8
Thallium	2.0 [6]	0.47	21.3 [9]	NE	***0.29*** J	1 U	***0.051*** J	1 U
Vanadium	0.260 [2]	NE	12.0 [11][17]	485	**13.4**	**41.4**	**49.5**	**52.7**
Zinc	1,100 [2]	85.6	85.6 [31]	548	9.3	3.3	2.4	2.2
Dissolved Inorganics (µg/L)								
Antimony	1.50 [2]	6.0	500 [21][22]	11.2	0.52 J	2 U	2 U	2 U
Arsenic	0.0450	10.0	36.0 [23]	14.0	**3**	**1.2**	**1.3**	**1.1**
Barium	730 [2]	2,000	16,667 [21][24]	260	39.5	9.6 J	4.8 J	4.8 J
Cadmium	1.80 [2]	5.0	8.80 [25]	36.4	0.061 J	1 U	0.062 J	0.059 J
Chromium	5,500 [2][5]	100	50 [26]	6.49	0.73 J	0.45 J	0.34 J	0.49 J
Cobalt	1.10 [2]	NE	45.0 [21][27]	581	**2.3**	0.64 J	**2.4**	**2.5**
Copper	150 [2]	1,300	3.10 [28]	29.1	29.3	11.3	5	9.5
Nickel	73.0 [2]	8.28	8.20 [25]	84.1	3.3	1 U	1.3	1.5
Selenium	18.0 [2]	50.0	71.0 [25]	23.9	10.1	6.3	8.1	7.9
Thallium	2.0 [6]	0.47	21.3 [9][21]	NE	0.27 J	1 U	1 U	1 U
Vanadium	0.260 [2]	NE	12.0 [11][17][21]	21.0	**12.6** J	**45.5** J	**52.8** J	**53.2** J
Zinc	1,100 [2]	85.6	81.0 [29]	361	8.4	2.3	2.5	2.1

TABLE 6-3

Revised: June 2, 2011

SUMMARY OF DETECTED LABORATORY RESULTS - GROUNDWATER
SWMU 67 - FORMER GAS STATION
PHASE I RFI REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Qualifiers/Notes:

U - Undetected at the Method Detection Limit
UJ - Reported quantitation limit is qualified as estimated
J - Estimated: The analyte was positively identified; the quantitation is an estimation
NA - Not Analyzed
R - Rejected data; data is not usable

µg/L - micrograms per liter
NA - Not Analyzed
NE - Not Established
NAPR - Naval Activity Puerto Rico
PAH - Polynuclear Aromatic Hydrocarbon
USEPA - United States Environmental Protection Agency

(A) PRWQS for Class SB coastal and estuarine waters uesd as groundwater screening values if more stingent than USEPA MCL or if no MCL was established for a constituent
(1) NAPR basewide background groundwater screening valueTable 4-4 (upper limit of the means concentration [mean plus two standard deviations]) (Baker, 2010)
(2) Noncarcinogenic Regional Screening Levels based on a target hazard quotient of 0.1 for conservative screening purposes.
(3) Value for acenaphthene used as a surrogate.
(4) Value for pyrene used as a surrogate.
(5) Value for chromium III used as a surrogate.
(6) Value for MCL
(7) Minimum acute value (96-hour NOEC for *Cyprinodon variegatus* [sheepshead minnow]) with a safety factor of 30 [USEPA 2007]
(8) Minimum acute value (96-hr LC_{50} for *Lumbriculus variegatus* [Oligochaete]) with a safety factor of 100 [USEPA 2007]
(9) USEPA Region 4 chronic screening value [USEPA 2001]
(10) The safety factors applied to acute endpoints (i.e., LC_{50}, EC_{50}, NOEC, and LOEL values) and chronic endpoints (i.e., LOELs) are those recommended by Wentsel et al. (1996).
(11) USEPA Region 5 ecological screening level [USEPA 2003]
(12) Minimum acute value (96-hr LC_{50} for *Crangon septemspinosa* [sand shrimp]) with a safety factor of 100 [USEPA 2007]
(13) Minimum acute value (96-hr LC_{50} for *Penaeus aztecus* [brown shrimp]) with a safety factor of 100 [USEPA 2007]
(14) Acute LOEL for chemical class with a safety factor of 50 (value for low molecular weight PAHs) [Buchman 2008]
(15) Final Chronic Value [USEPA 1996]
(16) Minimum acute value (96-hr LC_{50} for *Nereis arenaceodentata* [polychaete]) with a safety factor of 100 [USEPA 2007]
(17) The chemical lacks a marine/estuarine surface water screening value/literature-based toxicity value. The value shown is a freshwater screening value/toxicity value.
(18) Acute LOEL for chemical class with a safety factor of 50 (value for high molecular weight PAHs) [Buchman 2008]
(19) Acute value (LC_{50}) with a safety factor of 100 [USEPA 2004]
(20) Minimum acute value (48-hr LC_{50} for *Americamysis bahia* [opossum shrimp]) with a safety factor of 100 [USEPA 2007]
(21) The chemical lacks a screening value expressed as a dissolved concentration. The value shown is expressed as a total recoverable concentration.
(22) Proposed Criteria Continuous Concentration [Buchman 2008]
(23) Dissolved Criteria Continuous Concentration for trivalent arsenic [USEPA 2009]
(24) Minimum acute value (96-hr NOEC for *Cyprinodon variegatus* [sheepshead minnow]) with a safety factor of 30 [USEPA 2007]

SUMMARY OF DETECTED LABORATORY RESULTS - GROUNDWATER
SWMU 67 - FORMER GAS STATION
PHASE I RFI REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Notes (Cont):

(25) Dissolved Criteria Continuous Concentration [USEPA 2009]
(26) Dissolved Criteria Continuous Concentration for hexavalent chromium [USEPA 2009]
(27) Minimum acute value (96-hr LC_{50} for *Nitocra spinipes* [Harpacticoid copepod]) with a safety factor of 100 [USEPA 2007]
(28) Criteria Continuous Concentration based on Final Residaul Value [USEPA 2009]
(29) Dissolved Criteria Continuous Concentration [USEPA 2009]
(30) Total recoverable Puerto Rico Water Quality Standard for Class SB coastal and estuarine waters for trivalent arsenic [PREQB 2010]
(31) Total recoverable Puerto Rico Water Quality Standard for Class SB coastal and estuarine waters [PREQB 2010]
(32) Total recoverable Puerto Rico Water Quality Standard for Class SB coastal and estuarine waters for hexavalent chromium [PREQB 2010]

Table References:

Baker Environmental, Inc, (2010). Revised Final II Summary Report for Environmental Background Concentrations of Inorganic Compounds, Naval Activity Puerto Rico, Ceiba, Puerto Rico. July 30, 2010.

Buchman, M.F. 2008. NOAA Screening Quick Reference Tables. NOAA OR&R Report 08-1. National Oceanic and Atmospheric Administration, Office of Response and Restoration Division, Seattle, WA.

Puerto Rico Environmental Quality Board (PREQB). Puerto Rico Water Quality Standards Regulation. Regulation No. 7837. March 31, 2010.

USEPA. 2009. National Recommended Water Quality Criteria. Office of Water and Office of Science and Technology, Washington, D.C. http://www.epa.gov/waterscience/criteria/wqctable/.

USEPA. 2007. ECOTOX User Guide: Ecotoxicology Database System. Version 4.0. http:/www.epa.gov/ecotox/. Accessed May 14, 2003, July 2, 2008, January 8, 2009, April 1, 2009, and August 28, 2009.

USEPA. 2004. Superfund Chemical Data Matrix. http://www.epa.gov/superfund/sites/npl/hrsres/tools/scdm.htm.

USEPA. 2003. USEPA Region 5 Ecological Screening Levels Table. http://www.epa.gov/reg5rcra/ca/ESL.pdf.

USEPA. 2001. Region 4 Ecological Risk Assessment Bulletins - Supplement to RQGS. Waste Management Division, Atlanta, GA. http://www.epa.gov/region04/waste/ots/ecolbul.htm.

USEPA. 1996. Ecotox Thresholds. Eco Update, Volume 3, Number 2. Office of Solid Waste and Emergency Response, Washington, D.C. EPA/F-95/038.

TABLE 6-4

Revised: June 2, 2011

SUMMARY OF DETECTED LABORATORY RESULTS - FRESH SURFACE WATER
SWMU 67 - FORMER GAS STATION
PHASE I RFI REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Site ID Sample ID Sample Date	**Regional Tap Water Screening Levels**	*USEPA MCLs* [A]	Selected Ecological Screening Values	NAPR Basewide Background [1]	67SW03 67SW03 3/22/2010
Volatiles (µg/L)					
None Detected					
TPH DRO and GRO (µg/L)					
None Detected					
Semivolatiles (µg/L)					
Naphthalene	0.140	NE	13.0 [5]	NE	0.072 J
Total Inorganics (µg/L)					
Antimony	1.50 [2]	5.6	80.0 [5]	14.2	0.4 J
Arsenic	0.0450	10.0	150 [9]	6.28	**0.74** J
Barium	730 [2]	2,000	220 [5]	38.1	38
Chromium	5,500 [2][3]	100	33.3 [6][10]	5.35	0.44 J
Cobalt	1.10 [2]	NE	24.0 [5]	6.76	0.27 J
Copper	150 [2]	1,300	3.46 [6][11]	19.7	5.8
Lead	15.0 [4]	15.0	0.73 [6][11]	3.38	0.23 J
Nickel	73.0 [2]	NE	19.6 [6][11]	30.0	0.78 J
Selenium	18.0 [2]	50.0	5.00 [11]	8.90	3.8 J
Vanadium	0.260 [2]	NE	12.0 [5]	30.2	**8.8**
Zinc	1,100 [2]	NE	44.8 [6][11]	28.1	5.6 J
Dissolved Inorganics (µg/L)					
Antimony	1.50 [2]	5.6	80.0 [5]	13.2	0.45 J
Barium	730 [2]	2,000	220 [5]	36.1	38
Chromium	5,500 [2][3]	100	28.7 [6][7]	6.21	0.33 J
Cobalt	1.10 [2]	NE	24.0 [5]	6.01	0.13 J
Copper	150 [2]	1,300	3.32 [6][8]	10.0	6
Lead	15.0 [4]	15.0	0.70 [6][8]	3.71	0.091 J
Nickel	73.0 [2]	NE	19.5 [6][8]	30.9	0.89 J
Selenium	18.0 [2]	50.0	4.61 [8]	9.12	4.2 J
Vanadium	0.260 [2]	NE	12.0 [5]	34.1	**8.2** J
Zinc	1,100 [2]	NE	44.2 [6][8]	25.0	3

TABLE 6-4

Revised: June 2, 2011

SUMMARY OF DETECTED LABORATORY RESULTS - FRESH SURFACE WATER
SWMU 67 - FORMER GAS STATION
PHASE I RFI REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

J - Estimated: The analyte was positively identified; the quantitation is an estimation
NE - Not Established
PAH = Polynuclear Aromatic Hydrocarbon
USEPA = United States Environmental Protection Agency

(A) PRWQS for Class SD surface waters uesd as screening value if more stingent than USEPA MCL or if no MCL was established for a constituent
(1) NAPR basewide background groundwater screening value Table 5-3 (upper limit of the means concentration [mean plus two standard deviations]) (Baker, 2010)
(2) Noncarcinogenic Regional Screening Levels based on a target hazard quotient of 0.1 for conservative screening purposes.
(3) Value for chromium III used as a surrogate.
(4) Value for MCL
(5) USEPA Region 5 ecological screening level [USEPA 2003]
(6) The screening value shown is based on a water hardness of 31.35 mg/L as $CaCO_3$.
(7) Dissolved Continuous Concentration for trivalent chromium [USEPA 2009]
(8) Dissolved Criteria Continuous Concentration [USEPA 2009]
(9) Total recoverable Criteria Continuous Concentration for trivalent arsenic [USEPA 2009]
(10) Total recoverable Puerto Rico Water Quality Standard for Class SD surface waters for trivalent chromium [PREQB 2010]
(11) Total recoverable Puerto Rico Water Quality Standard for Class SD surface waters [PREQB 2010]

Table References:

Baker Environmental, Inc, (2010). Revised Final II Summary Report for Environmental Background Concentrations of Inorganic Compounds, Naval Activity Puerto Rico, Ceiba, Puerto Rico. July 30, 2010.

Puerto Rico Environmental Quality Board (PREQB). Puerto Rico Water Quality Standards Regulation. Regulation No. 7837. March 31, 2010.

United States Environmental Protection Agency (USEPA). 2009. National Recommended Water Quality Criteria. Office of Water and Office of Science and Technology, Washington, D.C. http://www.epa.gov/waterscience/criteria/wqctable/.

USEPA. 2003. USEPA Region 5 Ecological Screening Levels Table. http://www.epa.gov/reg5rcra/ca/ESL.pdf.

TABLE 6-5

Revised: June 2, 2011

SUMMARY OF DETECTED LABORATORY RESULTS - ESTUARINE SEDIMENT
SWMU 67 - FORMER GAS STATION
PHASE I RFI REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Site ID Sample ID Sample Date Sample Depth (ft bgs)	**Regional Screening Levels Residential Soil**	*Regional Screening Levels Industrial Soil*	Selected Ecological Sediment Screening Values	NAPR Basewide Background [1]	67SD01 67SD01 3/22/2010 0.0 - 0.25	67SD01D 67SD01D 3/22/2010 0.0 - 0.25	67SD02 67SD02 3/22/2010 0.0 - 0.25	67SD04 67SD04 3/22/2010 0.0 - 0.25	67SD05 67SD05 3/22/2010 0.0 - 0.25
Volatiles (µg/kg)									
2-Butanone	2,800,000 [2]	10,000,000 [2]	251 [8]	NE	11 J	20	9.4 J	15 J	15 J
Acetone	6,100,000 [2]	63,000,000 [2]	5.81 [8]	NE	95	170	120 J	190	210 J
Carbon Disulfide	82,000 [2]	370,000 [2]	13.9 [8]	NE	5.1 J	36 J	0.86 J	15	1.7 J
Chloromethane	12,000 [2]	50,000 [2]	212 [8]	NE	6.6 U	6 U	0.76 J	8.2 U	0.82 J
Methyl Iodide	NE	NE	NE	NE	1.2 J	0.77 J	2.5 J	2.3 J	2.5 J
Xylene, m/p-	63,000 [2][3]	270,000 [2][3]	NE	NE	13 U	0.24 J	0.42 J	0.38 J	17 UJ
Semivolatiles (µg/kg)									
Benzo(a)anthracene	150	2,100	74.8 [9]	NE	13 UJ	28 J	14 U	14 U	52 J
Benzo(a)pyrene	15.0	210	88.8 [9]	NE	13 U	12 U	14 U	14 U	**70** J
Benzo(b)fluoranthene	150	2,100	1,800 [10]	NE	13 U	12 U	14 U	14 U	110 J
Benzo(g,h,i)perylene	170,000 [2][4]	1,700,000 [2][4]	670 [11]	NE	13 U	12 U	14 U	14 U	73 J
Benzo(k)fluoranthene	1,500	21,000	1,800 [10]	NE	13 U	12 U	14 U	14 U	74 J
Chrysene	15,000	210,000	108 [9]	NE	13 UJ	24 J	14 U	14 U	77 J
Dibenz(a,h)anthracene	15.0	210	6.22 [9]	NE	13 U	12 U	14 U	14 U	**28** J
Fluoranthene	230,000 [2]	2,200,000 [2]	113 [9]	NE	13 UJ	43 J	14 U	14 U	95 J
Indeno(1,2,3-cd)pyrene	150	2,100	600 [12]	NE	13 U	12 U	14 U	14 U	100 J
Pyrene	170,000 [2]	1,700,000 [2]	153 [9]	NE	13 UJ	51 J	14 U	14 U	90 J
TPH (mg/kg)									
Diesel Range Organics	100 [5]	100 [5]	NE	NE	31 J	20 J	27 J	34 J	41 J
Total TPH	100 [5]	100 [5]	NE	NE	31.76 J	20.72 J	27.82 J	34.86 J	42.1 J

TABLE 6-5

Revised: June 2, 2011

SUMMARY OF DETECTED LABORATORY RESULTS - ESTUARINE SEDIMENT
SWMU 67 - FORMER GAS STATION
PHASE I RFI REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Site ID Sample ID Sample Date Sample Depth (ft bgs)	**Regional Screening Levels Residential Soil**	*Regional Screening Levels Industrial Soil*	Selected Ecological Sediment Screening Values	NAPR Basewide Background [1]	67SD01 67SD01 3/22/2010 0.0 - 0.25	67SD01D 67SD01D 3/22/2010 0.0 - 0.25	67SD02 67SD02 3/22/2010 0.0 - 0.25	67SD04 67SD04 3/22/2010 0.0 - 0.25	67SD05 67SD05 3/22/2010 0.0 - 0.25
Inorganics (mg/kg)									
Antimony	3.10 [2]	41.0 [2]	2.0 [13]	3.25	1.2 J	1.4 UJ	1.5 UJ	1.7 UJ	2 UJ
Arsenic	0.390	1.60	7.24 [9]	7.0	**1.2**	**0.99**	**0.93**	**1.6**	**1.3** J
Barium	1,500 [2]	19,000 [2]	48.0 [14]	24.9	62	53.3	44.8	61.8	113 J
Beryllium	16.0 [2]	200 [2]	NE	0.550	0.27 J	0.24 J	0.28 J	0.31 J	0.31 J
Cadmium	7.0 [2]	80.0 [2]	0.676 [9]	1.23	0.79	0.7	0.51 J	0.35 J	0.79 J
Chromium	12,000 [2][6]	150,000 [2][6]	52.3 [9]	50.1	28.2	21	27.5	36	37.2 J
Cobalt	2.30 [2]	30.0 [2]	10.0 [15]	22.3	***44.5*** J	***35.9*** J	***45.6*** J	***41.8*** J	**25.7** J
Copper	310 [2]	4,100 [2]	18.7 [9]	132	77.1 J	58.3 J	63.4 J	65.4 J	133 J
Lead	400 [7]	800 [7]	30.2 [9]	25.4	134 J	119 J	35.6 J	21.2 J	31.3 J
Mercury	0.560 [2]	3.40 [2]	0.130 [9]	0.168	0.028 J	0.04 J	0.033 J	0.041 J	0.084 J
Nickel	150 [2]	2,000 [2]	15.9 [9]	17.3	12.8	10.1	11.7	12.3	12.3 J
Selenium	39.0 [2]	510 [2]	1.0 [14]	1.51	1.4 J	1.2 J	1.4 J	1.5 J	1.6 J
Silver	39.0 [2]	510 [2]	0.733 [9]	2.41	0.15 J	0.69 U	0.77 U	0.85 U	0.99 UJ
Thallium	NE	NE	NE	NE	0.069 J	0.048 J	0.048 J	0.051 J	0.18 J
Vanadium	0.550 [2]	7.20 [2]	57.0 [15]	230	***232*** J	***190*** J	***371*** J	***282*** J	***214*** J
Zinc	2,300 [2]	31,000 [2]	124 [9]	96.9	86.8	75	68.7	65.1	98.1 J
Conventionals (mg/kg)									
Total Organic Carbon	NE	NE	NE	NE	NA	NA	25440	25600	47770

TABLE 6-5

Revised: June 2, 2011

SUMMARY OF DETECTED LABORATORY RESULTS - ESTUARINE SEDIMENT
SWMU 67 - FORMER GAS STATION
PHASE I RFI REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Qualifiers/Notes:

U - Undetected at the Method Detection Limit
UJ - Reported quantitation limit is qualified as estimated
J - Estimated: The analyte was positively identified; the quantitation is an estimation
NA - Not Analyzed
NE - Not Established
ft bgs - feet below ground surface

µg/kg - micrograms per kilogram
mg/kg - milligrams per kilogram
NAPR - Naval Activity Puerto Rico
PAH - Polynuclear Aromatic Hydrocarbons
TPH - Total Petroleum Hydrocarbons
USEPA - United States Environmental Protection Agency

(1) NAPR basewide background estuarine sediment screening value Table 5-9 (upper limit of the means concentration [mean plus two standard deviations]) (Baker, 2010)
(2) Noncarcinogenic Regional Screening Levels based on a target hazard quotient of 0.1 for conservative screening purposes.
(3) Value for total used as a surrogate.
(4) Value for pyrene used as a surrogate.
(5) Puerto Rico specific value
(6) Value for chromium III used as a surrogate.
(7) USEPA Residential Soil Action Level
(8) EqP-based screening value [USEPA 1993 and 1996]
(9) Threshold Effect Level [MacDonald 1994]
(10) Minimum Apparent Effects Threshold (Echinoderm larvae and infaunal commuity impacts) [Buchman 2008]
(11) Minimum Apparent Effects Threshold (Echinoderm larvae) [Buchman 2008]
(12) Minimum Apparent Effects Threshold (Microtox) [Buchman 2008]
(13) Effects Range-Low [Long and Morgan 1991]
(14) Minimum Apparent Effects Threshold (amphipod) [Buchman 2008]
(15) Minimum Apparent Effects Threshold (Neanthes bioassays) [Buchman 2008]

TABLE 6-5

Revised: June 2, 2011

SUMMARY OF DETECTED LABORATORY RESULTS - ESTUARINE SEDIMENT
SWMU 67 - FORMER GAS STATION
PHASE I RFI REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Table References:

Baker Environmental, Inc, (2010). Revised Final II Summary Report for Environmental Background Concentrations of Inorganic Compounds, Naval Activity Puerto Rico, Ceiba, Puerto Rico. July 30, 2010.

Buchman, M.F. 2008. NOAA Screening Quick Reference Tables. NOAA OR&R Report 08-1. National Oceanic and Atmospheric Administration, Office of Response and Restoration Division, Seattle, WA.

Long, E.R. and L.G. Morgan. 1991. The Potential for Biological Effects of Sediment-Sorbed Contaminants Tested in the National Status and Trends Program. National Oceanic and Atmospheric Administration, Seattle, WA. NOAA Technical Memorandum NOS OMA 52.

MacDonald, D.D. 1994. Approach to the Assessment of Sediment Quality in Florida Waters: Volume 1 - Development and Evaluation of Sediment Quality Assessment Guidelines. Prepared for Florida Department of Environmental Protection, Tallahassee, Fl. November 1994.

USEPA. 1996. Ecotox Thresholds. Eco Update, Volume 3, Number 2. Office of Solid Waste and Emergency Response, Washington, D.C. EPA/F-95/038.

USEPA. 1993. Technical Basis for Deriving Sediment Quality Criteria for Nonionic Organic Contaminants for the Protection of Benthic Organisms by Using Equilibrium Partitioning. Office of Water, Washington, D.C. EPA-822-R-93-011.

TABLE 6-6

Revised: June 2, 2011

SUMMARY OF DETECTED LABORATORY RESULTS - FRESHWATER SEDIMENT
SWMU 67 - FORMER GAS STATION
PHASE I RFI REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Site ID Sample ID Sample Date Sample Depth (ft bgs)	**Regional Screening Levels Residential Soil**	*Regional Screening Levels Industrial Soil*	Selected Ecological Sediment Screening Values	NAPR Basewide Background [1]	67SD03 67SD03 3/22/2010 0.0 - 0.25
Volatiles (µg/kg)					
2-Butanone	2,800,000 [2]	20,000,000 [2]	41.5 [8]	NE	13 J
Acetone	6,100,000 [2]	63,000,000 [2]	9.88 [8]	NE	200 J
Carbon Disulfide	82,000 [2]	370,000 [2]	13.9 [8]	NE	2.7 J
Methyl Iodide	NE	NE	NE	NE	2.9 J
Xylene, m/p-	63,000 [2][3]	270,000 [2][3]	4.0	NE	0.34 J
Semivolatiles (µg/kg)					
Benzo(g,h,i)perylene	170,000 [2][4]	1,700,000 [2][4]	170 [9]	NE	23
TPH (mg/kg)					
Diesel Range Organics	100 [5]	100 [5]	NE	NE	28 J
Total TPH	100 [5]	100 [5]	NE	NE	28.79 J

TABLE 6-6

Revised: June 2, 2011

SUMMARY OF DETECTED LABORATORY RESULTS - FRESHWATER SEDIMENT
SWMU 67 - FORMER GAS STATION
PHASE I RFI REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Site ID Sample ID Sample Date Sample Depth (ft bgs)	**Regional Screening Levels Residential Soil**	*Regional Screening Levels Industrial Soil*	Selected Ecological Sediment Screening Values	NAPR Basewide Background [1]	67SD03 67SD03 3/22/2010 0.0 - 0.25
Inorganics (mg/kg)					
Arsenic	0.390	1.60	9.79 [10]	3.7	**0.89**
Barium	1,500 [2]	19,000 [2]	20.0 [11]	213.0	68.3
Beryllium	16.0 [2]	200 [2]	NE	0.3	0.25 J
Cadmium	7.0 [2]	80.0 [2]	0.990 [10]	0.4	0.32 J
Chromium	12,000 [2][6]	150,000 [2][6]	43.4 [10]	66.8	23.8
Cobalt	2.30 [2]	30.0 [2]	50.0 [11]	66.4	***32.8*** J
Copper	310 [2]	4,100 [2]	31.6 [10]	139.6	64 J
Lead	400 [7]	800 [7]	35.8 [10]	14.6	11 J
Mercury	0.560 [2]	3.40 [2]	0.180 [10]	0.2	0.023 J
Nickel	150 [2]	2,000 [2]	22.7 [10]	19.2	9.8
Selenium	39.0 [2]	510 [2]	2.0 [12]	4.1	1.5 J
Thallium	NE	NE	NE	NE	0.047 J
Vanadium	0.550 [2]	7.20 [2]	57.0 [13][14]	260.4	***170*** J
Zinc	2,300 [2]	31,000 [2]	121 [10]	109.8	81.4
Conventionals (mg/kg)					
Total Organic Carbon	NE	NE	NE	NE	14030

TABLE 6-6

Revised: June 2, 2011

SUMMARY OF DETECTED LABORATORY RESULTS - FRESHWATER SEDIMENT
SWMU 67 - FORMER GAS STATION
PHASE I RFI REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Qualifiers/Notes:

U - Undetected at the Method Detection Limit
UJ - Reported quantitation limit is qualified as estimated
J - Estimated: The analyte was positively identified; the quantitation is estimated
NE - Not Established
ft bgs - feet below ground surface

µg/kg - micrograms per kilogram
mg/kg - milligrams per kilogram
NAPR - Naval Activity Puerto Rico
PAH - Polynuclear Aromatic Hydrocarbons
TPH - Total Petroleum Hydrocarbons
USEPA - United States Environmental Protection Agency

(1) NAPR basewide background freshwater sediment screening value Table C-7 (upper limit of the means concentration [mean plus two standard deviations]) (Baker, 2010)
(2) Noncarcinogenic Regional Screening Levels based on a target hazard quotient of 0.1 for conservative screening purposes.
(3) Value for total used as a surrogate.
(4) Value for pyrene used as a surrogate.
(5) Puerto Rico specific value
(6) Value for chromium III used as a surrogate.
(7) USEPA Residential Soil Action Level
(8) EqP-based screening value [USEPA 1993 and 1996]
(9 Lowest Effect Level [Persaud et al. 1993]
(10) Consensus-based Threshold Effect Concentration [MacDonald et al. 2000]
(11) Threshold Effect Concentration [MacDonald et al. 2003]
(12) USEPA Region 3 BTAG screening value [Lemley 2002 (as cited in USEPA 2007)]
(13) The chemical lacks a freshwater bulk sediment screening value. The value shown is a marine/estuarine bulk sediment screening valaue.
(14) Minimum Apparent Effects Threshold (infaunal community impacts) [Buchman 2008]

TABLE 6-6

Revised: June 2, 2011

SUMMARY OF DETECTED LABORATORY RESULTS - FRESHWATER SEDIMENT
SWMU 67 - FORMER GAS STATION
PHASE I RFI REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Table References:

Baker Environmental, Inc, (2010). Revised Final II Summary Report for Environmental Background Concentrations of Inorganic Compounds, Naval Activity Puerto Rico, Ceiba, Puerto Rico. July 30, 2010.

Buchman, M.F. 2008. NOAA Screening Quick Reference Tables. NOAA OR&R Report 08-1. National Oceanic and Atmospheric Administration, Office of Response and Restoration Division, Seattle, WA.

MacDonald, D.D. 1994. Approach to the Assessment of Sediment Quality in Florida Waters: Volume 1 - Development and Evaluation of Sediment Quality Assessment Guidelines. Prepared for Florida Department of Environmental Protection, Tallahassee, Fl. November 1994.

USEPA. 1996. Ecotox Thresholds. Eco Update, Volume 3, Number 2. Office of Solid Waste and Emergency Response, Washington, D.C. EPA/F-95/038.

USEPA. 1993. Technical Basis for Deriving Sediment Quality Criteria for Nonionic Organic Contaminants for the Protection of Benthic Organisms by Using Equilibrium Partitioning. Office of Water, Washington, D.C. EPA-822-R-93-011.

TABLE 6-7

SUMMARY OF DETECTED LABORATORY RESULTS - QUALITY ASSURANCE / QUALITY CONTROL
SWMU 67 - FORMER GAS STATION
PHASE I RFI REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

	Equipment Rinsates							
Sample ID	67ER01	67ER02	67ER03	67ER04	67ER05	67ER06	67ER07	67ER08
Sample Date	3/22/2010	3/23/2010	3/24/2010	3/25/2010	3/26/2010	3/27/2010	3/28/2010	3/30/2010
Volatiles (µg/L)								
2-Butanone	2.5 R	2.5 R	2 J	2.5 J	2.5 R	2.1 J	2.4 J	1.5 J
Acetone	3.5 J	3.2 J	2.7 J	3.9 J	5.1 J	3.1 J	4.9 J	4 J
Benzene	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.034 J
Bromodichloromethane	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.092 J	0.5 U	0.5 U
Chloroform	1.4	1.3	0.97	1	0.5 U	1.2	0.46 J	0.2 J
Methylene Chloride	1.5	1.3	1.1	1.1	0.18 J	0.9	0.52	3.8
Toluene	0.95	0.81	0.5	0.53	0.082 J	0.22 J	0.14 J	1
Xylene, m/p-	1 U	1 U	1 U	1 U	1 U	1 U	1 U	0.12 J
Xylene, o-	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.076 J
Xylenes, total	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.13 J
PAHs (µg/L)								
2-Methylnaphthalene	0.21 U	0.21 U	0.22 U	0.22 U	0.2 U	0.016 J	0.21 U	0.02 J
Naphthalene	0.097 J	0.093 J	0.079 J	0.061 J	0.2 U	0.074 J	0.04 J	0.11 J
Benzo(k)fluoranthene	0.21 U	0.21 U	0.22 U	0.22 U	0.011 J	0.21 U	0.21 U	0.2 U
TPH (mg/L)								
Gasoline Range Organics	0.03 J	0.03 J	0.029 J	0.03 J	0.037 J	0.03 J	0.035 J	0.033 J
Total TPH	0.53 J	0.53 J	0.529 J	0.56 J	0.547 J	0.57 J	0.535 J	0.533 J
Total Inorganics (µg/L)								
Copper	0.53 J	0.3 J	2 U	2 U	2 U	2 U	1.3 J	0.45 J
Lead	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Nickel	1 U	1 U	1 U	1 U	1 U	1 U	0.22 J	1 U
Zinc	0.61 J	0.83 J	1 J	0.99 J	0.98 J	2 U	1.8 J	2 U

TABLE 6-7

SUMMARY OF DETECTED LABORATORY RESULTS - QUALITY ASSURANCE / QUALITY CONTROL
SWMU 67 - FORMER GAS STATION
PHASE I RFI REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

	Field Blanks		Trip Blanks				
Sample ID	67FB01	67FB02	67TB01	67TB02	67TB03	67TB04	67TB05
Sample Date	3/23/2010	3/25/2010	3/22/2010	3/24/2010	3/26/2010	3/26/2010	3/30/2010
Volatiles (µg/L)							
2-Butanone	2.5 R	2.5 R	2.5 R	2.5 R	2.5 R	2.5 R	2.5 R
Acetone	3.7 J	5.1 J	2.5 R	2.5 R	2.5 R	2.5 R	2.5 R
Benzene	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Bromodichloromethane	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Chloroform	1.4	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Methylene Chloride	1.6	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Toluene	0.97	0.054 J	0.5 U	0.5 U	0.5 U	0.037 J	0.037 J
Xylene, m/p-	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Xylene, o-	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Xylenes, total	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
PAHs (µg/L)							
2-Methylnaphthalene	0.021 J	0.22 U	NA	NA	NA	NA	NA
Naphthalene	0.098 J	0.22 U	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	0.21 U	0.22 U	NA	NA	NA	NA	NA
TPH (mg/L)							
Gasoline Range Organics	0.032 J	0.032 J	0.033 J	0.032 J	0.03 J	0.036 J	0.032 J
Total TPH	0.532 J	0.532 J	0.033 J	0.032 J	0.03 J	0.036 J	0.032 J
Total Inorganics (µg/L)							
Copper	2 U	0.27 J	NA	NA	NA	NA	NA
Lead	1 U	0.074 J	NA	NA	NA	NA	NA
Nickel	1 U	0.11 J	NA	NA	NA	NA	NA
Zinc	2.3	1.2 J	NA	NA	NA	NA	NA

Notes:

U - Not detected
J - Analyte present - Reported value is estimated
R - Result is rejected and unusable
NA - Not Analyzed
PAH - Polyaromatic Hydrocarbons
TPH - Total Petroleum Hydrocarbons

FIGURES

K:_SOUTHNAVFAC\119197 JM01\SWMU 67\CADD\ 119197_67_03.dwg

4 0 2 4 8

1 inch = 4 miles

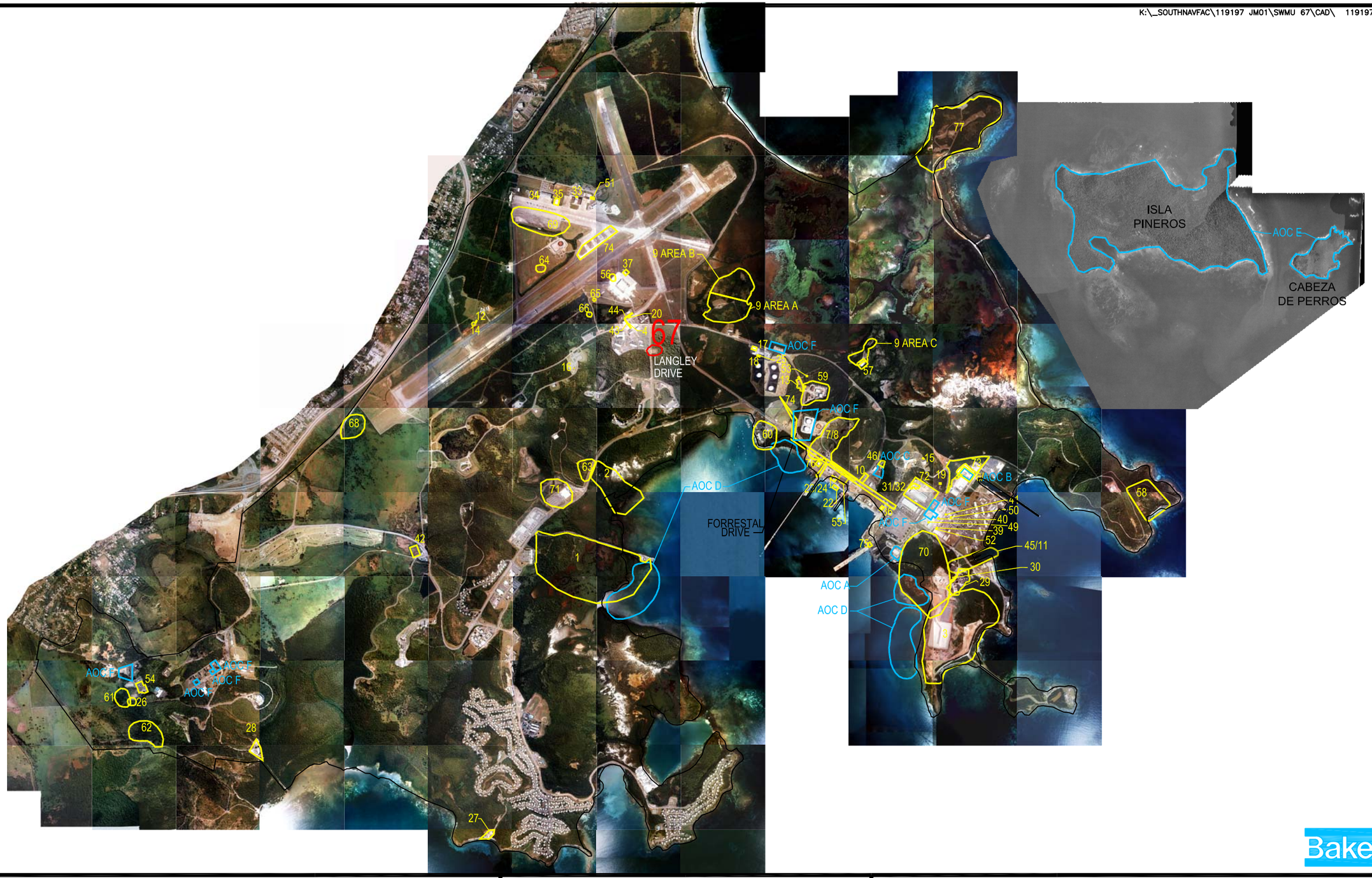
Baker

FIGURE 2-1
REGIONAL LOCATION MAP
SWMU 67-FORMER GAS STATION
PHASE I RFI REPORT

SOURCE: METRODATA, INC., 1999.

NAVAL ACTIVITY PUERTO RICO

K:_SOUTHNAVFAC\119197 JM01\SWMU 67\CAD\ 119197_67_04.dwg



LEGEND

1 – SWMUs

67 – AREA TO WHICH THIS INVESTIGATION PERTAINS

AOC D – AOCs

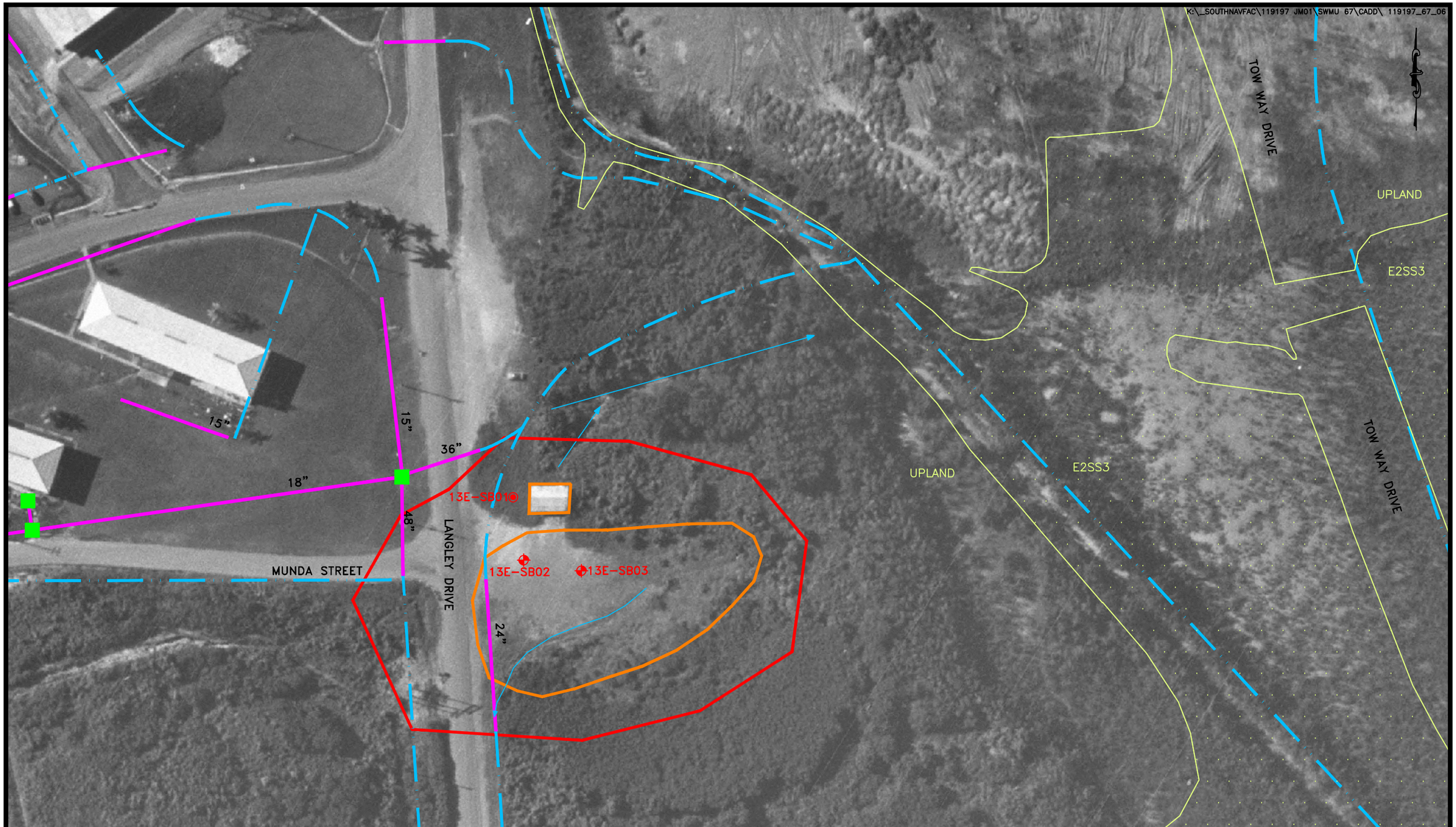
SOURCE: GEO-MARINE, INC., SEPTEMBER 6, 2000.

3000 0 1500 3000

1 inch = 3000 ft.

FIGURE 2-2
SWMU/AOC LOCATION MAP
SWMU 67-FORMER GAS STATION
PHASE I RFI REPORT

NAVAL ACTIVITY PUERTO RICO



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

100 0 50 100

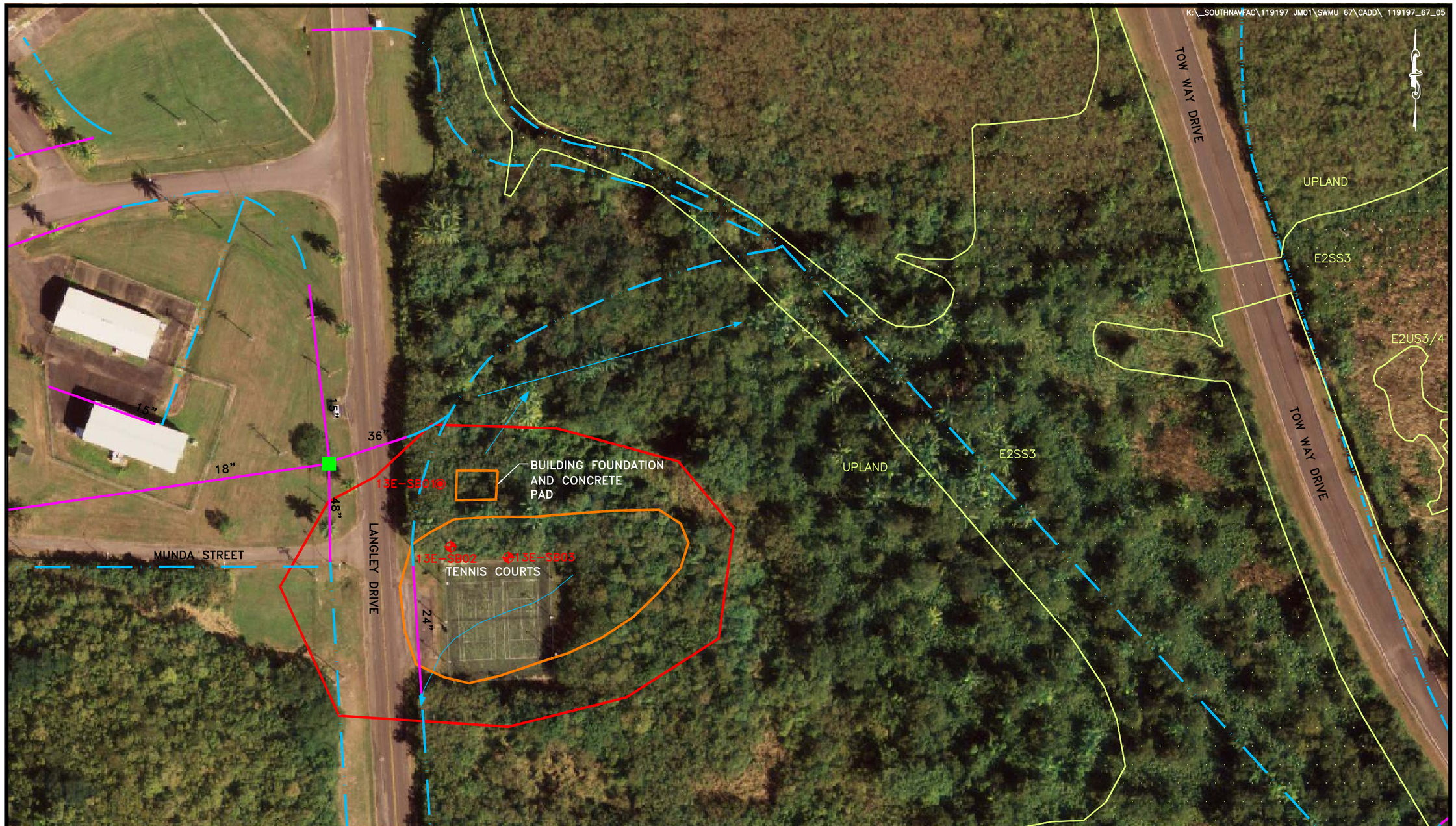
1 inch = 100 ft.

Baker

LEGEND

- –1958 POLYGON FEATURE
- –1958 DRAINAGE AND FLOW DIRECTION
- –SWMU BOUNDARY
- –DITCH
- –INLET
- 24" –STORM SEWER AND SIZE
- –ESTUARINE WETLAND BOUNDARY
- E2SS3 –ESTUARINE WETLAND IDENTIFICATION
- –EXISTING SOIL SAMPLING LOCATION (PHASE II ECP 2004)
- –EXISTING SOIL AND GROUNDWATER SAMPLING LOCATION (PHASE II ECP 2004)

FIGURE 2-3
SITE LAYOUT AND ECP
SAMPLE LOCATION MAP
1958 AERIAL PHOTOGRAPH
SWMU 67-FORMER GAS STATION
PHASE I RFI REPORT
NAVAL ACTIVITY PUERTO RICO



LEGEND

- 1958 POLYGON FEATURE
- 1958 DRAINAGE SWALE AND FLOW
- SWMU BOUNDARY
- DITCH
- INLET
- 24" STORM SEWER AND SIZE
- ESTUARINE WETLAND BOUNDARY
- E2SS3 ESTUARINE WETLAND IDENTIFICATION
- EXISTING SOIL SAMPLING LOCATION (PHASE II ECP 2004)
- EXISTING SOIL AND GROUNDWATER SAMPLING LOCATION (PHASE II ECP 2004)

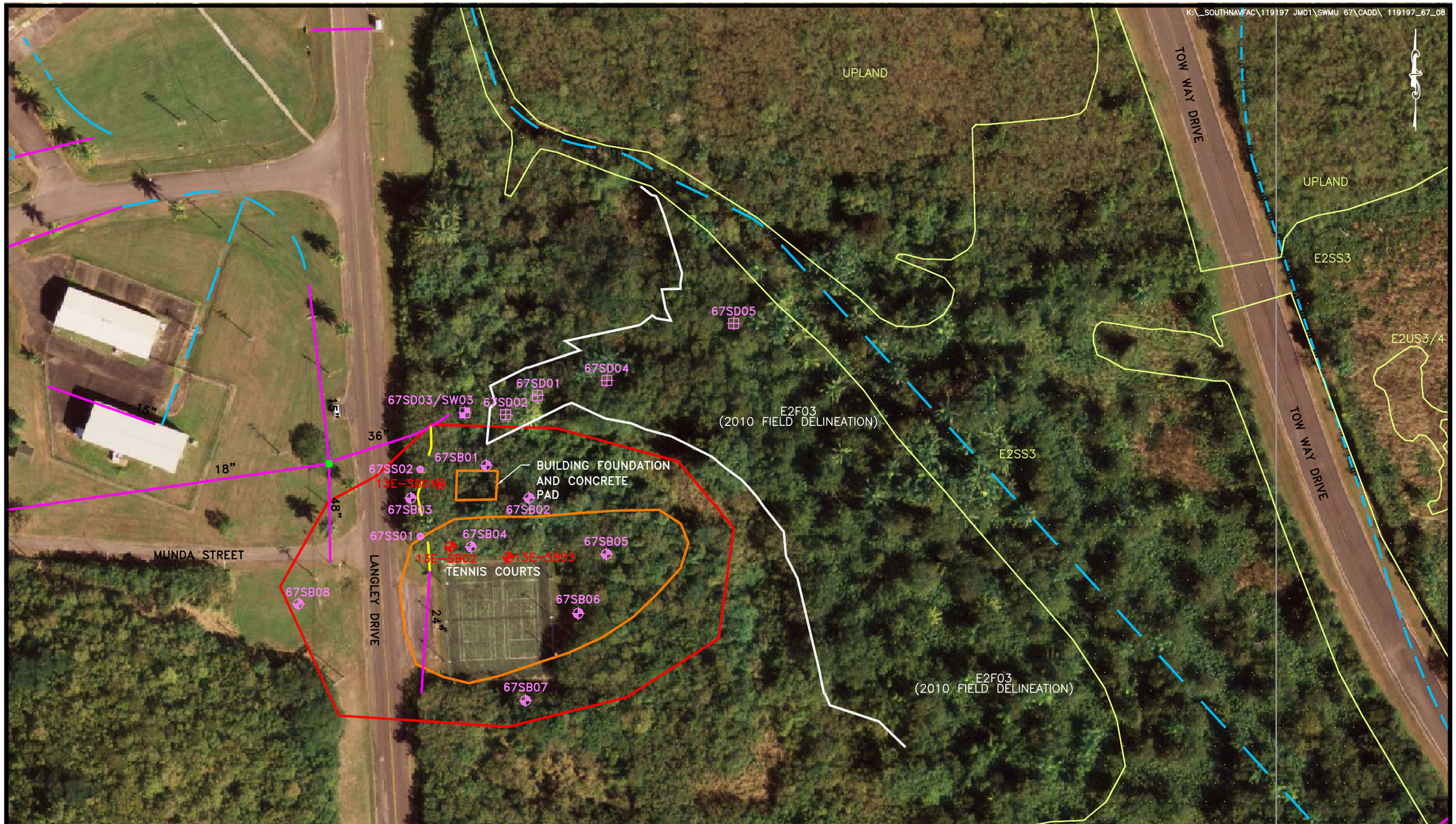
100 0 50 100

1 inch = 100 ft.

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

Baker

FIGURE 2-4
SITE LAYOUT AND ECP
SAMPLE LOCATION MAP
2000 AERIAL PHOTOGRAPH
SWMU 67-FORMER GAS STATION
PHASE I RFI REPORT
NAVAL ACTIVITY PUERTO RICO



100 0 50 100

1 inch = 100 ft.

Source: USGS, NOVEMBER 2006.

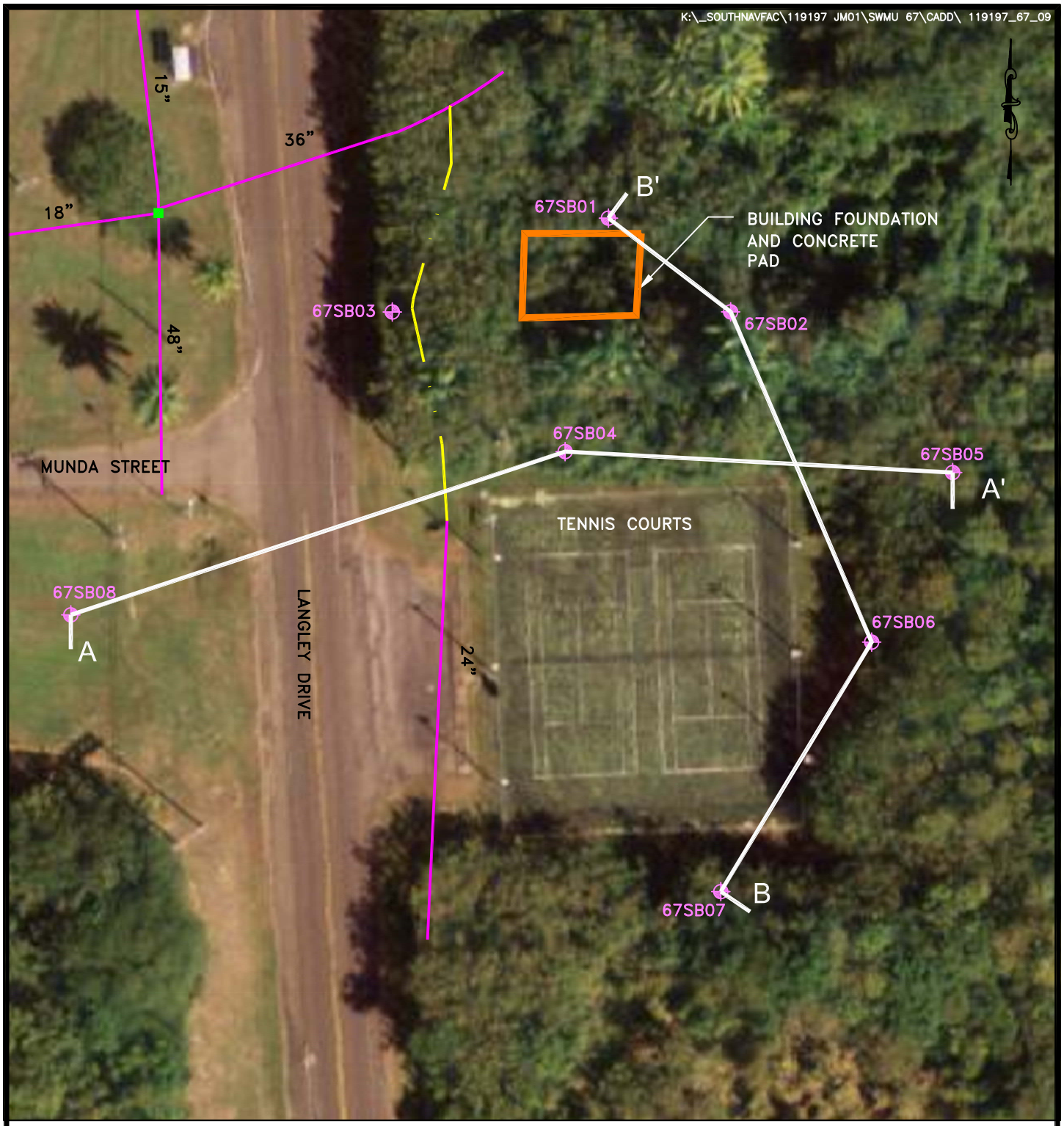
Baker

LEGEND

- EARTHEN DRAINAGE FEATURE
- 1958 POLYGON FEATURE
- SWMU BOUNDARY
- DITCH
- INLET
- 24" STORM SEWER AND SIZE
- E2SS3 ESTUARINE WETLAND IDENTIFICATION
- 2010 FIELD DELINEATED WETLAND BOUNDARY
- EXISTING SOIL SAMPLING LOCATION (PHASE II ECP 2004)
- EXISTING SOIL AND GROUNDWATER SAMPLING LOCATION (PHASE II ECP 2004)
- 2010 SOIL AND GROUNDWATER SAMPLING LOCATION
- 2010 SURFACE SOIL SAMPLING LOCATION
- 2010 SEDIMENT SAMPLING LOCATION
- 2010 SEDIMENT/SURFACE WATER SAMPLING LOCATION

FIGURE 4-1
SAMPLE LOCATION MAP
SWMU 67-FORMER GAS STATION
PHASE I RFI REPORT

NAVAL ACTIVITY PUERTO RICO



50 0 25 50

1 inch = 50 ft.

Baker

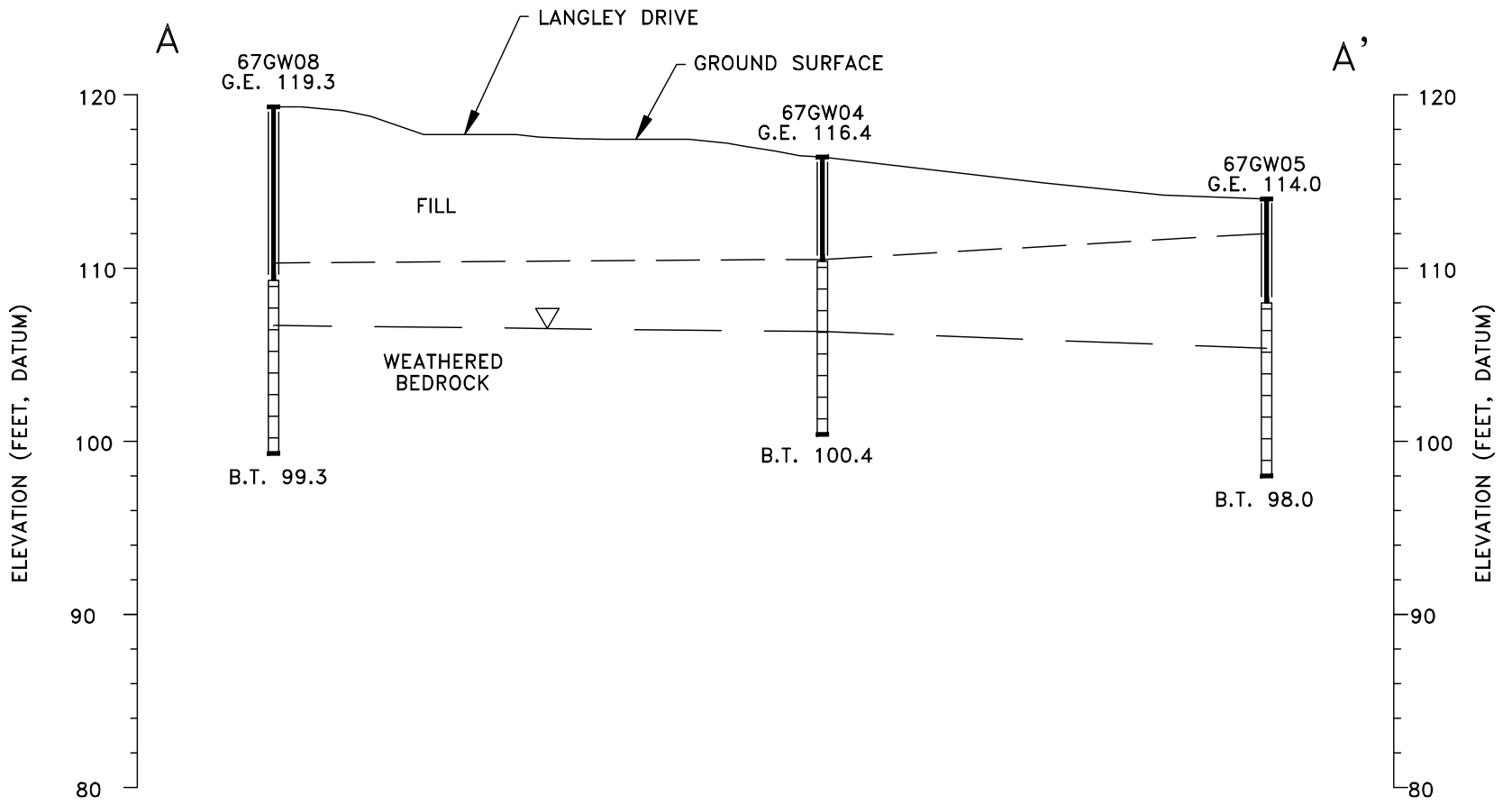
LEGEND

- PHASE I RFI SURFACE, SUBSURFACE AND GROUNDWATER SAMPLING LOCATION
- A A' CROSS SECTION TRAVERSE
- EARTHEN DRAINAGE FEATURE
- INLET
- 24" STORM SEWER AND SIZE

FIGURE 5-1
GEOLOGIC CROSS SECTION LOCATION MAP
SWMU 67-FORMER GAS STATION
PHASE I RFI REPORT

NAVAL ACTIVITY PUERTO RICO

119197_67_01



THE SOIL BORING INFORMATION IS CONSIDERED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT THE RESPECTIVE BORING LOCATIONS. SUBSURFACE CONDITIONS INTERPOLATED BETWEEN BORINGS ARE ESTIMATED BASED ON ACCEPTED SOIL ENGINEERING PRINCIPLES AND GEOLOGIC JUDGEMENT.

NOTE: DATUM PLAN USED IS THE MEAN LOW WATER +100.00 FOOT AS ESTABLISHED BY THE U.S. NAVY SECTION (NOVEMBER 1941).

Baker

50 0 25 50

1 inch = 50 ft.
HORIZONTAL SCALE

10 0 5 10

1 inch = 10 ft.
VERTICAL SCALE
EXACGERATION 10x

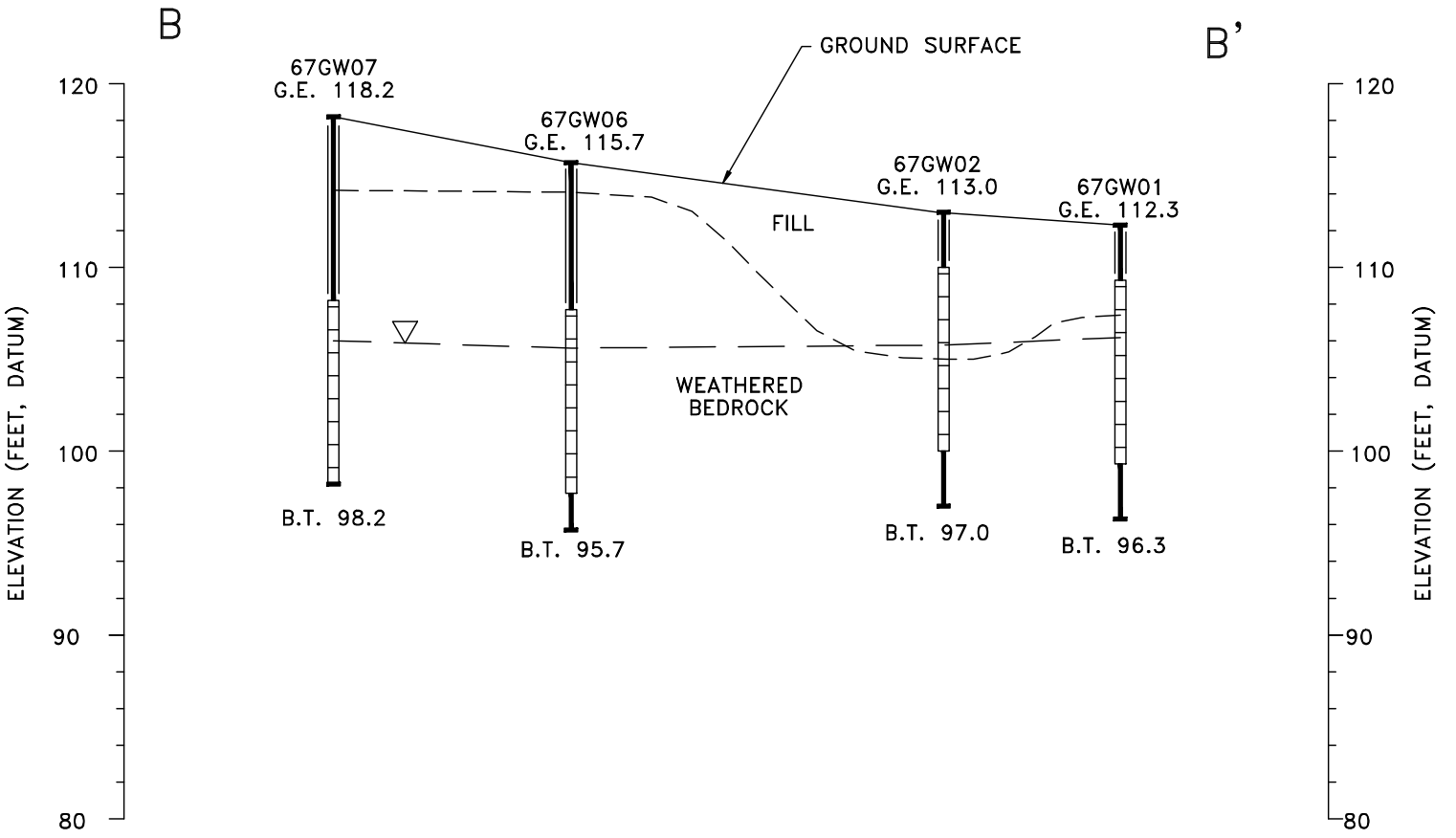
LEGEND

—ESTIMATED/PROJECTED CONTACT
—ESTMATED TOP OF GROUNDWATER
—BORING
—BORING AND RISER
—SCREEN
G.E. 119.3 —GROUND ELEVATION, DATUM ELEVATION
B.T. 99.3 —BORING TERMINATED, DATUM ELEVATION

FIGURE 5-2
GEOLOGIC CROSS SECTION A-A'
SWMU 67
FORMER GAS STATION

PHASE I RFI REPORT
NAVAL ACTIVITY PUERTO RICO

119197_67_02



THE SOIL BORING INFORMATION IS CONSIDERED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT THE RESPECTIVE BORING LOCATIONS. SUBSURFACE CONDITIONS INTERPOLATED BETWEEN BORINGS ARE ESTIMATED BASED ON ACCEPTED SOIL ENGINEERING PRINCIPLES AND GEOLOGIC JUDGEMENT.

NOTE: DATUM PLAN USED IS THE MEAN LOW WATER +100.00 FOOT AS ESTABLISHED BY THE U.S. NAVY SECTION (NOVEMBER 1941).

Baker

50 0 25 50

1 inch = 50 ft.
HORIZONTAL SCALE

10 0 5 10

1 inch = 10 ft.
VERTICAL SCALE
EXACGERATION 10x

LEGEND

- -ESTIMATED/PROJECTED CONTACT
- -ESTMATED TOP OF GROUNDWATER
- -BORING
- -BORING AND RISER
- -SCREEN
- G.E. 118.2 -GROUND ELEVATION, DATUM ELEVATION
- B.T. 98.2 -BORING TERMINATED, DATUM ELEVATION

FIGURE 5-3
GEOLOGIC CROSS SECTION B-B'
SWMU 67
FORMER GAS STATION

PHASE I RFI REPORT
NAVAL ACTIVITY PUERTO RICO

NOTE: DATUM PLAN USED IS THE MEAN LOW WATER +100.00 FOOT AS ESTABLISHED BY U.S. NAVY SECTION (NOVEMBER 1941).

50 0 25 50
1 inch = 50 ft.

Baker

LEGEND

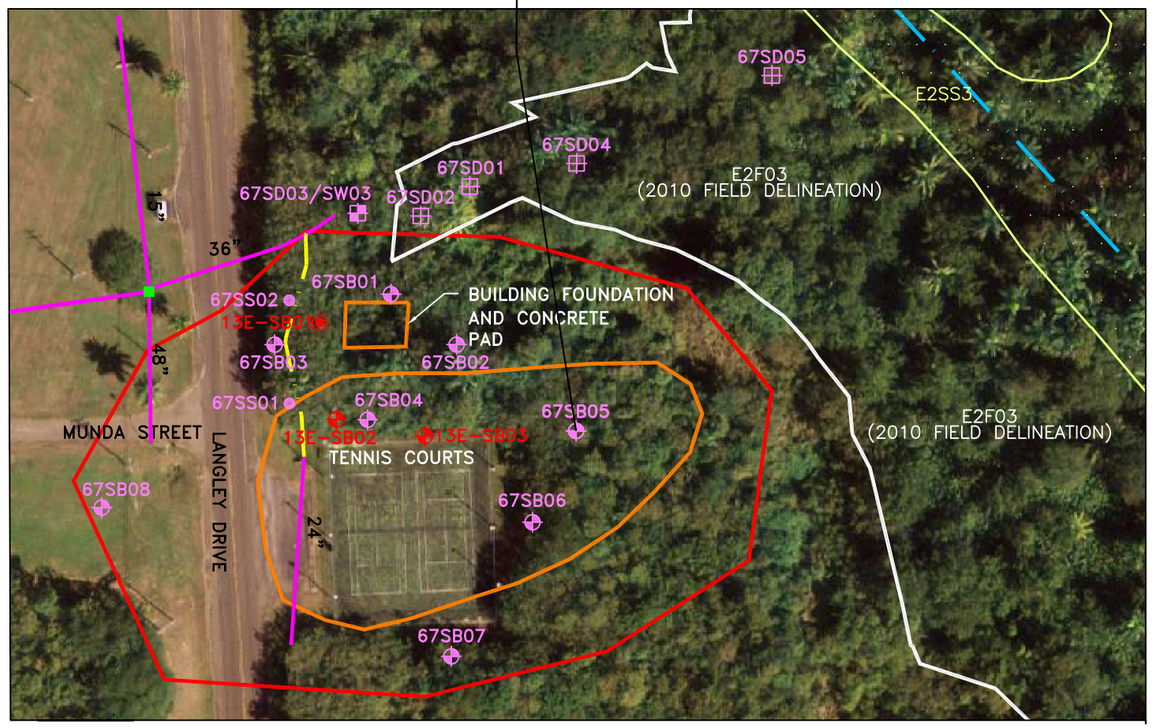
- –PHASE I RFI SURFACE, SUBSURFACE AND GROUNDWATER SAMPLING LOCATION
- 106.68 –GROUNDWATER ELEVATION
- –GROUNDWATER CONTOUR LINE
- –GROUNDWATER FLOW DIRECTION
- –EARTHEN DRAINAGE FEATURE
- –INLET
- 24" –STORM SEWER AND SIZE

FIGURE 5–4
GROUNDWATER CONTOUR MAP
SWMU 67–FORMER GAS STATION
PHASE I RFI REPORT

NAVAL ACTIVITY PUERTO RICO

K:_SOUTHNAVFAC\119197 JM01\SWMU 67\CADD\ 119197_67_17

Site ID	67SB05
Sample ID	67SB05-00
Sampling Date	3/24/2010
Depth (feet bgs)	0.0-1.0
TPH (mg/kg)	
Diesel Range Organics	*110*
Total TPH	*110.6*



LEGEND

J:	Estimated: The analyte was positively identified; the quantitation is an estimation
ITALIC	Exceeds PREQB Standard for TPH in soil
Depth Range	Feet Below Ground Surface

100 0 50 100
1 inch = 100 ft.

Source: USGS, NOVEMBER 2006.

Baker

LEGEND

- EARTHEN DRAINAGE FEATURE
- 1958 POLYGON FEATURE
- SWMU BOUNDARY
- DITCH
- INLET
- 24" STORM SEWER AND SIZE
- ESTUARINE WETLAND BOUNDARY
- E2SS3 ESTUARINE WETLAND IDENTIFICATION
- 2010 FIELD DELINEATED WETLAND BOUNDARY
- EXISTING SOIL SAMPLING LOCATION (PHASE II ECP 2004)
- EXISTING SOIL AND GROUNDWATER SAMPLING LOCATION (PHASE II ECP 2004)
- 2010 SOIL AND GROUNDWATER SAMPLING LOCATION
- 2010 SURFACE SOIL SAMPLING LOCATION
- 2010 SEDIMENT SAMPLING LOCATION
- 2010 SEDIMENT/SURFACE WATER SAMPLING LOCATION

FIGURE 6-1
DETECTED DIESEL RANGE ORGANICS IN EXCESS OF PREQB TPH STANDARDS IN SURFACE SOIL
SWMU 67-FORMER GAS STATION
PHASE I RFI REPORT
NAVAL ACTIVITY PUERTO RICO

K:_SOUTHNAVFAC\119197 JM01\SWMU 67\CADD\ 119197_67_16

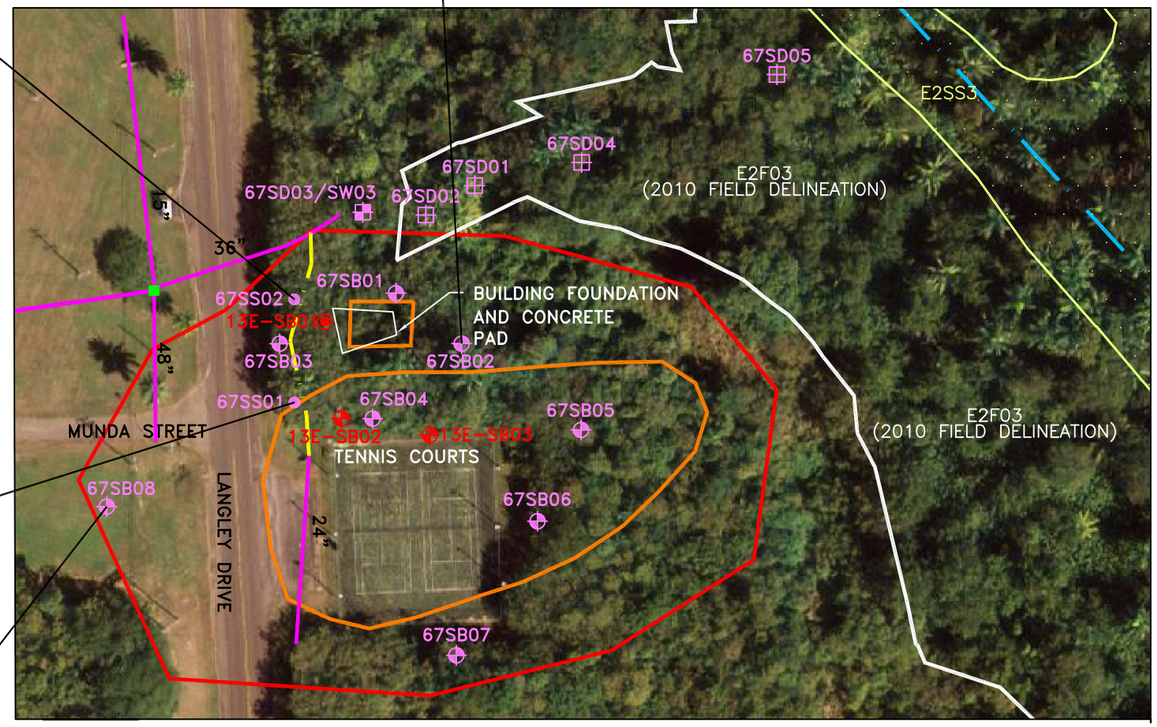
Site ID	67SB02
Sample ID	67SB02-00
Sampling Date	3/25/2010
Depth (feet bgs)	0.0-1.0
Inorganics (mg/kg)	
Copper	277J
Lead	62.4
Selenium	1.5J

Site ID	67SS02
Sample ID	67SS02
Sampling Date	3/30/2010
Depth (feet bgs)	0.0-1.0
Inorganics (mg/kg)	
Arsenic	***5***
Lead	31.5

Site ID	67SS01
Sample ID	67SS01
Sampling Date	3/30/2010
Depth (feet bgs)	0.0-1.0
Inorganics (mg/kg)	
Arsenic	***2.9***
Lead	23.8

Site ID	67SB08
Sample ID	67SB08-00
Sampling Date	3/22/2010
Depth (feet bgs)	0.0-1.0
Inorganics (mg/kg)	
Selenium	1.6J
Vanadium	***320J***

Site ID	67SB08
Sample ID	67SB08-00D
Sampling Date	3/22/2010
Depth (feet bgs)	0.0-1.0
Inorganics (mg/kg)	
Mercury	0.17
Selenium	2.2J
Vanadium	***272J***



LEGEND

J:	Estimated: The analyte was positively identified; the quantitation is an estimation
	Exceeds Ecological Soil Screening Values
BOLD	Exceeds Regional Screening Levels, Residential soil
ITALIC	Exceeds Regional Screening Levels, Industrial soil
UNDERLINE	Exceeds Basewide Background
Depth Range	Feet Below Ground Surface

100 0 50 100

1 inch = 100 ft.

Source: USGS, NOVEMBER 2006.

Baker

LEGEND

- -EARTHEN DRAINAGE FEATURE
- -1958 POLYGON FEATURE
- -SWMU BOUNDARY
- -DITCH
- -INLET
- 24" -STORM SEWER AND SIZE
- -ESTUARINE WETLAND BOUNDARY
- E2SS3 -ESTUARINE WETLAND IDENTIFICATION
- -2010 FIELD DELINEATED WETLAND BOUNDARY
- -EXISTING SOIL SAMPLING LOCATION (PHASE II ECP 2004)
- -EXISTING SOIL AND GROUNDWATER SAMPLING LOCATION (PHASE II ECP 2004)
- -2010 SOIL AND GROUNDWATER SAMPLING LOCATION
- -2010 SURFACE SOIL SAMPLING LOCATION
- -2010 SEDIMENT SAMPLING LOCATION
- -2010 SEDIMENT/SURFACE WATER SAMPLING LOCATION

FIGURE 6-2
DETECTED INORGANICS IN EXCESS OF HUMAN HEALTH AND/OR ECOLOGICAL AND BACKGROUND SCREENING CRITERIA IN SURFACE SOIL
SWMU 67-FORMER GAS STATION
PHASE I RFI REPORT
NAVAL ACTIVITY PUERTO RICO

K:_SOUTHNAVFAC\119197 JM01\SWMU 67\CADD\ 119197_67_15

Site ID	67SB02
Sample ID	67SB02-01
Sampling Date	3/25/2010
Depth (feet bgs)	1.0-3.0
Inorganics (mg/kg)	
Cobalt	**28.8J**
Zinc	97J

Site ID	67SB02
Sample ID	67SB02-02
Sampling Date	3/25/2010
Depth (feet bgs)	3.0-5.0
Inorganics (mg/kg)	
Cobalt	***99.2J***

Site ID	67SB05
Sample ID	67SB05-01
Sampling Date	3/24/2010
Depth (feet bgs)	1.0-3.0
Inorganics (mg/kg)	
Mercury	0.22

Site ID	67SB06
Sample ID	67SB06-01
Sampling Date	3/23/2010
Depth (feet bgs)	1.0-3.0
Inorganics (mg/kg)	
Arsenic	***1.8***
Cobalt	**105J**
Mercury	0.13

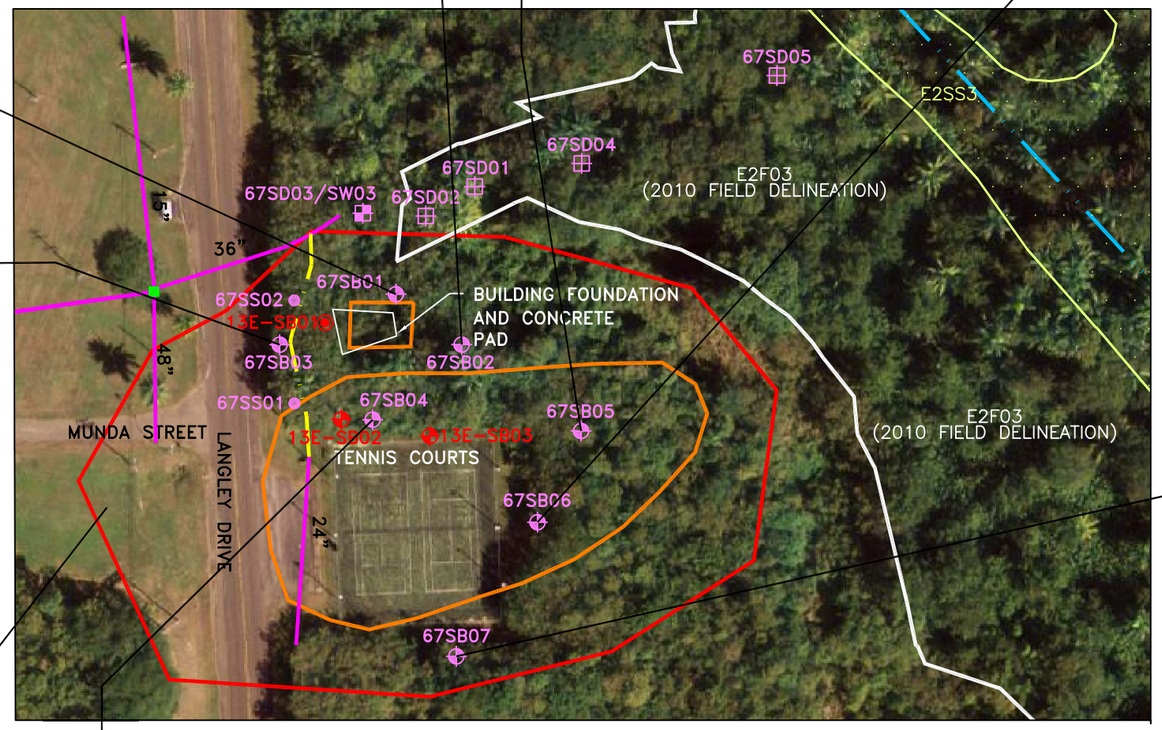
Site ID	67SB06
Sample ID	67SB06-01D
Sampling Date	3/23/2010
Depth (feet bgs)	1.0-3.0
Inorganics (mg/kg)	
Cobalt	***44J***

Site ID	67SB01
Sample ID	67SB01-01
Sampling Date	3/24/2010
Depth (feet bgs)	1.0-3.0
Inorganics (mg/kg)	
Cobalt	**27.4J**

Site ID	67SB01
Sample ID	67SB01-01D
Sampling Date	3/24/2010
Depth (feet bgs)	1.0-3.0
Inorganics (mg/kg)	
Cobalt	***30.7J***

Site ID	67SB01
Sample ID	67SB01-03
Sampling Date	3/24/2010
Depth (feet bgs)	5.0-7.0
Inorganics (mg/kg)	
Cobalt	***472J***
Copper	**681J**
Nickel	**310**
Vanadium	***1480J***

Site ID	67SB03
Sample ID	67SB03-01
Sampling Date	3/26/2010
Depth (feet bgs)	1.0-3.0
Inorganics (mg/kg)	
Cobalt	**27.1**



Site ID	67SB07
Sample ID	67SB07-01
Sampling Date	3/23/2010
Depth (feet bgs)	1.0-3.0
Inorganics (mg/kg)	
Cobalt	**29.6J**

Site ID	67SB07
Sample ID	67SB07-05
Sampling Date	3/23/2010
Depth (feet bgs)	9.0-11.0
Inorganics (mg/kg)	
Cobalt	***75.2J***
Copper	**493J**
Vanadium	***821J***

Site ID	67SB08
Sample ID	67SB08-01
Sampling Date	3/22/2010
Depth (feet bgs)	1.0-3.0
Inorganics (mg/kg)	
Cobalt	***58.8J***
Lead	27.4J

Site ID	67SB04
Sample ID	67SB04-03
Sampling Date	3/25/2010
Depth (feet bgs)	5.0-7.0
Inorganics (mg/kg)	
Cobalt	***39.5***

LEGEND

J:	Estimated: The analyte was positively identified; the quantitation is an estimation
	Exceeds Ecological Soil Screening Values
BOLD	Exceeds Regional Screening Levels, Residential soil
ITALIC	Exceeds Regional Screening Levels, Industrial soil
UNDERLINE	Exceeds Basewide Background
Depth Range	Feet Below Ground Surface

100 0 50 100

1 inch = 100 ft.

Source: USGS, NOVEMBER 2006.

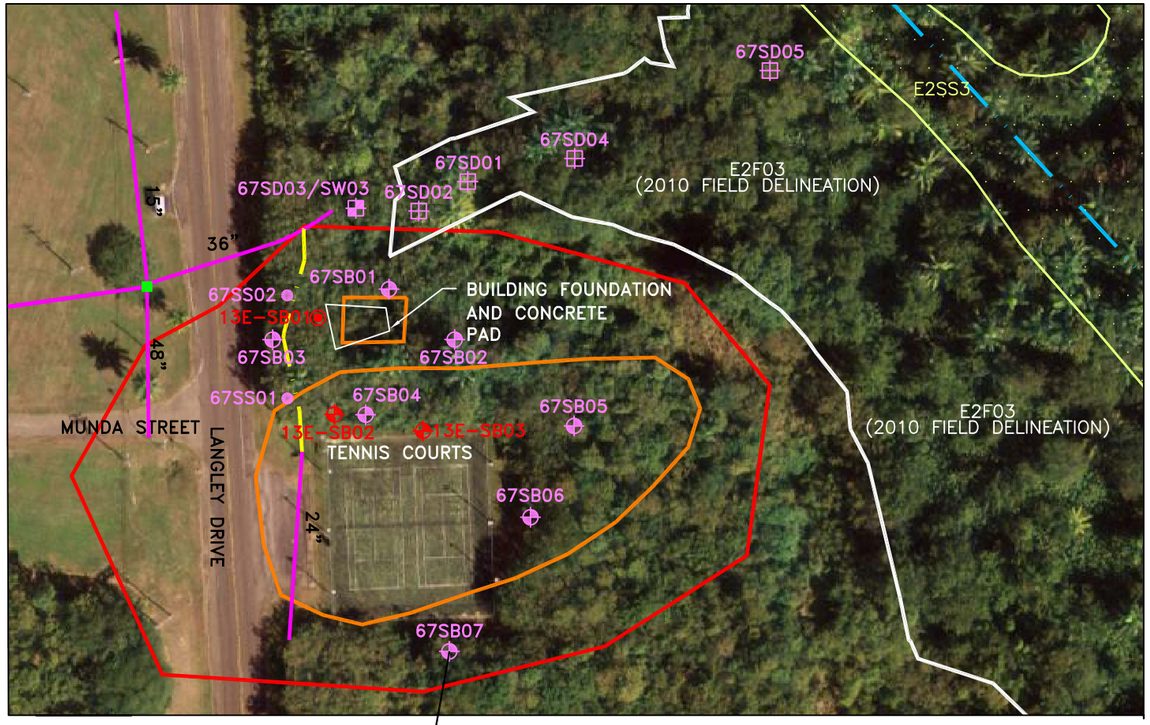
Baker

LEGEND

- EARTHEN DRAINAGE FEATURE
- 1958 POLYGON FEATURE
- SWMU BOUNDARY
- DITCH
- INLET
- 24" STORM SEWER AND SIZE
- ESTUARINE WETLAND BOUNDARY
- E2SS3 ESTUARINE WETLAND IDENTIFICATION
- 2010 FIELD DELINEATED WETLAND BOUNDARY
- EXISTING SOIL SAMPLING LOCATION (PHASE II ECP 2004)
- EXISTING SOIL AND GROUNDWATER SAMPLING LOCATION (PHASE II ECP 2004)
- 2010 SOIL AND GROUNDWATER SAMPLING LOCATION
- 2010 SURFACE SOIL SAMPLING LOCATION
- 2010 SEDIMENT SAMPLING LOCATION
- 2010 SEDIMENT/SURFACE WATER SAMPLING LOCATION

FIGURE 6-3
DETECTED INORGANICS IN EXCESS OF HUMAN HEALTH AND/OR ECOLOGICAL AND BACKGROUND SCREENING CRITERIA IN SUBSURFACE SOIL
SWMU 67-FORMER GAS STATION
PHASE I RFI REPORT
NAVAL ACTIVITY PUERTO RICO

K:_SOUTHNAVFAC\119197 JM01\SWMU 67\CADD\ 119197_67_18



Site ID	67SB07
Sample ID	67GW07
Sampling Date	3/23/2010
Depth (feet bgs)	0.0–1.0
Organics (mg/kg)	
Naphalene	**1**

LEGEND

J: Estimated: The analyte was positively identified; the quantitation is an estimation

Exceeds Ecological Groundwater Screening Values

BOLD Exceeds Regional Screening Levels, Tap Water

ITALICS Exceeds USEPA MCLs

UNDERLINE Exceeds Basewide Background

Depth Range Feet Below Ground Surface

100 0 50 100

1 inch = 100 ft.

Source: USGS, NOVEMBER 2006.

Baker

LEGEND

–EARTHEN DRAINAGE FEATURE
–1958 POLYGON FEATURE
–SWMU BOUNDARY
–DITCH
–INLET
24" –STORM SEWER AND SIZE
–ESTUARINE WETLAND BOUNDARY
E2SS3 –ESTUARINE WETLAND IDENTIFICATION
–2010 FIELD DELINEATED WETLAND BOUNDARY
–EXISTING SOIL SAMPLING LOCATION (PHASE II ECP 2004)
–EXISTING SOIL AND GROUNDWATER SAMPLING LOCATION (PHASE II ECP 2004)
–2010 SOIL AND GROUNDWATER SAMPLING LOCATION
–2010 SURFACE SOIL SAMPLING LOCATION
–2010 SEDIMENT SAMPLING LOCATION
–2010 SEDIMENT/SURFACE WATER SAMPLING LOCATION

FIGURE 6–4
DETECTED ORGANICS IN EXCESS OF HUMAN HEALTH AND/OR ECOLOGICAL SCREENING CRITERIA IN GROUNDWATER
SWMU 67–FORMER GAS STATION
PHASE I RFI REPORT
NAVAL ACTIVITY PUERTO RICO

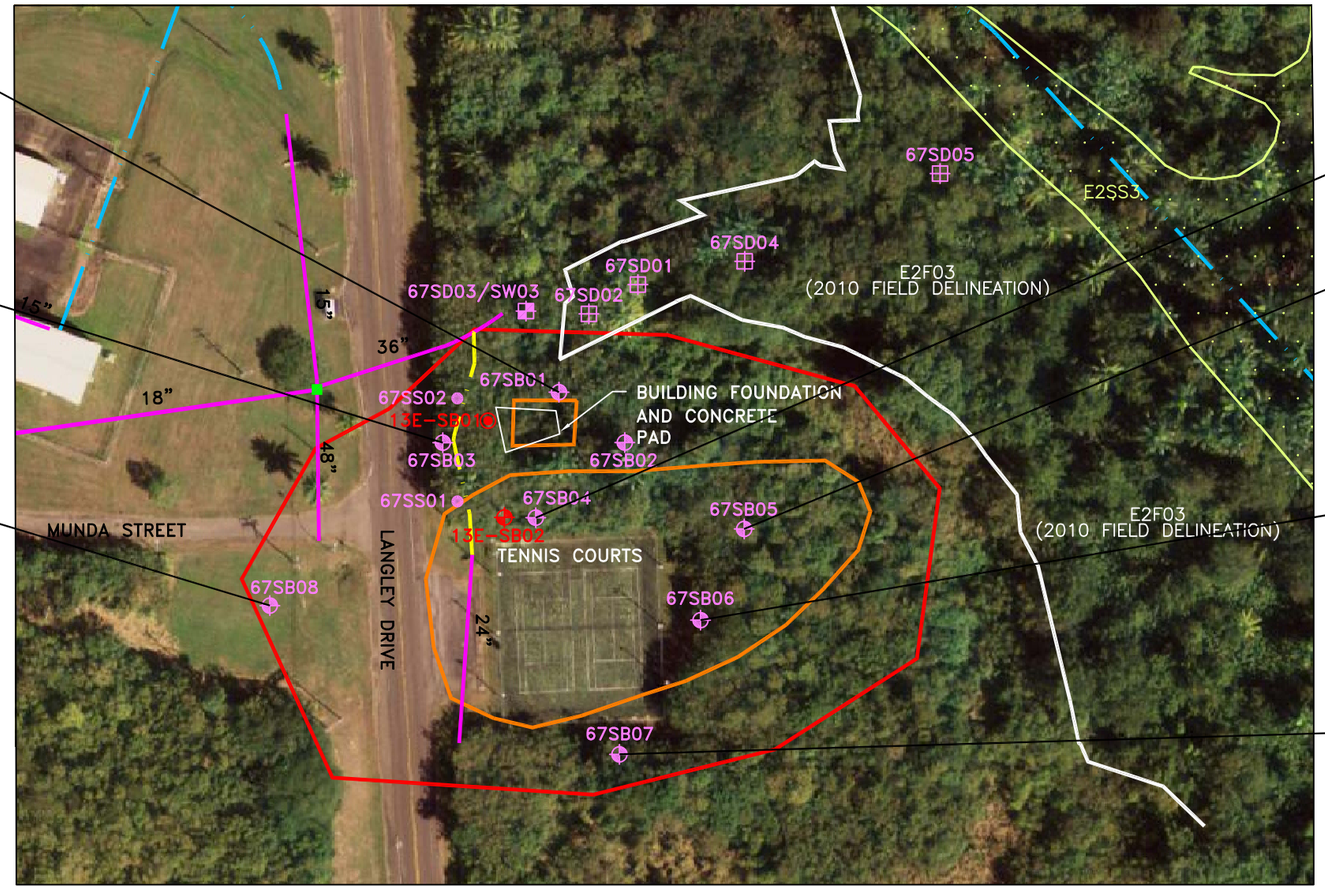
K:_SOUTHNAVFAC\119197 JM01\SWMU 67\CADD\ 119197_67_14

Site ID	67SB01
Sample ID	67GW01
Sampling Date	3/27/2010
Total Inorganics (ug/L)	
Mercury	0.19J
Dissolved Inorganics (ug/L)	
Copper	42.5

Site ID	67SB03
Sample ID	67GW03
Sampling Date	3/28/2010
Dissolved Inorganics (ug/L)	
Vanadium	**90.9J**

Site ID	67SB08
Sample ID	67GW08
Sampling Date	3/26/2010
Dissolved Inorganics (ug/L)	
Vanadium	**52.8J**

Site ID	67SB08
Sample ID	67GW08D
Sampling Date	3/26/2010
Dissolved Inorganics (ug/L)	
Vanadium	**53.2J**



Site ID	67SB04
Sample ID	67GW04
Sampling Date	3/28/2010
Total Inorganics (ug/L)	
Selenium	37.2
Dissolved Inorganics (ug/L)	
Copper	36.3
Vanadium	**21.4J**

Site ID	67SB05
Sample ID	67GW05
Sampling Date	3/27/2010
Dissolved Inorganics (ug/L)	
Copper	31.3

Site ID	67SB06
Sample ID	67GW06
Sampling Date	3/27/2010
Dissolved Inorganics (ug/L)	
Copper	29.3

Site ID	67SB07
Sample ID	67GW07
Sampling Date	3/26/2010
Dissolved Inorganics (ug/L)	
Vanadium	**45.5J**

LEGEND

J:	Estimated: The analyte was positively identified; the quantitation is an estimation
	Exceeds Ecological Groundwater Screening Values
BOLD	Exceeds Regional Tap Water Screening Levels
ITALIC	Exceeds USEPA MCLs
UNDERLINE	Exceeds Basewide Background
Depth Range	Feet Below Ground Surface

100 0 50 100

1 inch = 100 ft.

Source: USGS, NOVEMBER 2006.

Baker

LEGEND

- –EARTHEN DRAINAGE FEATURE
- –1958 POLYGON FEATURE
- –SWMU BOUNDARY
- –DITCH
- –INLET
- 24" –STORM SEWER AND SIZE
- –ESTUARINE WETLAND BOUNDARY
- E2SS3 –ESTUARINE WETLAND IDENTIFICATION
- –2010 FIELD DELINEATED WETLAND BOUNDARY
- –EXISTING SOIL SAMPLING LOCATION (PHASE II ECP 2004)
- –EXISTING SOIL AND GROUNDWATER SAMPLING LOCATION (PHASE II ECP 2004)
- –2010 SOIL AND GROUNDWATER SAMPLING LOCATION
- –2010 SURFACE SOIL SAMPLING LOCATION
- –2010 SEDIMENT SAMPLING LOCATION
- –2010 SEDIMENT/SURFACE WATER SAMPLING LOCATION

FIGURE 6–5
DETECTED INORGANICS IN EXCESS OF HUMAN HEALTH AND/OR ECOLOGICAL AND BACKGROUND SCREENING CRITERIA IN GROUNDWATER
SWMU 67–FORMER GAS STATION
PHASE I RFI REPORT
NAVAL ACTIVITY PUERTO RICO

K:_SOUTHNAVFAC\119197 JM01\SWMU 67\CADD\ 119197_67_13

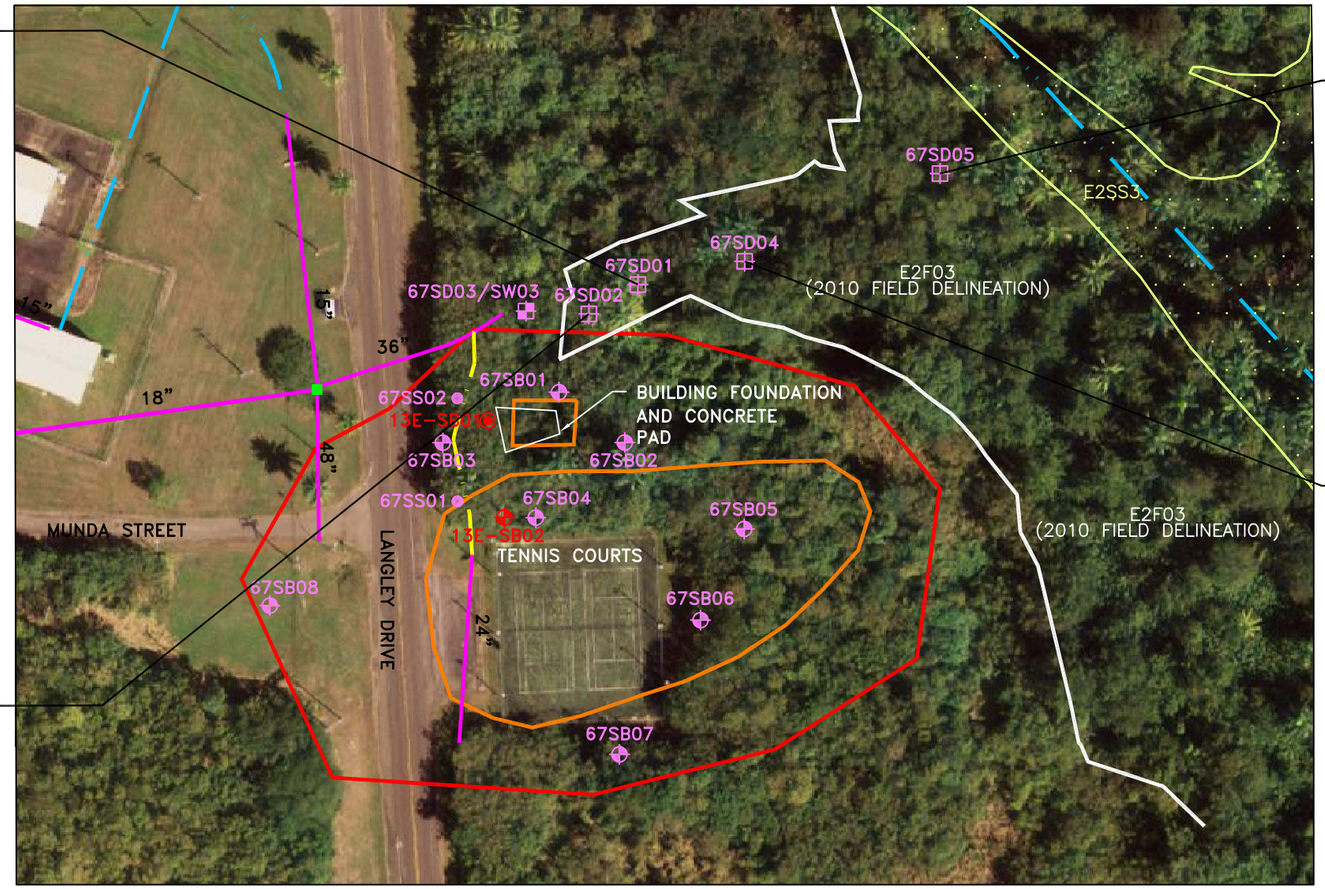
Site ID	67SD01
Sample ID	67SD01
Sampling Date	3/22/2010
Depth (feet bgs)	0.0–0.25
Volatiles (ug/kg)	
Acetone	95

Site ID	67SD01D
Sample ID	67SD01D
Sampling Date	3/22/2010
Depth (feet bgs)	0.0–0.25
Volatiles (ug/kg)	
Acetone	170
Carbon Disulfide	36J

Site ID	67SD05
Sample ID	67SD05
Sampling Date	3/22/2010
Depth (feet bgs)	0.0–0.25
Volatiles (ug/kg)	
Acetone	210J
PAHs (ug/kg)	
Benzo(a)pyrene	**70J**
Dibenz(a,h)anthracene	**28J**

Site ID	67SD04
Sample ID	67SD04
Sampling Date	3/22/2010
Depth (feet bgs)	0.0–0.25
Volatiles (ug/kg)	
Acetone	190
Carbon Disulfide	15

Site ID	67SD02
Sample ID	67SD02
Sampling Date	3/22/2010
Depth (feet bgs)	0.0–0.25
Volatiles (ug/kg)	
Acetone	120J



LEGEND

J:	Estimated: The analyte was positively identified; the quantitation is an estimation
	Exceeds Ecological Sediment Screening Values
BOLD	Exceeds Regional Screening Levels, Residential soil
ITALIC	Exceeds Regional Screening Levels, Industrial soil
Depth Range	Feet Below Ground Surface

100 0 50 100
1 inch = 100 ft.

SOURCE: USGS, NOVEMBER 2006.

Baker

LEGEND

- –EARTHEN DRAINAGE FEATURE
- –1958 POLYGON FEATURE
- –SWMU BOUNDARY
- –DITCH
- –INLET
- 24" –STORM SEWER AND SIZE
- –ESTUARINE WETLAND BOUNDARY
- E2SS3 –ESTUARINE WETLAND IDENTIFICATION
- –2010 FIELD DELINEATED WETLAND BOUNDARY
- –EXISTING SOIL SAMPLING LOCATION (PHASE II ECP 2004)
- –EXISTING SOIL AND GROUNDWATER SAMPLING LOCATION (PHASE II ECP 2004)
- –2010 SOIL AND GROUNDWATER SAMPLING LOCATION
- –2010 SURFACE SOIL SAMPLING LOCATION
- –2010 SEDIMENT SAMPLING LOCATION
- –2010 SEDIMENT/SURFACE WATER SAMPLING LOCATION

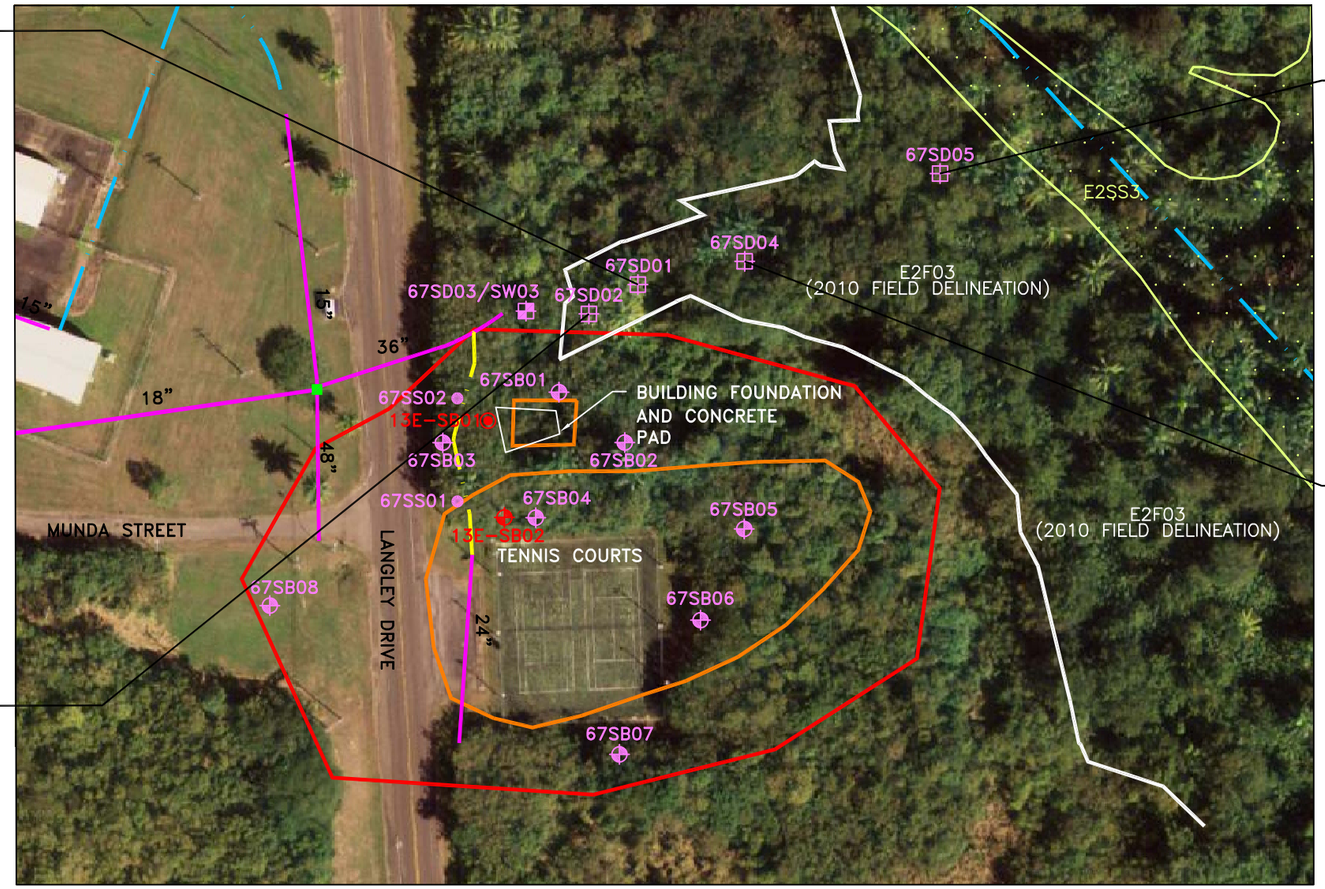
FIGURE 6–6
DETECTED ORGANICS IN EXCESS OF HUMAN HEALTH AND/OR ECOLOGICAL SCREENING CRITERIA IN ESTUARINE SEDIMENT
SWMU 67–FORMER GAS STATION
PHASE I RFI REPORT
NAVAL ACTIVITY PUERTO RICO

K:_SOUTHNAVFAC\119197 JM01\SWMU 67\CADD\ 119197_67_13

Site ID	67SD01
Sample ID	67SD01
Sampling Date	3/22/2010
Depth (feet bgs)	0.0–0.25
Inorganics (mg/kg)	
Barium	62
Cobalt	***44.5J***
Lead	134J
Vanadium	***232J***

Site ID	67SD01D
Sample ID	67SD01D
Sampling Date	3/22/2010
Depth (feet bgs)	0.0–0.25
Inorganics (mg/kg)	
Barium	53.3
Cobalt	***35.9J***
Lead	119J

Site ID	67SD02
Sample ID	67SD02
Sampling Date	3/22/2010
Depth (feet bgs)	0.0–0.25
Inorganics (mg/kg)	
Cobalt	***45.6J***
Lead	35.6J
Vanadium	***371J***



Site ID	67SD05
Sample ID	67SD05
Sampling Date	3/22/2010
Depth (feet bgs)	0.0–0.25
Inorganics (mg/kg)	
Barium	113J
Cobalt	**25.7J**
Copper	133J
Lead	31.3J
Selenium	1.6J

Site ID	67SD04
Sample ID	67SD04
Sampling Date	3/22/2010
Depth (feet bgs)	0.0–0.25
Inorganics (mg/kg)	
Barium	61.8
Cobalt	***41.8J***
Vanadium	***282J***

LEGEND

J:	Estimated: The analyte was positively identified; the quantitation is an estimation
	Exceeds Ecological Sediment Screening Values
BOLD	Exceeds Regional Screening Levels, Residential soil
ITALIC	Exceeds Regional Screening Levels, Industrial soil
UNDERLINE	Exceeds Basewide Background
Depth Range	Feet Below Ground Surface

100 0 50 100

1 inch = 100 ft.

SOURCE: USGS, NOVEMBER 2006.

Baker

LEGEND

- –EARTHEN DRAINAGE FEATURE
- –1958 POLYGON FEATURE
- –SWMU BOUNDARY
- –DITCH
- –INLET
- 24" –STORM SEWER AND SIZE
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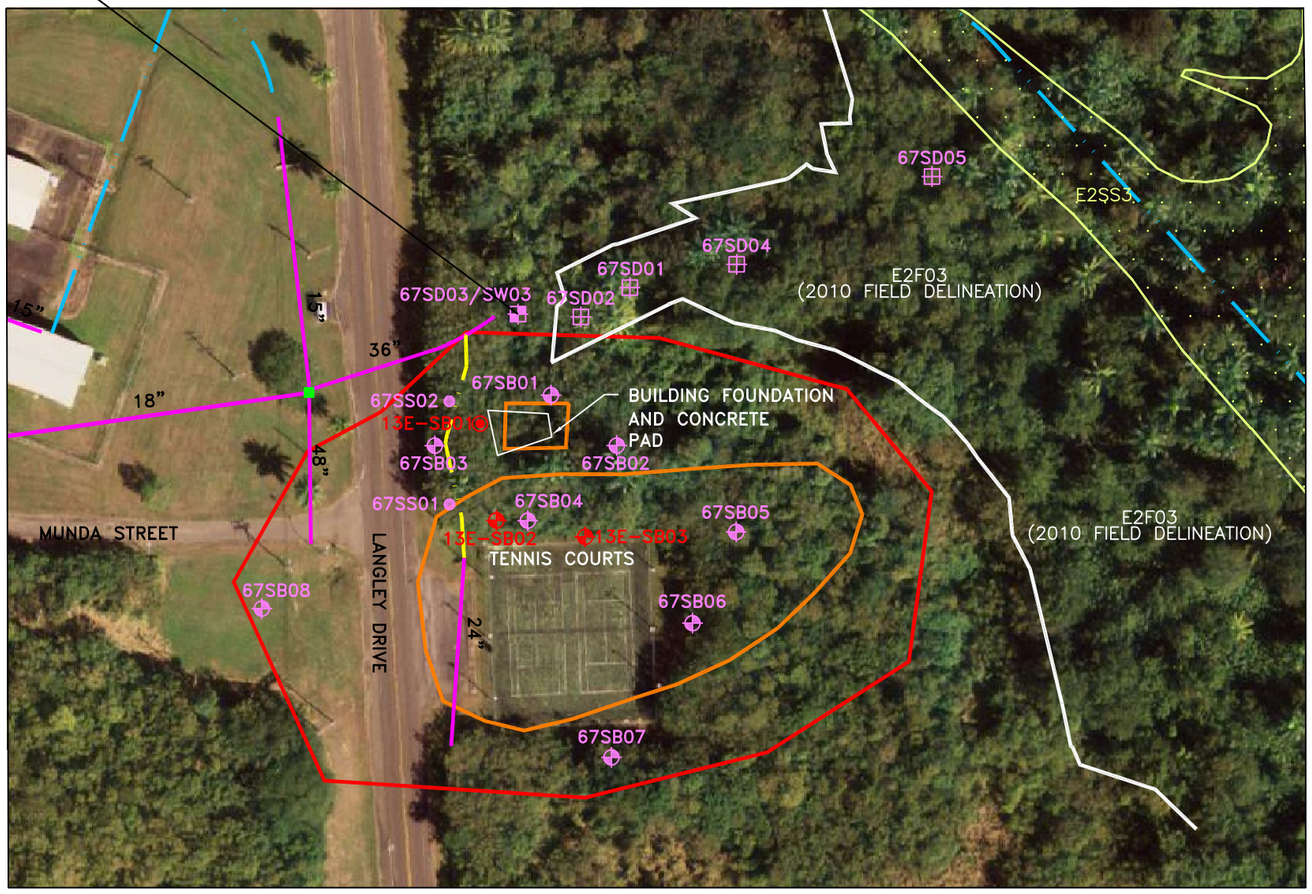
- –EXISTING SOIL AND GROUNDWATER SAMPLING LOCATION (PHASE II ECP 2004)
- –2010 SOIL AND GROUNDWATER SAMPLING LOCATION
- –2010 SURFACE SOIL SAMPLING LOCATION
- –2010 SEDIMENT SAMPLING LOCATION
- –2010 SEDIMENT/SURFACE WATER SAMPLING LOCATION

FIGURE 6–7
DETECTED INORGANICS IN EXCESS OF HUMAN HEALTH AND/OR ECOLOGICAL AND BACKGROUND SCREENING CRITERIA IN ESTUARINE SEDIMENT
SWMU 67–FORMER GAS STATION
PHASE I RFI REPORT
NAVAL ACTIVITY PUERTO RICO

K:_SOUTHNAVFAC\119197 JM01\SWMU 67\CADD\ 119197_67_12

Site ID	67SD03
Sample ID	67SD03
Sampling Date	3/22/2010
Depth (feet bgs)	0.0–0.25
Volatiles (ug/kg)	
Acetone	200J



LEGEND

J:	Estimated: The analyte was positively identified; the quantitation is an estimation
	Exceeds Ecological Sediment Screening Values
BOLD	Exceeds Regional Screening Levels, Residential soil
ITALIC	Exceeds Regional Screening Levels, Industrial soil
UNDERLINE	Exceeds Basewide Background
Depth Range	Feet Below Ground Surface

100 0 50 100

1 inch = 100 ft.

Source: USGS, NOVEMBER 2006.

Baker

LEGEND

- –EARTHEN DRAINAGE FEATURE
- –1958 POLYGON FEATURE
- –SWMU BOUNDARY
- –DITCH
- –INLET
- 24" –STORM SEWER AND SIZE
- –ESTUARINE WETLAND BOUNDARY
- E2SS3 –ESTUARINE WETLAND IDENTIFICATION
- –2010 FIELD DELINEATED WETLAND BOUNDARY
- –EXISTING SOIL SAMPLING LOCATION (PHASE II ECP 2004)
- –EXISTING SOIL AND GROUNDWATER SAMPLING LOCATION (PHASE II ECP 2004)
- –2010 SOIL AND GROUNDWATER SAMPLING LOCATION
- –2010 SURFACE SOIL SAMPLING LOCATION
- –2010 SEDIMENT SAMPLING LOCATION
- –2010 SEDIMENT/SURFACE WATER SAMPLING LOCATION

FIGURE 6–8
DETECTED ORGANICS IN EXCESS OF HUMAN HEALTH AND/OR ECOLOGICAL SCREENING CRITERIA IN FRESHWATER SEDIMENT
SWMU 67–FORMER GAS STATION
PHASE I RFI REPORT
NAVAL ACTIVITY PUERTO RICO

APPENDIX A
SUMMARY OF ANALYTICAL RESULTS FROM PHASE II ECP

Table 5-45. Summary of Organic Detections in Suburface Soil at ECP Site 13 – Former Gas Station

Site ID Sample ID Sample Date Sample Depth (ft bgs)	EPA Region III Industrial RBCs (ug/kg)	**EPA Region III Residential RBCs** (ug/kg)	13E-SB01 13E-SB01-04 05/08/04 7.00 - 9.00	13E-SB02-05 13E-SB02-05 05/08/04 9.00 - 11.00	13E-SB03 13E-SB03-05 05/08/04 9.00 - 11.00	Number Exceeding EPA Region III Industrial RBCs	Range Exceeding EPA Region III Industrial RBCs	**Number Exceeding EPA Region III Residential RBCs**	**Range Exceeding EPA Region III Residential RBCs**	Location of Maximum Detection
Volatile Organic Compounds (ug/kg)										
Tetrachloroethene	5,300	1,200	6.2 U	5.9 U	2.4 J	0/3		0/3		13E-SB03-05
Chlorobenzene	2,000,000	160,000	6.2 U	5.9 U	2.9 J	0/3		0/3		13E-SB03-05
Acetone	92,000,000	7,000,000	62 U	44 J	43 J	0/3		0/3		13E-SB02-05
Semivolatile Organic Compounds (ug/kg)										
Dibenzo(a,h)anthracene	390	87	**110** J	63 J	480 U	0/3		1/3	110J	13E-SB01-04
Indeno(1,2,3-cd)pyrene	3,900	870	110 J	60 J	480 U	0/3		0/3		13E-SB01-04
Benzo(g,h,i)perylene	NE	NE	120 J	75 J	480 U	NE		NE		13E-SB01-04
Total Petroleum Hydrocarbons (mg/kg)										
Diesel Range Organics	NE	NE	2.7 J	2.6 J	3.2 J	NE		NE		13E-SB03-05

Notes:

J - The reported result is an estimated concentration that is less than the PQL, but greater than or equal to the MDL.
U - The compound was analyzed for, but was not detected at or above the MDL/PQL.
NE - Not Established.
ft bgs - feet below ground surface.
ug/kg - micrograms per kilogram.
mg/kg - milligrams per kilogram.

Table 5-46. Summary of Inorganic Detections in Suburface Soil at ECP Site 13 – Former Gas Station

Site ID Sample ID Sample Date Sample Depth (ft bgs)	EPA Region III Industrial RBCs (mg/kg)	**EPA Region III Residential RBCs** (mg/kg)	2x Average Detected Background (mg/kg)	13E-SB01 13E-SB01-04 05/08/04 7.00 - 9.00	13E-SB02 13E-SB02-05 05/08/04 9.00 - 11.00	13E-SB03 13E-SB03-05 05/08/04 9.00 - 11.00	Number Exceeding EPA Region III Industrial RBCs	Range Exceeding EPA Region III Industrial RBCs	**Number Exceeding EPA Region III Residential RBCs**	**Range Exceeding EPA Region III Residential RBCs**	Number Exceeding 2x Average Detected Background	Range Exceeding 2x Average Detected Background	Location of Maximum Detection
Appendix IX Metals (mg/kg)													
Arsenic	1.9	0.43	2.05	1.2 U	**0.85** B	1.3 U	0/3		1/3	0.85B	0/3		13E-SB02-05
Barium	7,200	550	222	250	190	140	0/3		0/3		1/3	250	13E-SB01-04
Beryllium	200	16	0.74	0.21 B	0.32 B	0.33 B	0/3		0/3		0/3		13E-SB03-05
Cobalt	2,000	160	30.0	10	23	36	0/3		0/3		1/3	36	13E-SB03-05
Chromium	310	23	133	10	9	**40**	0/3		1/3	40	0/3		13E-SB03-05
Copper	4,100	310	193	36	18	120	0/3		0/3		0/3		13E-SB03-05
Nickel	2,000	160	31.9	4.9	5.4	18	0/3		0/3		0/3		13E-SB03-05
Lead	400[(1)]	400[(1)]	8.68	1.9	0.83	1.9	0/3		0/3		0/3		13E-SB01-04, 13E-SB03-05
Tin	61,000	4,700	2.96	2 B	1.6 B	2.1 B	0/3		0/3		0/3		13E-SB03-05
Vanadium	100	7.8	462	**240**	**210**	**200**	3/3	200 - 240	3/3	200 - 240	0/3		13E-SB01-04
Zinc	31,000	2,300	88.6	52	210	67	0/3		0/3		1/3	210	13E-SB02-05
Mercury	31[(2)]	2.3[(2)]	0.093	0.019 B	0.023 U	0.019 B	0/3		0/3		0/3		13E-SB01-04, 13E-SB03-05

Notes:

B - The reported result is an estimated concentration that is less than the PQL, but greater than or equal to the MDL.

U - The compound was analyzed for, but was not detected at or above the MDL/PQL.

NE - Not Established.

(1) - 1996 Soil Screening Guidance.

(2) - Value based on the RBC for Mercuric Chloride.

ft bgs - feet below ground surface.

mg/kg - milligrams per kilogram.

Table 5-47. Summary of Organic Detections in Groundwater at ECP Site 13 – Former Gas Station

Site ID Sample ID Sample Date	Federal MCLs (ug/L)	**EPA Region III Tap Water RBCs** (ug/L)	PR Water Quality Standards (ug/L)	13E-SB02 13E-GW02 5/10/2004	13E-SB03 13E-GW03 5/10/2004	Number Exceeding Federal MCLs	Range Exceeding Federal MCLs	**Number Exceeding EPA Region III Tap Water RBCs**	**Range Exceeding EPA Region III Tap Water RBCs**	Number Exceeding PR Water Quality Standards	Range Exceeding PR Water Quality Standards	Location of Maximum Detection
Volatile Organic Compounds (ug/L)												
Acetone	NE	550	NE	8 J	7 J	NE		0/2		NE		13E-GW02
Carbon disulfide	NE	100	NE	1 U	1.1	NE		0/2		NE		13E-GW03
Semivolatile Organic Compounds (ug/L)												
Not Detected												
Total Petroleum Hydrocarbons (mg/L)												
Diesel Range Organics	NE	NE	NE	0.81	0.71	NE		NE		NE		13E-GW02
Gasoline Range Organics	NE	NE	NE	0.014 J	0.05 U	NE		NE		NE		13E-GW02

Notes:

J - The reported result is an estimated concentration that is less than the PQL, but greater than or equal to the MDL.
U - The compound was analyzed for, but was not detected at or above the MDL/PQL.
ug/L - micrograms per liter.
mg/L - milligrams per liter.
NE - Not Established.

Table 5-48. Summary of Inorganic Detections in Groundwater at ECP Site 13 – Former Gas Station

Site ID Sample ID Sample Date	Federal MCLs (mg/L)	**EPA Region III Tap Water RBCs** (mg/L)	PR Water Quality Standards (mg/L)	13E-SB02 13E-GW02 5/10/2004	13E-SB03 13E-GW03 5/10/2004	Number Exceeding Federal MCLs	Range Exceeding Federal MCLs	**Number Exceeding EPA Region III Tap Water RBCs**	**Range Exceeding EPA Region III Tap Water RBCs**	Number Exceeding PR Water Quality Standards	Range Exceeding PR Water Quality Standards	Location of Maximum Detection
Appendix IX (Dissolved) Metals (mg/L)												
Barium	2	0.26	NE	0.0061 B	0.043	0/2		0/2		NE		13E-GW03
Cobalt	NE	0.073	NE	0.01 U	0.0014 B	NE		0/2		NE		13E-GW03
Copper	1.3[(1)]	0.15	1.3	0.02 U	0.0032 B	0/2		0/2		NE		13E-GW03
Nickel	NE	0.073	NE	0.0023 B	0.004 B	NE		0/2		NE		13E-GW03
Vanadium	NE	0.0037	NE	**0.067**	**0.038**	NE		2/2	0.038 - 0.067	NE		13E-GW02
Mercury	0.002	0.0011[(1)]	0.002	**0.0012** B	0.004 U	0/2		1/2	0.0012B	0/2		13E-GW02

Total Cyanide and Sulfide (mg/L)
Not Detected

Notes:
B - The reported result is an estimated concentration that is less than the PQL, but greater than or equal to the MDL.
U - The compound was analyzed for, but was not detected at or above the MDL/PQL.
NE - Not Established.
(1) - Value based on the Tap Water RBC for Mercuric Chloride.
mg/L - milligrams per liter.

APPENDIX B
2010 FIELD ACTIVITIES

SITE PHOTOGRAPHS AND PHOTOGRAPH LOCATION MAP

Photo #1. Equipment staging and parking area adjacent to tennis courts
View looking northeast

Photo #2. Outside perimeter of tennis courts (northern section) with groundwater monitoring well 67GW04 near center midground - view looking west

Photo #3. Suspected vehicle maintenance bay/garage grease pit (as described in the Phase I/II ECP Report) - view looking north

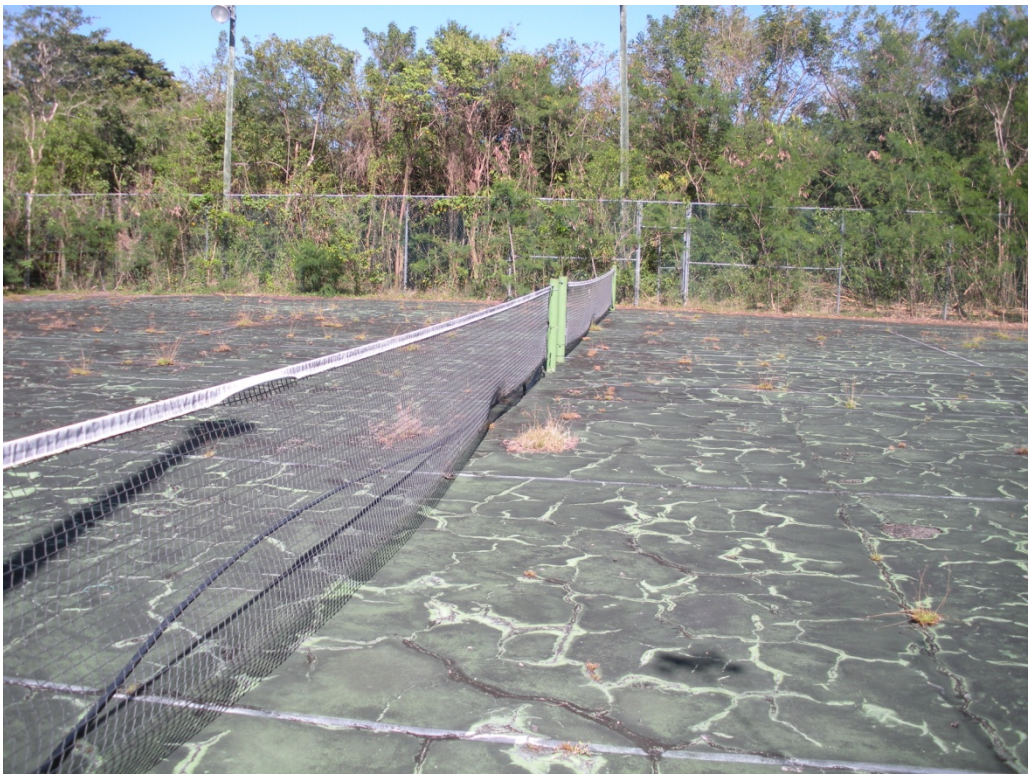


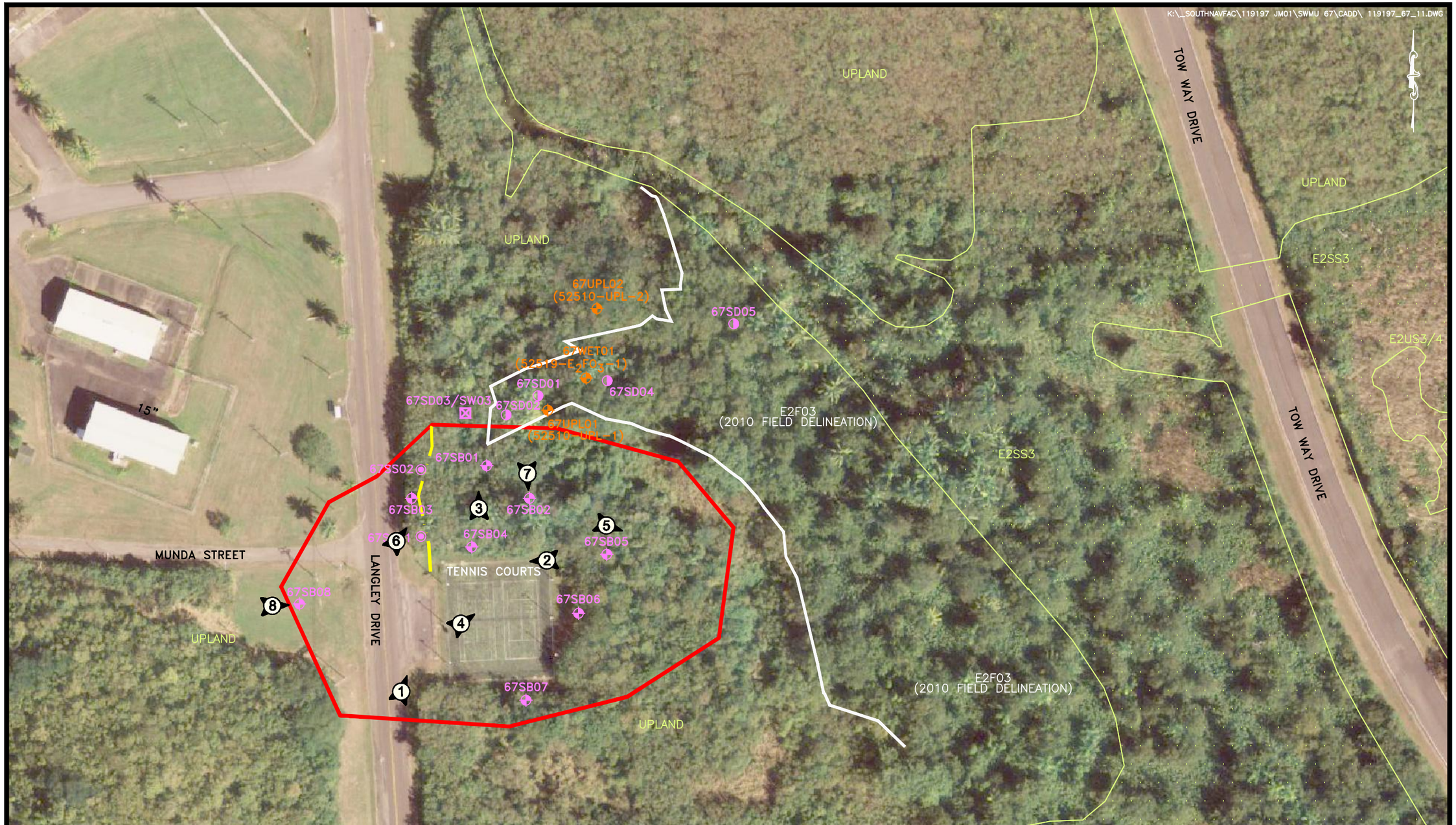
Photo #4. SWMU 67 and tennis court area - view looking east-northeast

Photo #5. Groundwater monitoring well installation associated with 67GW05
View looking southeast

Photo #6. Groundwater sample collection from 67GW03
View looking northeast

Photo #7. Soil boring advancement at 67SB02
View looking south

Photo #8. Groundwater sample collection from 67GW08
View looking east



100 0 50 100
1 inch = 100 ft.

SOURCE: USGS, NOV, 2006.

Baker

LEGEND

- EARTHEN DRAINAGE FEATURE
- SWMU BOUNDARY
- ESTUARINE WETLAND BOUNDARY
- E2SS3 ESTUARINE WETLAND IDENTIFICATION
- 2010 FIELD DELINEATED WETLAND BOUNDARY
- 3 PHOTO LOCATION AND DIRECTION
- 2010 SOIL AND GROUNDWATER SAMPLING LOCATION
- 2010 SURFACE SOIL SAMPLING LOCATION
- 2010 SEDIMENT SAMPLING LOCATION
- EXISTING SOIL AND GROUNDWATER SAMPLING

PHOTO LOCATION MAP
SWMU 67–FORMER GAS STATION
PHASE I RFI REPORT

NAVAL ACTIVITY PUERTO RICO

FIELD LOG BOOK NOTES

Environmental Scientist – Adam Gailey

Sunday March 21, 2010
SWMU 67 Phase I RFI

0715 - Depart PIT for SJU.

1515 - Arrive at NAPR. Prep for next day's sampling events. Charge equipment

1630 - Depart NAPR

APG

Monday March 22, 2010

0650 - Arrive at NAPR. Brief Recon at SWMU 67 + 75. Prep for day's sampling.

0820 - Arrive at SWMU 67. GPS / Navigate to proposed soil boring locations.

Note: where surface soil samples are located in a forested wetland area. Saturated sediment and hydrophytes throughout. Hydrology to this area is conveyed through a large culvert. Vegetation includes golden leather fern, black mangrove, and PR. palm. Additional information will be gathered later.

1015 - Meet with Drillers GeoEnviroTech.

3-22-10

1115 - Break for lunch.

1310 - Sample 67SW03 / 67SD03 (VOC, SVOC, DRO, GRO and METALS)
A large Culvert outlets to a small Pool. Pool is Approx. 8 ft. long x 4 ft. wide and about 2 ft. deep (in center). No defined Channel beyond the Pool - However, a forested Wetland Begins at this Point. Evidence that Water is moved downgradient during storm events (drainage Patterns and Sediment / gravel deposition).

1400 - Collect 67SD01 and 67SD01 D/MS/MSD.
Saturated Forested Wetland env. Golden leatherfern and PR. Rotal Palm Persistent. Saturated. 0-6" Sample depth obtained. VOC, SVOC, Metals, DRO, GRO and TOC.
Silt. Brown.

3-22-10

1510 - Collect 67SD05.
Sediment Sample at 0-6" depth interval. Sample within PFO Wetland. Saturated. Golden leatherfern, Black Mangrove, and PR. Rotal Palm. VOC, SVOC, metals, DRO, GRO, and TOC. Silt, Brown.

Weather Conditions:
Warm + Sunny. High mid-upper 60's.

67SD04 - 1515.
Collect VOC, SVOC, DRO, GRO, metals, and TOC. Golden leather fern. Saturated 0-6" Silt with Coarse gravel. Brown.

1530 - Collect 67SD02
VOC, SVOC, DRO, GRO, metals, and TOC.
Silty, Brown and Saturated. PR. Rotal Palm and Golden Leather fern. Saturated. Sample at 0-6".

3-22-10

1550 - Collect 67ER01 by flushing D.I. water over an un-used Stainless Steel Spoon. This Rinsate is assoc. with Sediment Samples collected Today.

1610 - Back at Security to label bottles.

1730 - Depart NAPR

ADC

Tuesday March 23, 2010

0645 - Arrive at NAPR. Prep for Day's events.

- Recon at SWMU 71 for Additional / upcoming investigations. Earthen drainage features were investigated and sample points were GPS'd.

Break for Lunch - 1130.

1215 - Meet with RWEC for site clearing.

1230 - Begin site clearing at SWMU 67.

1310 - Prep and Pack Samples for FEDEX Delivery in SAN Juan PR.

1515 - Recon at SWMU 62.

1700 - Depart NAPR.

ADC

Wednesday March 24, 2010

0650 - Arrive at UMPR. Organize and manage room samples (re-ice, etc.).

Travel to Ceiba for supplies: Store bought DI water, and beverages - gatorade/water. Pick up lunch.

Assist with SWMU 3 - Semi Annual Landfill Sampling:

Perform Daily Decon on bladder pump.

YSI Meter Calibration: S/N 01D0692

		Initial	Adjusted
pH buffer	4	3.97	4.00
	7	7.98	7.00
	10	10.04	10.00
ORP		243	231
SP Cond		1.362	1.409
DO		8.64	8.23
Temp		25.23	—

APC

3-24-10

(HI98703)

Hama Turbidimeter:

~~HD~~ NTU standard (15) 15.0 NTU

1240 - Arrive at SWMU 3 Well R7GW11 - see Low Flow Purge Data Sheets for more info.

1430 - Depart R7GW11 and Drop off samples at Security (ice samples).

1445 - GPS Survey work at SWMU 67. GPS site features (Corner of Tennis Court Fence posts - for ref, Adjacent EFO Wetland, and Southern Drainage Feature and Culverts).

APC

3-24-10

Earthern Drainage Feature:
Drainage Feature on-site Conveys Roadway Runoff downgradient of SWMU 67. The feature is dry with No hydrophytes and dissipates downgradient. It does appear that after Site Recon that this feature Conveys flow to the Pfo Wetland. Vegetation species in the earthen Drainage feature are upland in Nature.

1700 - DePart NAPR

APG

Thursday March 25, 2010

0645 - Arrive at NAPR. Prep for fedex shipment today.

1450 - Prep for landfill Gas monitoring. GEM 500 Landfill Gas meter was Calibrated earlier - See D. Hupe logbook Notes.

PID meter Calibration Conducted earlier also - See R. Rosecins logbook.

1520 - Arrive at landfill for Gas Monitoring:

Background:
1525 - VOC (ppm) = 0.0
Methane (%) = 2.5
CO_2 (%) = 1.3
O_2 (%) = 20.6

Weather Conditions: Mostly Sunny and warm - high of 57°F.

Friday March 26, 2010

0650 - Arrive at NAPR.
Prep for Today's FEDEX shipment.

1110 - Break for lunch.

1225 - Finish Fedex Shipment prep.

1645 - Fedex arrives.

1715 - Depart NAPR.

APG

SATurday March 27, 2010

0640 - Arrive at NAPR.
- YSI and Hanna Turbidimeter Calibration Conducted - See Calibration Record Sheet.

0805 - Arrive at 67GW05.
Prep for Purge and Sampling. See ground water Sample Sheets and R. Roselius Notebook for additional information.

0940 - sample time

1035 - Sample Complete

1043 - Refuel Rental Vehicle at Base Marina.

1108 - Arrive at SWMU 67.

Weather Conditions:
Mostly Sunny and Warm - High 81 °F

1130 - Sample 67GW05 - See GW Sheets for additional info.

1210 - Break for Lunch.

3-27-10

1240 - Arrive at SWMU 67 and perform between-well Decon on Two bladder Pumps (and Tubing)

1315 Collect 67ER06 by Running DI water and operating bladder Pump.

1320 - Set up at GW well 67GW01. see GW sheets for additional info.
Sample Time: 1535

1550 - Depart SWMU 67. Drop off Samples at Security bldg.

1615 - Depart NAPR

ARV

Sunday March 28, 2010

0645 - Arrive at NAPR
- Calibrate YSI and Hanna Turbidity Meters.
See - Daily Meter Calibration Record sheets for additional info.

0850 - Check water level at a Monitoring well at SWMU 75.
See R. Roselius Log Book for Notes.

0910 Arrive at SWMU 67 - 67GW02.
Sample Time - 0940
Very Low Yeild Well - see Well Detail and Sampling Log sheets.

Perform between well decon on 2 bladder pumps.

1045 - Collect 67ER07 by Running DI water through Tubing/Pump while operating Pump.

3-28-10

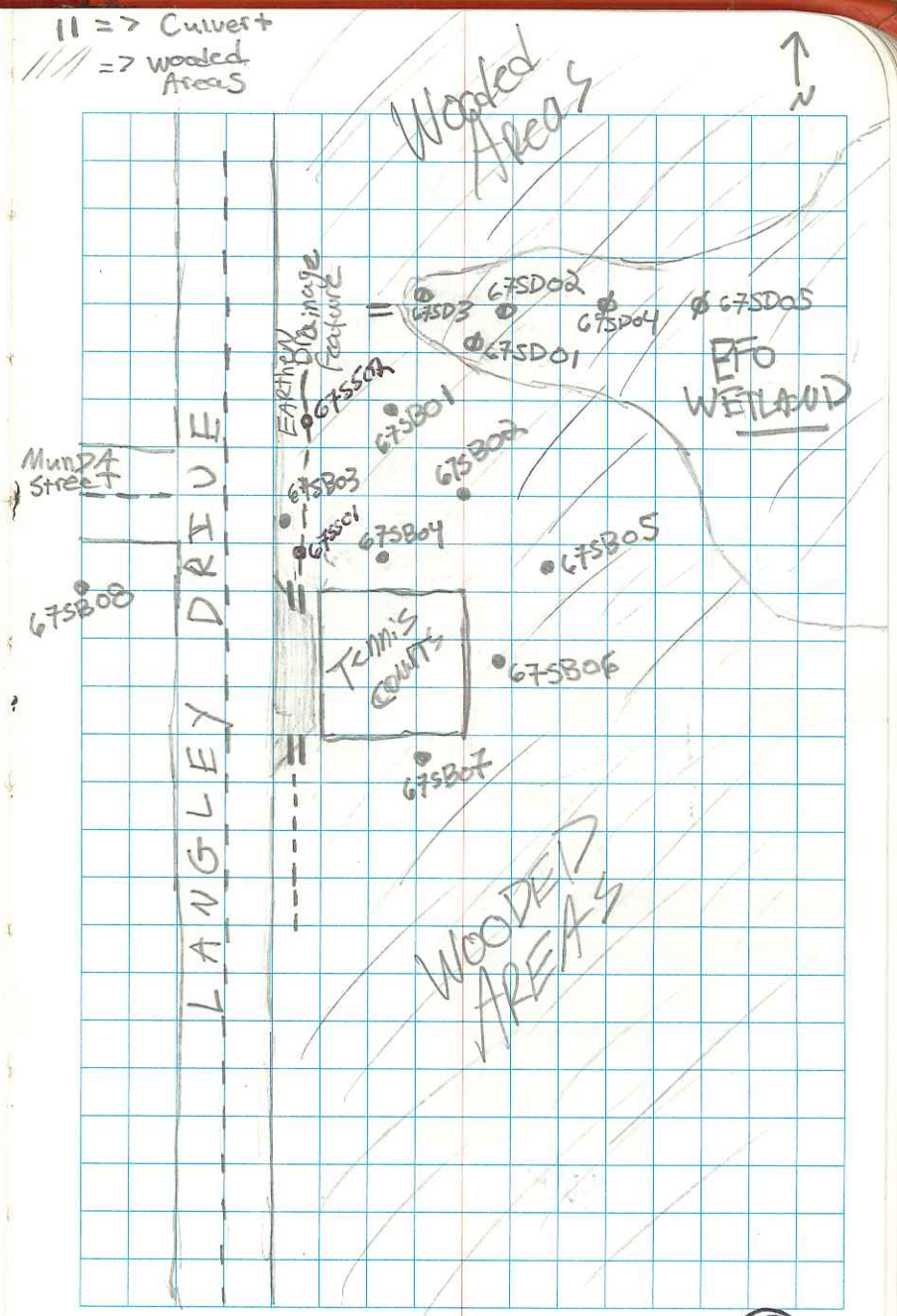
1110 - Break for lunch.
Prep for Next well.

1210 - Arrive at 67GW04 (set-up). See low flow Purge Data sheets for additional info.

Sample Time: 1320

1415 - Depart NAPR.

APG



3-29-10 12.07

1402 Final Round of Water Levels at SWMU 3 - Landfill.

Time	Well ID	SWL
1405	17GW09R	12.07
1410	17GW09	9.79
1415	17GW02R	5.02
1417	17GW01R	7.31
1423	17GW03R	14.28
1426	17GW10	13.40
1428	17GW07R	14.88
1431	17GW08R	10.83
1440	17GW11	7.88

1450 - Arrive at Security to secure for Next day's Activities and Security Equipment Room organization.

1645 - Depart NAPR

ADG

Tuesday March 30, 2010

0640 - Arrive at NAPR - scheduled to meet with Surveyors in A.M. Surveyors will work at SWMU's 57, 67, 61, and 75.
- Also, prep for today's Sampling.

0720 - Surveyors arrive. Meeting to discuss Surveying Approach.

0730 - Buker and Transystem, Inc. ~~at~~ Recon at SWMU 75.

0740 - Recon at SWMU 57
0750 - Recon at SWMU 67
0802 - Recon at SWMU 61

0824 - Return to Security Bldg. Calibrate Gw Sampling Equipment. See Daily Meter Calibration Record sheets for additional details.

ADG

3-30-10

0920 - Collect 67SS01 from Earthen Drainage Feature as Described previously on Page # 69. Sample Collected using a Stainless Steel Spoon. Approx. 1 ft. depth obtained. Snail shells abundant - and 2 earthworms were observed. Sample area was dry. No hydrophytes. Soil Sample contained some fill and gravel. Mostly Clay loam otherwise.

3 x 40 vials (VOC)
1 8oz. Jar (SVOC)
1 4oz. Jar (GRO)
1 2oz. Jar (METALS)

0950 - Collect 67SS02. Clay loam - Brown. Approx. 1 ft. obtained. Snail shells and 1 Parakeet.(?) Area Dry with No Standing water or Saturation.

" " Same glassware and analysis for 67SS02

Weather Conditions:
Sunny and warm - Low humidity. Pleasant. High of 82°F.

3-30-10

1000 - Assist with 67GW03 Purge and Sample.

1110 - Back at security and lunch.

1205 - Collect 67IDW01 (Soil Composite.)

1215 - Collect 67IDW02 (Aqueous)

1220 - Back to security to Prep and Pack coolers for Fedex shipment.

Depart MAPR 1445

ADK

Wednesday March 31, 2010

0645 - Arrive at NAPR. Pack Equipment and Supplies.

0830 - Water Levels at SWMU 75.

0900 - Recon at SWMU 59 for upcoming CMS Investigation. GPS Navigate to Proposed Soil Boring / GW Well Locations at Most Locations.

1020 - Water levels at SWMU 67 - See R. Rosecrans Logbook.

1035 - GPS 67SS01 and 67SS02

1055 - SWMU 61 Water levels and Check on Transystem, Inc. Survey Crew.

1140 - Break for lunch Finishing Equipment Pack for Fedex.

3-31-10

1315 - GPS Work at SWMU 2.

1410 - Back at Sec. Bldg. to Make Final Fedex Check and Secure Room.

1445 - Depart NAPR.

ADK

5-24-10

- Back To Security to Pack Equipment and Samples.

1530 - Fedex arrives.

1545 - Reconnaissance at SWMU 9. evaluate Site Conditions for eventual upcoming investigation.

1640 - Sec. bldg. to organize, camp., clean-up, etc.

1700 - Depart MAPR

MPa

Tuesday May 25, 2010

0705 - Arrive at MAPR.

0730 - Surveyors arrive on site - Felix and George.

0820 - Collect additional Estuarine Wetland data at SWMU 67. Also, additional GPS coordinates obtained for wetland sample points.

0915 - Rain. Lasts for approx. 15 minutes. Wait for rain to stop - back in field at SWMU 67 - To finish gathering wetland data.

1035 - Depart SWMU 67 - To SWMU 59 to check on surveyors. Positive Progress.

1045 Arrive at Security Bldg. Download Photos / GPS - Process information.

Environmental Geologist – Robert Roselius

Sun. 3/21/10 SWMU 67

MOBE - ROSELINE, GAILEY, & HUPE
DEPART PITT. 0715 EST, PRING.
SAN JUAN 1320 EDT @ NOPR 1515,
PREP / BOTTLE / CHECKS / ORG. DEPART.
1630 DEPART

3/22/10 (MON.)
0850 ONSITE, INSPECT SWMU 67
& 75. - FOUND 2 WELLS @ 75 AND
NONE ELECTRICAL UNDERGROUND
UTILITIES ISSUE. - PREP FOR DAY.

▲ 67 GROSSLURRE
APPX VOCS = 2 DI H_2O / 1 MeOH.
" SVOCS & DRO = 1 8 oz JAR.
TPH GRO = 1 4 oz.
" METALS = 1 2 oz

0740 CALIBRATE PID TO 102 ppm
100 ppm ISOBUTYLENE.
0815 DEPART FOR SWMU 67 —
LOCATE SB & SS (WILL BE SED
SAMPLES) SEE GAILEY LOG. RE:
WETLAND / DRAINAGE DETAIL

1015 MEET DRILLERS @ SECURITY BLDG.
ESCORT TO 67 - KICK-OFF, SOW
N & S. THEY UNLOAD, BUILD
DOWN POD.
— NEED TO 75 to LOCATE BB's
EVALUATE BEDROCK?
SET REFUSAL @ ≈ 9' @ PROPOSED/MOVE E 10'
1145 SET UP ON 57SB08.

57SB08
0-4 3.5
BKG.
57SB08-00
@
57SB08-01
@

- REFUSAL @ 2nd LOCATIONS @ 8+'
MAYBE CONCRETE?
- EVALUATE W/ GALY NEXT LOCATION. CONSIDERING
OVERHEAD ELECTRICAL LINES, WILL
MOVE ≈ 40+' NW (SEE GPS MAPPING)
1230 DRILLERS DEPART FOR LUNCH.

1320 DRILLER SET UP AND BEGIN @
RCR 4/11/11 — 57SB08

— 57SB08 — (PID BKG 0.0)

0-4 0-0.1' TOPSOIL
3.5. 0.1-1.3 CLAY, LITTLE SILT, MAROON,
BKG DRY to W/ LITTLE LT GREY, YELLOW & BR,
RCR 1/13/11 DAMP, SLIGHT PLASTICITY, MED HARD & (FILL)
57SB08-00 AND DUP
@ 1325 Ø 1.3-4.0 CLAY W/ SOME FINE SAND to,
RCR 1/13/11 TRACE, COARSE SAND & F. GRAVEL
57SB08-01 (i.e. FEW PIECES), BROWN,
@ 1330 SLIGHT PLASTICITY, MED STIFF.
(FILL).

4-8. 4-8 SILT AND F. SAND, (COARSE
3.9 SAND + SIZE ROCK?) 6.8-7.3)
BKG BR., DRY to DAMP. NON PLASTIC,
LOOSE. (FILL?)

8-12 8-9 SAA. DAMP. (FILL?) SLUMPED.
3.4.
BKG 9-12 SAPROLITE/WEATHERED BEDROCK
RCR 1/13/11 OR ALTE → BLACK & WHITE, CLAY, ~~LITTLE~~
57SB08-05 SOME SILT, LITTLE F. SAND SIZED
@ 1350 NON SLIGHT PLASTICITY, MED
STIFF, DAMP.

675B08 (CONT) 12-15.5

12-16 SPA W/ IRON/RUST STAINING
3.2 DAMP TO MOIST?
BKG

DK OLIVE

16-20 SPA W/ LESS STAINING, BACK
3.3 TO BLK/WHITE, RUST STAINED
BKG ZONE. 19-19.1', MOIST.
SLEEVE IS WET.

EVAL SITE CONDITIONS, REVIEW LOGS.
WILL BUILD WELL W/ 20' TD.
1840 COMPLETE 676W08

• 676W08 •
TD 20' bgs
SCREEN 10-20' bgs
SAND to 7' bgs
BENTONITE to 4.5' bgs

EVALUATE ROUTE/CLEARING TO
675B07 - DRILLERS TO CLEAR/
SETUP @ 675B07 & DECON.
1675 HEAD TO OFFICE TO MANIFOLD
SAMPLES ETC.
1700 DRILLERS DEPART.
1730 DEBRIEF NAPR

TUES (3/23/10)

0645 ONSITE, PREP, CALIB PID to 103
ppm @ 0710.

0730 @ 67 DRILLER ARRIVES ALSO.
PREP to SAMPLE 675B07. - WORK
ON CHAIN SAW, CHAIN OFF, to CUT TO
GET TO SPECIFIC LOCATION
0755 BEGIN 675B07

- 675B07 - (PID BKG - 0.0)

0-4 0-0.3 TOPSOIL, ORGANICS.
3.2
BKG 0.3-3.5 CLAY to FINE SAND, SOME
COARSE SAND & COARSE GRAVEL (1.7-2.0)
675B07-00 w/ SOME GRAVEL THROUGHOUT
@ DRY to DAMP, NON PLASTIC,
0805 LOOSE. (FILL)
675B07-01 3.5-4.0 FINE SAND, SOME COARSE
@0810 SAND, PINK WHITE, DRY to DAMP.
NON PLASTIC, LOOSE (FILL)

4.8 4-4.4 CLAY w/ SILT to COARSE SAND, BR, OK
4.0 GREY. DAMP, SLIGHT PLASTICITY,
BKG STIFF.
4.4-8.0 CLAY, SOME SILT, ORANGE BR. W/
SOME LT GREY, RUST, OR BLK MOTTLES, MED
PLASTICITY, MED STIFF.

67SB07 (CONT.)

8-12 8-10.4 SAA.
3.5
BRG 10.4-12. WEATHERED BEDROCK,
SOPROLITE, OLIVE GREEN & LT.
67SB07-05 GREY (CLAY SHALE, LITHO SILT.)
@ 0830 MED PLASTIC, MED HARD, DAMP

12-16 12-16. CLAY, SOME SILT., OMMIT
3.1 BR. MO. OLIVE, DAMP, MED.
BRG PLASTICITY, MED. STIFF.

16-20 SAA.
3.4 APPEARS TO BE NO ~~GW~~ GW, CHECK
BRG W/ 1/4" ROD - STILL DRY - WILL BUILD
WELL W/ 20' TD, PREP @ 0905,
LOAD AUGERS, CLEAR TO GET TO
LOCATION, 0930 BEGIN AUGERING @
67SB07.

1020 COMPLETE AUGERING @ 67SB07
MOIST CUTTING, LIKELY LOW YIELD
WELL

1030 COLLECT 67FB01 USING LAB
GRADE DI WATER.

1045 COLLECT 67VEROZ FROM NEW
DPT LINER.

1100 COMPLETE CONSTRUCTING 67GW07

• 67GW07 •
TD 20' bgs
SCREEN 10-20' bgs
SAND to 7.5' bgs
BENTONITE TO 5' bgs.

1120 SET UP/MOVE/CLEAR @ 67SB
(FRANKIE)

1215 RIGHT WAY ONSITE, DIRECT
CHEMICAL - DRILLER DOWN/PREP.

1335 DRILLERS @ 67SB06

— SEE NEXT PAGE —

— 67SB06 — (PID BKG 0.0)

0.4 0-0.3 TOPSOIL
3.1 0.3-1.6 CLAY TO F GRAVEL
BKG BR, LT GREY, DRY TO DAMP, NON PLASTIC, LOOSE (BEGIN SAND
67SB06-00 1.3-1.6) PINK, LOOSE, NON PLASTIC)
@1350 1.6-4.0 CLAY, ORANGE BR.
LITTLE BLK MOTTLING, MOD PLASTICITY.
67SB06-01 MOD STIFF., DAMP. MAROON & LT GREY (MARLED)
DUP(01D)
@1355

4-8 & 4-5.8 SAA.
4.0 5.8-6.8 - CLAY, LITTLE SILT,
BKG DK GREY TO BLK., DAMP, MOD PLASTICITY, MOD STIFF.
6.8-8.0 SAA ABOVE 5.8 (MAROON) CLAY.

8-12 8-9.4 SAA (MAROON CLAY)
3.6 9.4-12 WEATHERED BEDROCK/SAPROLITE
BKG OLIVE & LT GREY CLAY, LITTLE
67SB06-05 SILT., DAMP TO MOIST, & MOD PLASTICITY
@1415 SOFT TO MOD STIFF. SLIGHT TO
(OF SAPROLITE)

67SB06 (CONT)
12-16 12-16 - SAPROLITE AN, BUT SILTY
3.6 SOME FINE SAND & CLAY, DAMP TO MOIST?
BKG ORANGE W/ SOME OLIVE, NON PLASTIC, LOOSE.
16-20 SAA (SLEEVE STUCK IN SAMPLER)
2.3 W/ SOME LT GREY CLAY RETRIEVE.
BKG AREAS (MARL) BUT MOSTLY ORANGE SILT AS ABOVE, STILL DAMP+, BUT MUST BE WITHIN GW,

WILL BUILD WELL W/ 18' TD DUE TO ELEVATION CHANGE (LOWER) & PROXIMITY TO WETLAND.

1440 BEGIN AUGERING 67GW06.
1500± RIGHT WAY DEPARTS
1540 COMPLETE AUGERING - SLOW GO ACCP TO BUILD WELL

• 67GW06 •
TD 18'
SCREEN 8-18'
SAND TO 5.5'
BENTONITE TO 3.5'

1615 DEPART 67 (DRILLERS ALSO),
MONITOR SAMPLES @ OFFICE DEPART NOW 1700 HRS

WED. 3/24/10 15.68 3.5.

0650 ONSITE PREP FOR DAY, CALIBRATE PID to 104 ppm @ 0710

0725 @ 67 PREP FOR SWLS USE INTERFACE PROBE

0730 67GW08 SWL 15.68 TOC

~~0739~~ APPROX TEMP STICKUP 3.5

(WILL BE CUT WHEN COMPLETED AT SURFACE) 12.18 bgs

~~0839~~ 67GW07 SWL 15.44

0739 APPROX TEMP STICKUP 3.40

12.04

~~08~~ 0740 DRILLERS ONSITE, PREP to DRILL.

67GW06 SWL 12.00' TOC

APPROX STICKUP TEMP 2.00

10.00' bgs

0805 DRIVER BOOM SAMPLING @ 67SB05

-67SB05- (PID BKG @ 0)

0-4 0-0.2 TOPSOIL

3.1 0.2-1.5 SILT to F. GRAVEL, SOME CLAY

BKG. BR/Lt GREY (GRAVEL), DRY TO DAMP. NON PLASTIC, LOOSE. (FILL

1.5-2.0 BEACH SAND, SHELL, & CORAL

67SB05-00 (VARIGATED) PINKISH WHITE.

@0810 2.0-4.0 CLAY, LITTLE SILT. MAROON (DARK) / OLIVE/TAN YELLOW W/ Lt GREY, LITTLE BLK MOTTLING, DAMP

67SB05-01 SLIGHT PLASTICITY, VERY STIFF,

@0820

4-8 SAA (MAROON CLAY) COLOR GRADES (GREY VARIGATED ~~MAL~~)

3.6. to YELLOW & BLACK @ 6.5-7.4

BKG 7.4-7.5 - QUARTZ?, RETURN TO MAROON CLAY.

8-10.5 INCREASE IN GRAINSIZE, [LITTLE SILT Trace F SAND. MED PLASTIC, MED STIFF

8-12 VSAA, GRADES to OLIVE/Lt GREY (10.5-11.4)

3.1 11.4-12. - SAME AS 8-10.5 (COLOR)

BKG

67SB05-05

@0835

12-16 12-14.5 SAA.

2.7 BKG 14.5-16.0 SILT, SOME FINE SAND LITTLE CLAY. Lt ORANGE & Lt GREY, DAMP TO MOIST, NON PLASTIC, LOOSE.

1010 COMPLETE CONSTRUCTION 67SB05.

• 67SB05 •
TD 16' bgs
SCREEN 6-16' bgs
SAND to 4.0' bgs
BENTONITE to 2.0' bgs

DRILLER PREP TO DECON.
1050 COMPLETED DECON / PREP FOR NEXT WELL - MOVE to 67SB01

1105 BEGIN @ SB01

— 67SB01 — (PID BKG 0.0)

0-4 0.-0.3' TOPSOIL
2.6 0.3 - 3.5 SILT to F. GRAVEL, SOME
BKG CLAY, BROWN, (GREY GRAVEL), BRICK
67SB01-00 PIECES, DRY to DAMP, NON PLASTIC,
@ LOOSE. (FILL)
1110 3.5 - 4.0 BEACH SAND, SHELLS,
67SB01-01 PINKISH WHITE DRY, NON PLASTIC
~~DUP~~ ~~-01D~~ LOOSE (FILL)
@
1115

67SB01 (CON'T)

4-8 4.0-4.9 SAA (BEACH SAND, SHELLS)
3.8
BKG 4.9 - 6.4 CLAY, LITTLE SILT, MAROON & RUST YELLOW, GREY, DAMP, SLIGHT PLASTICITY, V. STIFF.
6.4 - 8.0 ~~SAA BUT GL~~ SAA BUT.
67SB01-03 CLAY, LITTLE SILT, YELLOW
@ 1125 ORANGE, W/ BLK MOTTLING, DAMP
(CORE TO LIKELY SHALLOW GW) HIGH PLASTICITY, MOD STIFF.

8-12 LINER STUCK IN SAMPLER (SWELLING CLAY)
2.9 8-12 SAA, MOIST.
BKG

8-12-16 SAA, ~~MOIST~~ RED to WET.
3.0
BKG

WILL BUILD 67GW01 W/ 13' TD
BASED ON ELEVATION & PROXIMITY TO WETLAND
1150 DRILLER DEPART - LUNCH
ASSIST ADOM W/ GW SAMPLING (RTGW11)
1255 DRILLERS @ 05' PUSHER INSTALL
67GW01.
1405 DRILLERS COMPLETE 67GW01
CONSTRUCTION (SEE NEXT PAGE)

• 67GW01 •
TD 13' bgs
SCREEN 3 - 13' bgs
SAND to 2' bgs
BENTONITE to SURFACE.

DRILLER PROP TO DECON AND GROUT WELLS, WILL PICKUP SAND/CONSTRUCTION SUPPLIES TONIGHT.

DEVELOP

1505 67GW08 TD 22.28 (VERY SOFT)
SWL 15.06
7.22 (x0.163)
≈ 1.2 GAL/VOL

- SURGE/BAIL 5 GAL FOR 25 MIN SWL 15.17 - VERY TURBID & SOMPY AT FIRST, STILL TURBID BUT CAN FEEL HARD BOTTOM
- SURGE/BAIL ANOTHER 5 GAL FOR 20 MIN SWL 15.08 TD 22.30 HARD
- DECON BAILER

1610 COLLECT 67ER03 FROM NEW DPT LINER

HEAD TO OFFICE TO MANAGE SAMPLES
- CALL CATHY D. RE: ENCORES TRACK, SHIPPED UPS, IN PR AT 0960 THIS MORNING. 1700 DEPARTED NAPR. 22.3 PCL 15.8

THURS (3/25/10)

0645 ONSITE, PREP
0705 CALIBRATE PID to 104 ppm.
0720 @ 67, PREP FOR ER/FB SAMPLES
0730 COLLECT 67ER04 FROM NEW DPT LINER.
0740 COLLECT 67FB02 USING STORE BOUGHT DISTILLED WATER.
- LATE ENTRY DRILLER ARRIVE 0735 PREP TO CONTINUE SAMPLING

0805 SETUP @ 67SB08 - BELOW.

-67SB02 - (PID BKG 0.0)

0-4 0-0.2 TOPSOIL
3.6 BKG 0.2-4.0 FILL - SILT & F SAND, SOME CLAY AND GRAVEL & COARSE SAND, BROWN, GREY (GRAVEL) ROOTS, DRY TO DAMP, NON PLASTIC, MED STIFF, (FRIABLE 0.3-2.0.)

67SB02-00 + MS/MSD @ 0815 → { MS + MSD VOL FOR VOCs; MS/MSD (SINGLE VOL FOR OTHERS

67SB02-01 @ 0825 SEE NEXT PAGE

RJF

4.05
3

67SB02 (CONT)

4-8 LOW RECOVERY — COARSE GRAVEL NEAR BOTTOM
1.8 OF LINER — FILL - SAA. COLLECT
BKG SAMPLE & LABEL 6702-02 (ie. 3-5)

67SB02-02 [0845 67GW01 SWL 9.05
@ 0840 APPROX TEMP STICKUP 3.00
∴ 6.05' bgs

8-12 8-9.5 CLAY, LITTLE SILT, ORANGE/BRN W/
3.8 SOME DARK MOTTLES, DAMP to MOIST,
BKG MED PLASTICITY, MED STIFF.

9.5-12 SAA BUT GRADES TO OLIVE
AND SOFT, MOIST to WET.

12-16 12-15.2 SAA.
2.7 15.2-16.0 SILT, SOME F. SAND, LITTLE
BKG CLAY, ORANGE & GREY, MOIST, NON
PLASTIC., MED DENSE

0900 ABRO NOW & NASSER WORKING ON
COMPLETING 67GW08 @ SURFACE.
0950 ABRO to MOVE DOWN

• 67GW02 •

TD 13' bgs
SCREEN 3-13' bgs
SAND TO 2' bgs
BENTONITE to SURFACE

DEVELOP

0955 67GW07 TD 22.64' TOC HARD BOTTOM
SWL 14.80' → 7.84
ABRO STICKUP 2.6
∴ ~1.3 GAL VOC

0950 SURGE/BAIL 10 GAL FOR 35+ MIN.
TD. 22.64, SWL 20.8
TURBID BUT NOT NEARLY AS VISCOUS/SOAPY
AS 67GW08. - DEWN BAILER.

1000 DRILLER DECONTAM. / PREP FOR 67SB04

— 67SB04 — (PID BKG - 0.0)

0-4 0-0.3 TOPSOIL
3.3 0.3-3.4 FILL - SILT to F. GRAVEL, SOME
BKG CLAY, BROWN & GREY (GRADES), LITTLE
SHELL FRAGS, DAMP, NON PLASTIC, LOOSE

67SB04-01 3.4-4.0 CLAY, LITTLE SILT, & SAND
@1120 STILL LOOK LIKE FILL.

67SB04-01 MS + MSD (DOUBLE VOL) FOR VOCs
MS/MSD (SINGLE VOL) FOR OTHERS
@1125 4.0-5.9 ✓
4.0-8 SAA — FILL — SILT to F. GRAVEL W/
3.8 SOME ORANGE CLAY, COUPLE LARGE GRAVEL
BKG 5.9-8.0 - CLAY, LITTLE SILT (NATIVE) (NEAR)
67SB04-03 DARK OLIVE/DK GREY GRADED TO ORANGE & GREY/
@1140 ~7.0, DAMP, SLIGHT PLASTICITY, MED HARD OLIVE
[FROM NATIVE CLAY]

8-12 3.4 BKG

8 - 11.9 SILT & CLAY, DK OLIVE, MOIST TO WET?, SLIGHT PLASTICITY, SOFT.

11.9 - 12 SILT, SOME F. SAND AND CLAY, ORANGE & GREY, MOIST, NON-PLASTIC LOOSE TO MED HARD.

12-16 3.6 BKG

SAA W/ ZONE OF LIGHT GREY CLAY, AND COLOR VARIES FROM ORANGE, TO LT GREY/OLIVE, LITTLE BLK. MATTLING

WILL BUILD GTGW04 WITH 16' TD

1150 DRILLERS DEPART.

1245 PROP TO ANCHOR 67GW04.

ABRAHAM/NASSER CONTINUE TO COMPLETE WELLS & SURFACE

• 67GW04 •

TD 16' bgs

SCREEN 6-16' bgs

SAND to 4' bgs

1400 BENTONITE to 2' bgs.

~~1500~~ PROP to MOVE DOWN.

1420 DEVELOP 67GW06

~~SWL~~ TD 20.82' HARD

SWL 12.21' → 8.11 (0.163)

ABOVE STICKUP 2.5'

∴ 1.3± GAL/VOL

SURGE/BAIL 4.5± GAL NEAR DRY. (20 min)

1448 SWL 20.6± AND RISING. (TURBID LESS THAN OTHERS)

1500 SWL 18.65 AND RISING

ALLOW BAIL NEAR DRY SWL 20.65±

TO RECHARGE DECON BAILER.

1510 DRILLERS DEPART (READY FOR TOMORROW)

1520 DEVELOP 67GW05 TD 18.80 HARD

1525 ABRAHAM/NASSER DEPART. SWL 14.92 → 3.88

APROX STICKUP 2.9± ∴ 0.6± GAL/VOL

1536 SURGE/BAIL ≈ 2± GAL NEAR DRY

SWL 18.63 AND RISING. ~ (~7 min)

ALLOW TO RECHARGE (SLIGHTLY TURBID)

1557 SWL 17.80' BAIL NEAR DRY (0.15± GAL)

DECON BAILER

1607 RETURN TO GTGW06 - SWL 16.27' TOC

BAIL 2.2± GAL NEAR DRY SWL 20.55±'

DECON BAILER

- RETURN TO OFFICE/LANDFILL SAMPLE MGMT.

1715 DEPART WADR, MATRIX & CONDO

1625 Pen

FRI (3/26/10)

0650 ONSITE, PREP FOR DAY
0710 CALIBRATE PID to 103ppm
0735 @ 67
LATE ENTRY: ABRAHAM & NOSSER COMPLETED THE FOLLOWING WELLS @ THE TANK SURFACE: 67GW01, 02 AND 05 THROUGH 08 (6 TOTAL YESTERDAY)
0755 DRILLERS ONSITE (ALSO ABRAHAM and NOSSER)
0815 BEGIN @ 67SB03.

— 67SB03 — (PID BKG 0.0)

0-4 0-0.2 TOPSOIL
3.8 0.2-0.5 FILL CLAY TO GRAVEL, BR
BKG. LT GREY GRAVEL, DAMP, NON PLASTIC LOOSE.
67SB03-00 0.5-2.0 CLAY & SILT, DK MAROON/BR,
+MS/MSD DAMP, SLIGHT PLASTICITY, MED STIFF (FILL)
@0825
67SB03-01 2.0-4.0 FILL (SAME AS ABOVE 0.5)
@0830 BUT YELLOW, TAN, AND GREY, 0.1'
04-8 4.0-7.0 SAA GRAVEL @ 5.3 & 6.9' (ABOVE NATIVE) FILL
67SB03-04 7.0-8.0 CLAY, LITTLE SILT, DAMP ORANGE
@0840 w/ PINK & BLK MOTTLING, MED PLASTICITY
7.9 3.6 BKG MED STIFF.

WILL BUILD 67GW03 w/ 15' TD BASED ON ELEVATION AND POTENTIAL GRADIENT.
0850 BEGIN ENGINEERING

8-12 8.0-~~9.3~~ 10.3 SAA BUT MOIST AND SOFT
3.5 TO MED ~~HARD~~ STIFF
BKG 10.3 ~~9.3~~-12 CL SILT & CLAY, SOME F. SAND, YELLOW ORANGE & OLIVE, w/ WHITISH, BLK, MOTTLING (SAPROLITE), MOIST, SLIGHT PLASTICITY, SOFT.

12-16 12.16 SAA SAPROLITE, BUT LIGHTER
3.7 YELLOW, TAN & WHITISH MOTTLED w/
BKG DK OLIVE V
~~0955~~

• 67GW03 •
TD 15 bgs
SCREEN 5'-15' bgs
SAND to 3.5' bgs
BENTONITE TO 4' bgs. (1' bgs)

1000 DERON / CLEAN UP, COMPLETING 67GW03 @ SURFACE, MOVE DRUMS.
1255 SITE CLEAN, BOLLARDS POINTED, DRUMS, 4 SOIL / 1 WATER @ STORAGE, DRILLERS DEPART TO LEAVE TRUCK, TRAILER & RIG ~~@ SITE~~ ACCESS FROM SECURITY. (FOR SUMMIT 75 INVEST ON MONDAY)

LATE ENTRY: 1045 COLLECT 67ER05
FROM NEW DPT LINER.

16.16

1305 DEVELOP 67GW01 TD ~~15.18~~ HORD
SWL 9.06 → 6.90'
APPROX STICKUP 3.0' ∴ 1.1 GAL/VOL

SURGE/BAIL ≈ 3.0 GAL FOR 15 MIN
TO NEAR DRY 15.2± RISING (GOOD)
ALLOW TO RECHARGE. 1325

1342 SWL 12.11
BAIL 1.3± GAL FOR 7± MIN.
SWL 15.3± TD 16.16

1340 13MW04
SWMU59 13MW04 (9/17/97)
18' TD
8'-18' SCREEN
SWL 10.05
APPROX STICKUP 2.0±
VALVE 8.0' bgs

1350 WELL NE OF PIT 7
TD 12.2
SWL 6.60
APPROX STICKUP 2.5
4.35' bgs

1605 WELL SOUTH OF ENTRANCE (E SIDE OF ROAD)
TD 18.87'
SWL 10.71'
APPROX STICKUP 2.3±
8.41' bgs

SWMU59

SAT (3/27/10)

0640 ONSITE, PREP FOR GW SAMPLING ~~DONE~~ DECON 2 PUMPS, CALIBRATE PID TO 103ppm @ 0720.

0805 @ 67 PREP TO SAMPLE 67GW06 (SEE SAMPLE LOGS.) ASSIST GAILEY, VERY LOW YIELD <70 ml/min, ~~W~~ WITH DROPPING WATER LEVEL WILL CONTINUE.

0910 - EQUILIBRATED BUT ORP STILL DROPPING (MAY SAMPLE SOON, SEE SAMPLE LOGS)

— DUE TO LOW YIELD AND LITTLE WATER IN SCREEN (3.8±') @ 61GW05, WILL PULL SAMPLE W/O LOW FLOW [SEE PG 91 FOR DEVELOPMENT]

0920 DEVELOP 67GW02 TD 16.21', HORD TOC ✓
SWL 10.53' → 5.68
APPROX STICKUP 2.9 ∴ 0.9 GAL/FOOT

SURGE/BAIL ≈3.0± GAL FOR 15± MIN SLIGHTLY TURBID, NEAR CLEAR, CLEAREST YET. SWL 16.01 @ 0939 AND RISING ALLOW TO RECHARGE.

1011 SWL 15.11 - <1' RECHARGE, LOW YIELD
~~16.01~~

(67GW02 DEVELOP, CON'T)

1018 SWL 15.99' TOC, TD 16.21' HORD
DETECT BOILING 0.4± GALS. (1400 ml) MEASURED
- WILL SAMPLE W/ BLADDER PUMP W/O. LOW FLOW DUE TO LOW YIELD (SIMILAR ~~T~~ TO 67GW05 ∴ DECON BOILER DEVELOP

1035 ~~DEVELOP~~ 67GW04 - TD 18.50' TOC, HORD
SWL 12.95 → 5.55
APPROX STICKUP 2.8±' ∴ 0.9 GAL/FOOT

~~1~~ SURGE/BAIL 3.7± GAL. TO NEAR DRY (FOR 20± MIN)

1105 SWL 18.46
ALLOW TO RECHARGE.
- ASSIST GW SAMPLING (GAILEY LOG)

1145 SWL 16.84 (67GW04)
FORCE/BAIL 1.4± GAL (<10 min)

1157 SWL 18.52 & RISING.
ALLOW TO RECHARGE (ASSIST GW SAMPLING MONITOR SAMPLES)

1242 SWL 15.63
BAIL

1250 SWL 18.53 & RISING
— DECON BAILER
- ASSIST GW PUMP DECON.

1401 DEVELOP 67GW03 - TD 17.87' TOC
SWL 11.20 → 6.62
APPROX STICKUP 2.6' ∴ 41.1 GALL VOL
BOTTOM SOFT & SOMPY SIMILAR TO 67GW08
SURGE/BAIL 10+ GAL OVER 40+ MIN.

1446 SWL 14.45 & RISING GOOD
TD 18.15' HARD
- BEGIN SAMPLING @ 67GW01
VERY LOW YIELD - TOO LOW FOR "LOW FLOW" SAMPLING.
MANIFOLD SAMPLES @ OFFICE.

1615 DEPART NOPR.

SUN. (3/28/10) B.L.

0645 ON SITE, PREP FOR GW SAMP., MANIFOLD SAMPLE, CALIBRATE YSI (SEE GAILEY LOG/CAL RECORDS)
0735 CALIBRATE PID to 103 ppb.
FLUSH MOUNT.
0900 @ 75 SWL @ WELL SOUTH OF BLDG (BETWEEN BLDG & PIER) - 8.20' TOC
TOC APPROX. 0.2' bgs ∴ SWL 8.4' bgs.
- TIDE NEAR HIGH (MAYBE DOWN 0.5' FROM HIGH?) - 9±' FROM TOP OF PIER CONCRETE.
COLLECT
0940 67GW02 - NO LOW FLOW (SEE
1045 67ER07
1320 COLLECT 67GW04
- SEE GAILEY & GW SAMPLE LOGS)
RETURN TO OFFICE, MANIFOLD SAMPLE, ORG.
1415 DEPART NOPR.

- @ CONDO: SUMMITS KICKOFF, WP, CREATE LABELS (COMPUCHEM DID NOT PROVIDE.

MON (3/29/10

0645 ONSITE, PREP FOR SOUMU 75 SAMPLING, ORG OFFICE/TANCK

0740 CALIBRATE PID to 103ppm.

0850 COLLECT 75FB01

0900 COLLECT 75ER01 FROM NEW DPT LINER. (SEE GOLDY LOG).

— AWAITING ARRIVAL OF DRILLERS.

0902 DRILLERS ARRIVE, HEAD TO 75

0920 CONDUCT 75 KICKOFF & H&S MEETING

— UTILITIES CLEARED BY MORE TIMES.

0930 BEGIN

— 75SB03 — (PID BKG 0.0)

0-4 0-0.2 TOPSOIL
3.2 0.2-4.0 FILL - ~~FINE~~ SILT to MOD SAND, ~~SA~~ (BROWN SAND), LITTLE SHELLS., LWHITISH/LT TAN DRY to DAMP, NON PLASTIC, LOOSE (FILL?)
BKG

75SB03-00
@0935

75SB03-01
@0940

4-8 4.0-8.0 SAND, DAMP.
2.9
BKG

75SB03-04
@0950

75SB03 (CONT)

8-12 8.0-12.0 SAND. & MOIST,
3.2 WET/SATURATED @ 11 bgs.
BKG

— 75SB05 — (PID BKG 0.0)

0-4 0.0-0.1 TOPSOIL (LITTLE)
2.2 0.1-3.9 (SAME @ 75SB03 - BROWN SAND
BKG LITTLE SHELLS.) A

75SB05-00 3.9-4.0 CONCRETE W/ NOISE/REFUSAL
@1000 (LIKELY THE WATER TROUGH?) TERMINATE BORING

75SB05-01
@1005

CONSTRUCTION FEATURE

— 75SB04 — (PID BKG 0.0)

0-4 ~~0-1.8 FILL~~
2.6 0.0-0.2 TOPSOIL
BKG. 0.2-1.3 FILL. SILT to GRAVEL, SOME CLAY, BROWN, LT GREY GRAVEL, DRY to DAMP, NON PLASTIC, LOOSE.

75SB04-00 1.3-4.0 FILL. BROWN SAND & SHELLS
+DUP AS SB03 & SB05.
@1015

75SB04-01 MS + MSD (DOUBLE VOL) FOR VOCS
+MS/MSD MS/MSD (SINGLE) FOR OTHERS
@1025

755B04 (CONT)

4-8 SAME AS ABOVE – BEACH SAND, DAMP
BKGN
2.8

755B04-04
@1040

8-12 SAA, WET SATURATED (VERY
1.2 LITTLE RECOVERY
BKGN

— 755B02 — (PID BKG 0.0)

0-4
2.5
BKG

755B02-00
@1115

755B02-01
@1120.

STET

0.0 - 0.2 FILL SILT to GRAVEL,
BE; Lt GRAY GRAVEL, DRY, NON PLASTIC
LOOSE
0.2-4.0 BEACH SAND AS OTHERS

755B02 (CONT)

~~8-4~~

4-8 4.0-8.0. SAA BEACH SAND, DAMP
2.6
BKG.

755B02-04
@1125

8-12 8.0-12.0 SAA BEACH SAND, WET/
2.4 SATURATED.
BKGN

— 755B01 — (PID BKG 0.0)

0-4 0.0-0.4 (NO TOPSOIL) FILL –
1.9 SILT & FINE SAND, BR & BEACH SAND
BKG MIXED, DRY TO DAMP, NON PLASTIC,
LOOSE.

755B01-00
@1140

755B01-01
+ DUP
@1145

755B01 (CONT.)

4-8 FILL - BEACH SAND & SUBBS - DAMP
2.1
BKG

SAME AS OTHERS

755B01-04
@ ~~1145~~ PAR
1155

8-12 BEACH SAND, WET, SATURATED
2.1
BKG

1200 DRILLER GROUTING SBs,

— MANAGE SAMPLES
~~GW~~ SVLC @ CONDFILL
PREP/ORG - (SEE GAILEY LOG)

1645 DEPART NAPR

WRK @ CONDO - G7/75 SAMPLE
SUM TBLS.

TUES (3/30/10)

0640 ONSITE, PREP TO GW SAMPLE, PLAN
TO MEET SURVEYORS: TRANSYSTEM, INC.
(BOB MCNEAL 757 630 1675
GEORGE FRANKLIN 757 375 1310
0715 SURVEYORS ON SITE, KICKOFF MEETING,
SITE VISITS OF SUMMUS 75, 57, 67 & 61

~~GW 1030~~ PAR
09:00 PREP TO SAMPLE/LOW FLOW PURGE 67GW03
(SEE GW SAMPLING LOGS)

1005 COLLECT 67ER08 FROM ~~C~~ NEW
SPOON (SEE GAILEY LOG FOR SURFACE
SOIL SAMPLING DETAILS)

1030 COLLECT 67GW03 (SEE SAMPLING
LOGS)

- COLLECT IDW SAMPLES (SEE GAILEY
LOG)
- PREP/PACK/MANAGE/SHIP SUMMUS 67 & 75
SAMPLES.
1445 DEPART NAPR
GW SAMPLE LOGS/DRILLING LOGS
@ CONDO.

~~- 1005 ER08~~
~~- 1030 GW03~~

WED (3/31/10)

0645 ONSITE, PREP/ORG/PACK EQUIP

@ 75 TRY TO REMOVE FLUSH MNT.
MARK BOTTOM / TD 14.30' TOC

0830 75-N 8.21' TOC
0832 75-S 8.33' TOC
(AS SUN. 3/28) TD 15.1' TOC

* NEAR HIGH TIDE; BASED ON HIGH WATER MARKS ON PIER

1000 COMPLETE GPS / END OF SWMN 59
CONSIDERATIONS — • CONCRETE FLUSH MOUNTS
• CLEARING (BUT NOT RIGHT WAY)
• UTILITIES. (FIRE HYDRANTS FIBER LINE)
• WPG/CHIP.
• STGW02 CONFLICTS W/ MAPPING.

1020 @ SWMN 67 FOR SWLS.

				CASING MARK
1023	67GW07	14.94'	TOC	S
1024	06	14.88'		N
1025	05	11.92		SW
1027	02	10.68		SE
1028	01	9.21		NE
1029	04	13.00		E
1031	03	11.34		N
1032	08	15.28		S

1055 ARRIVE @ SWMN 61 FOR SWLS
SEE PAGE 71 — SURVEYORS ONSITE.

— CLEAN/ORG/SNIP EQUIP/INVENTORY VEHICLE.

1445 DEPART NAR.

@ CAMP — SWMN 59 SCHEDULING/LOGISTICS/INFORM/LODGING/PLANNING

SWM (4/25/10)

		SWL Ft TOC
1026	61GW21	7.56
1027	61GW23	7.58
1028	61GW06	7.26
1030	61GW05	4.94
1031	61GW23	3.03
1032	61GW03	2.67
1033	61GW24	6.10
1034	61GW27	10.20
1035	61GW01	6.15
1037	61GW36	5.71
1039	61GW02	7.14
1040	61GW36	9.33
1041	61GW04	6.18
1042	61GW07	6.05

SWM (4/25/10)

1130 @ SWMU 67 to COLLECT SWLs (DURING SWMU 59 FIELD INVEST)

		SWL Ft. TOC
1132	67GW08	15.45
1133	07	15.03
1134	06	12.84
1135	05	11.67
1136	02	10.21
1137	01	9.27
1138	04	13.05
1139	03	11.41

Environmental Technician – Darrin Hupe

Weather: Mostly Sunny, breezy, ~ 85°F

3/26/10

0645 - Arrive on Site. Prepare for GW Sampling @ SWMU 67.

0745 - Arrive @ SWMU 67 (See Field Data Sheets for purge & Sample Details for 67GW08)

1000 - Sample Taken (67GW08) + Dup. (67GW08D) & MS/MSD

1200 - Sampling Complete. Perform btw. well Decon. on pump.

1230 - Arrive @ 67GW07 (See Field Data Sheets for purge/Sample Details)

1325 - Sample taken (67GW07)

1350 - Head to bld. 1205 to ice samples

[redacted] - *performed Daily pump decon. & Meter calibration

1715 - Depart Site

3/27/10

0840 - Depart SJU for PIT.

10 DNH

SOIL BORING AND MONITORING WELL LOGS

Baker

Michael Baker Jr., Inc.

TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT:	Naval Activity Puerto Rico SWMU 67		
PROJ. NO.:	119197, 6.5	BORING NO.:	67SB01
COORDINATES:	EAST: 933196.77	NORTH:	804847.80
ELEVATION:	SURFACE: 112.3	TOP OF PVC CASING:	115.46

Rig:	Geoprobe Track Rig 6610 DT				**Date**	**Progress (Ft.)**	**Weather**	**Depth to Water (Ft.)**
	MC Sampler	**Casing**	**Augers**	**Core Barrel**				
Size (ID)	1-5/8"	--	3 1/4"	--	3/24/2010	0.0 - 16.0	sunny, mid+ 80s	
Length	4'	--	5'	--				
Type	Acetate	--	HSA	--				
Hammer Wt.	--	--	--	--				
Fall	--	--	--	--				

Remarks: PID background (BKG) - 0.0.

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	2"	~+2.8	3.0
Schedule 40 PVC Screen	2"	3.0	13.0

Depth (Ft.)		Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab ID	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. Datum)
1					67SB01-00		TOPSOIL (organics) 0.3	Bentonite 0 to 2'	112.0
2		D-1	2.6 65%		67SB01-01 + duplicate	BKG	SILT to FINE GRAVEL' some clay, brick pieces; brown, gray gravel; dry to damp; non plastic, loose (fill)	2" PVC Riser; Sand 2 to 13'	
3							3.5		108.8
4	4.0						BEACH SAND, shells, pinkish white; dry; non plastic; loose (fill)	2" PVC Screen 3 to 13'	
5							4.9		107.4
6		D-2	3.8 95%		67SB01-03	BKG	CLAY, little silt; maroon, yellow, tan and gray; damp; slight plasticity; very stiff 6.4		105.9
7							same as above but yellow, orange w/ black mottling; damp; high plasticity; med stiff		
8	8.0						same as above but moist		
9		D-3	2.9 73%			BKG			
10									

DRILLING CO.:	GeoEnviroTech, Inc.	BAKER REP.:	Robert Roselius	
DRILLER:	William Rodrigez	BORING NO.:	67SB01	SHEET 1 OF 2

Baker

Michael Baker Jr., Inc.

TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: Naval Activity Puerto Rico SWMU 67

SO NO.: 119197, 6.59.3 BORING NO.: 67SB01

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

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. Datum)
11		D-3	2.9 73%			BKG	*Continued from Sheet 1*	Sand 1 to 13'	
12	12.0							2" PVC Screen 3 to 13'	
13		D-4	3.0 75%			BKG	same as above but wet	13	99.3
14									
15									
16	16.0								96.3
17							End of Boring at 16.0'		
18									
19									
20									
21									
22									
23									
24									
25									
26									
27									
28									
29									
30									

DRILLING CO.: GeoEnviroTech, Inc. BAKER REP.: Robert Roselius

DRILLER: William Rodrigez BORING NO.: 67SB01 SHEET 2 OF 2

Baker

Michael Baker Jr., Inc.

TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT:	Naval Activity Puerto Rico SWMU 67		
PROJ. NO.:	119197, 6.5	BORING NO.:	67SB02
COORDINATES: EAST:	933240.17	NORTH:	804814.55
ELEVATION: SURFACE:	113.0	TOP OF PVC CASING:	115.99

Rig: Geoprobe Track Rig 6610 DT								
	MC Sampler	**Casing**	**Augers**	**Core Barrel**	**Date**	**Progress (Ft.)**	**Weather**	**Depth to Water (Ft.)**
Size (ID)	1-5/8"	--	3 1/4"	--	3/25/2010	0.0 - 16.0	sunny, mid+ 80s	
Length	4'	--	5'	--				
Type	Acetate	--	HSA	--				
Hammer Wt.	--	--	--	--				
Fall	--	--	--	--				

Remarks: PID background (BKG) - 0.0.

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	2"	~+2.8	3.0
Schedule 40 PVC Screen	2"	3.0	13.0

Depth (Ft.)		Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab ID	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. Datum)
1 2 3 4	4.0	D-1	3.6 90%		67SB02-00 +MS/MSD 67SB02-01 67SB02-02	BKG	TOPSOIL (organics) 0.2 SILT and FINE SAND, some clay, coarse sand and gravel; brown and gray (gravel); roots; dry to damp; non plastic; med stiff (fill)	Bentonite 0 to 2' 2" PVC Riser Sand 2 to 13' 2" PVC Screen 3 to 13'	112.8
5 6 7 8	8.0	D-2	1.8 45%			BKG	low recovery, same as above with gravel near bottom of liner (fill) 8.0		105.0
9 10		D-3	3.8 95%			BKG	CLAY, little silt; orange and brown w/ some black mottling; damp to moist; med plasticity; med stiff 9.5 same as above but grades to olive; moist to wet; soft		103.5

DRILLING CO.:	GeoEnviroTech, Inc.	BAKER REP.:	Robert Roselius
DRILLER:	William Rodrigez	BORING NO.:	67SB02 SHEET 1 OF 2

Baker

Michael Baker Jr., Inc.

TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: Naval Activity Puerto Rico SWMU 67

SO NO.: 119197, 6.59.3 BORING NO.: 67SB02

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

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. Datum)
11	D-3	3.8 95%			BKG	*Continued from Sheet 1*	Sand 1 to 13'; 2" PVC Screen 3 to 13'	
12 12.0								
13						13		100.0
14	D-4	3.8 95%			BKG			
15						SILT, some fine sand, little clan; orange and gray; moist; non plastic; med dense 15.2		97.8
16 16.0								97.0
17						End of Boring at 16.0'		
18								
19								
20								
21								
22								
23								
24								
25								
26								
27								
28								
29								
30								

DRILLING CO.: GeoEnviroTech, Inc. BAKER REP.: Robert Roselius

DRILLER: William Rodrigez BORING NO.: 67SB02 SHEET 2 OF 2

Baker

Michael Baker Jr., Inc.

TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT:	Naval Activity Puerto Rico SWMU 67		
PROJ. NO.:	119197, 6.5	BORING NO.:	67SB03
COORDINATES:	EAST: 804814.5159	NORTH:	933120.087
ELEVATION:	SURFACE: 114.8	TOP OF PVC CASING:	117.73

Rig:	Geoprobe 6610DT				Date	Progress (Ft.)	Weather	Depth to Water (Ft.)
	MC Sampler	Casing	Augers	Core Barrel				
Size (ID)	1-5/8"	--	3 1/4"	--	3/26/2010	0.0 - 16.0	Sunny, mid+ 80s	
Length	4"	--	5'	--				
Type	Acetate	--	HSA	--				
Hammer Wt.	--	--	--	--				
Fall	--	--	--	--				

Remarks: PID background (BKG) - 0.0.

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	2"	~+2.5	5.0
Schedule 40 PVC Screen	2"	5.0	15.0

Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab ID	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. Datum)
1, 2, 3, 4 (4.0)	D-1	3.8 95%		67SB03-00 +MS/MSD; 67SB03-01	BKG	TOPSOIL (organics) 0.2; CLAY to GRAVEL; brown and light gray (gravel); damp;non plastic; loose (fill)	cemente grout to surface; Bentonite 1 to 3'; 2" PVC Riser	114.6
5, 6, 7, 8 (8.0)	D-2	3.6 90%			BKG	0.1' lift of gravel at 5.3'; 0.1' lift of gravel at 6.9' 7.0; CLAY, little silt; orange with rust and black mottling; damp; med plasticity; med stiff (moist and soft to med stiff at 8.0')	Sand 3 to 15'; 2" PVC Screen 5 to 15'	107.8
9, 10	D-3	3.5 88%		67SB03-04	BKG	SILT and CLAY, some fine sand; yellow orange and olive w/ whitish and black mottling; (next pg) 10.3		104.5

DRILLING CO.:	GeoEnviroTech, Inc.	BAKER REP.:	Robert Roselius
DRILLER:	William Rodrigez	BORING NO.:	67SB03 SHEET 1 OF 2

Baker

Michael Baker Jr., Inc.

TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: Naval Activity Puerto Rico SWMU 59

PROJ. NO.: 119197, 6.5 BORING NO.: 67SB03

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

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. Datum)
11		D-3	3.5 88%			BKG	Continued from Sheet 1 moist; slight plasticity; soft	Sand 3 to 15'	
12	12.0								
13		D-4	3.7 93%			BKG	same as above but yellow, tan and whitish w/ dark olive mottling	2" PVC Screen 5 to 15'	
14									
15							15		99.8
16	16.0								98.8
17							End of Boring at 16.0'		
18									
19									
20									
21									
22									
23									
24									
25									
26									
27									
28									
29									
30									

DRILLING CO.: GeoEnviroTech, Inc. BAKER REP.: Robert Roselius

DRILLER: William Rodrigez BORING NO.: 67SB03 SHEET 2 OF 2

Baker

Michael Baker Jr., Inc.

TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT:	Naval Activity Puerto Rico SWMU 67		
PROJ. NO.:	119197, 6.5	BORING NO.:	67SB04
COORDINATES:	EAST: 933181.4189	NORTH:	804764.9663
ELEVATION:	SURFACE: 116.4	TOP OF PVC CASING:	119.38

Rig:	Geoprobe 6610DT				Date	Progress (Ft.)	Weather	Depth to Water (Ft.)
	MC Sampler	Casing	Augers	Core Barrel				
Size (ID)	1-5/8"	--	3 1/4"	--	3/25/2010	0.0 - 16.0	sunny, mid+ 80s	
Length	4'	--	5'	--				
Type	Acetate	--	HSA	--				
Hammer Wt.	--	--	--	--				
Fall	--	--	--	--				

Remarks: PID background (BKG) - 0.0.

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	2"	~+2.5	6.0
Schedule 40 PVC Screen	2"	6.0	16.0

Depth (Ft.)		Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab ID	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. Datum)
1					67SB04-00		TOPSOIL (organics) 0.3	cemente grout to surface	116.1
2		D-1	3.3 83%		67SB04-01 +MS/MSD	BKG	SILT to FINE GRAVEL, some clay; little shell fragments; brown and gray; damp; non plastic; loose (fill)		
3								Bentonite 2 to 4'	
4	4.0						3.4 CLAY, little silt and sand (fill)		113.0
5								2" PVC Riser	
6		D-2	3.8 95%		67SB04-03	BKG	5.9 CLAY, little silt; dark olive, dark gray, gray; damp; slight plasticity, med hard color grades to orange and gray at		110.5
7								Sand 4 to 16'	
8	8.0						7' (varigated) 8.0		108.4
9		D-3	3.4 85%			BKG	SILT and CLAY; dark olive, moist to wet; slight plasticity, soft	2" PVC Screen 6 to 16'	
10									

DRILLING CO.:	GeoEnviroTech, Inc.	BAKER REP.:	Robert Roselius	
DRILLER:	William Rodrigez	BORING NO.:	67SB04	SHEET 1 OF 2

Baker

Michael Baker Jr., Inc.

TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: Naval Activity Puerto Rico SWMU 67

PROJ. NO.: 119197, 6.5 BORING NO.: 67SB04

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

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. Datum)
11		D-3	3.4 85%			BKG	Continued from Sheet 1		
							11.9	Sand 4 to 16'	104.5
12	12.0						SILT, some fine sand and clay; orange and gray; moist; non plastic; loose to med hard		
13						BKG			
14		D-4	3.6 90%				color varies from orange to light gray and olive with little black mottling, also zones of light gray clay (12 - 16')	2" PVC Screen 6 to 16'	
15									
16	16.0								100.4
							End of Boring at 16.0'		
17									
18									
19									
20									
21									
22									
23									
24									
25									
26									
27									
28									
29									
30									

DRILLING CO.: GeoEnviroTech, Inc. BAKER REP.: Robert Roselius

DRILLER: William Rodrigez BORING NO.: 67SB04 SHEET 2 OF 2

Baker

Michael Baker Jr., Inc.

TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT:	Naval Activity Puerto Rico SWMU 67		
PROJ. NO.:	119197, 6.5	BORING NO.:	67SB05
COORDINATES:	EAST: 933318.9580	NORTH:	804757.5589
ELEVATION:	SURFACE: 114.0	TOP OF PVC CASING:	117.04

Rig:	Geoprobe 6610DT				Date	Progress (Ft.)	Weather	Depth to Water (Ft.)
	MC Sampler	Casing	Augers	Core Barrel				
Size (ID)	1-5/8"	--	3 1/4"	--	3/24/2010	0.0 - 16.0	sunny, mid+ 80s	
Length	4'	--	5'	--				
Type	Acetate	--	HSA	--				
Hammer Wt.	--	--	--	--				
Fall	--	--	--	--				

Remarks: PID background (BKG) - 0.0.

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	2"	~+2.5	6.0
Schedule 40 PVC Screen	2"	6.0	16.0

Depth (Ft.)		Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab ID	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. Datum)
1					67SB05-00		TOPSOIL (organics) 0.3	cement grout to surface	113.7
2		D-1	3.1 78%		67SB05-01	BKG	SILT to FINE GRAVEL, some clay; brown and light gray (gravel); dry to damp; non plastic; loose (fill) 1.5		112.5
3							BEACH SAND, shells, and coral; pinkish white (fill) 2.0	Bentonite 2 to 4'	112.0
4	4.0						CLAY, little silt; maroon w/ light gray, olive, tan, and yellow varigated w/ little black mottling; danp; slight plasticity; very stiff		
5								2" PVC Riser	
6		D-2	3.6 90%			BKG			
7								Sand 4 to 16'	
8	8.0						Quartz vein 7.4 - 7.5		
9		D-3	3.1 78%			BKG	same as above but increase in grain size (little silt, trace fine sand)	2" PVC Screen 6 to 16'	
10					67SB05-05		color grades olive & lt.ght gray 10.5 -11.4'		

DRILLING CO.:	GeoEnviroTech, Inc.	BAKER REP.:	Robert Roselius
DRILLER:	William Rodrigez	BORING NO.:	67SB05 SHEET 1 OF 2

Baker

Michael Baker Jr., Inc.

TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: Naval Activity Puerto Rico SWMU 67

PROJ. NO.: 119197, 6.5 BORING NO.: 67SB05

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

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. Datum)
11		D-3	3.1 78%			BKG	Continued from Sheet 1 color returns to similar as above 10.5'	Sand 4 to 16'	
12	12.0								
13						BKG			
14		D-4	2.7 68%					2" PVC Screen 6 to 16'	
15							SILT, some fine sand, little clay; light orange and light gray; damp to moist; non plastic, loose		
16	16.0								98.0
17							End of Boring at 16.0'		
18									
19									
20									
21									
22									
23									
24									
25									
26									
27									
28									
29									
30									

DRILLING CO.: GeoEnviroTech, Inc. BAKER REP.: Robert Roselius

DRILLER: William Rodrigez BORING NO.: 67SB05 SHEET 2 OF 2

Baker

Michael Baker Jr., Inc.

TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT:	Naval Activity Puerto Rico SWMU 67		
PROJ. NO.:	119197, 6.5	BORING NO.:	67SB06
COORDINATES:	EAST: 933290.2007	NORTH:	804697.3779
ELEVATION:	SURFACE: 115.7	TOP OF PVC CASING:	118.45

Rig:	Geoprobe 6610DT				Date	Progress (Ft.)	Weather	Depth to Water (Ft.)
	MC Sampler	Casing	Augers	Core Barrel				
Size (ID)	1-5/8"	--	3 1/4"	--	3/23/2010	0.0 - 18.0	Sunny, mid+ 80s	
Length	4'	--	5'	--				
Type	Acetate	--	HSA	--				
Hammer Wt.	--	--	--	--				
Fall	--	--	--	--				

Remarks: PID background (BKG) - 0.0.

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	2"	~+2.5	8.0
Schedule 40 PVC Screen	2"	8.0	18.0

Depth (Ft.)		Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab ID	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. Datum)
1					67SB06-00		TOPSOIL (organics) 0.3	cement grout to surface	115.4
2		D-1	3.1 78%		67SB06-01	BKG	CLAY to FINE GRAVEL; brown and light gray; dry to damp; non plastic; loose (beach sand 1.3 - 1.6') (fill) 1.6		114.1
3							CLAY; orange brown, maroon, and light gray (marled) w/ little black mottling; damp; med plasticity; med stiff		
4	4.0								
5								Bentonite 3.5 to 5.5'	
6		D-2	4.0 100%			BKG	5.8 CLAY, little silt; dark gray to black; damp, med plasticity; med stiff	2" PVC Riser	109.9
7							6.8		108.9
8	8.0						same as 1.6 -5.8'	Sand 5.5 to 18'	
9		D-3	3.6 90%			BKG	9.4 CLAY, little silt; olive and light gray; damp; slight to med plasticity; med hard (weathered BR/saprolite)	2" PVC Screen 8 to 18'	106.3
10					67SB06-05				

DRILLING CO.:	GeoEnviroTech, Inc.	BAKER REP.:	Robert Roselius
DRILLER:	William Rodrigez	BORING NO.:	67SB06 SHEET 1 OF 2

Baker

Michael Baker Jr., Inc.

TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: Naval Activity Puerto Rico SWMU 67

PROJ. NO.: 119197, 6.5 BORING NO.: 67SB06

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

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. Datum)
11		D-3	3.6 90%			BKG	Continued from Sheet 1	Sand 5.5 to 18'	
12	12.0								
13									
14		D-4	3.6 90%			BKG		2" PVC Screen 8 to 18'	
15									
16	15.0								
17							liner stuck in sampling reducing recovery		
18		D-5	2.3 58%			BKG	18		97.7
19								Soil	
20	20.0								95.7
21							End of Boring at 18.0'		
22									
23									
24									
25									
26									
27									
28									
29									
30									

DRILLING CO.: GeoEnviroTech, Inc. BAKER REP.: Robert Roselius

DRILLER: William Rodrigez BORING NO.: 67SB06 SHEET 2 OF 2

Baker

Michael Baker Jr., Inc.

TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT:	Naval Activity Puerto Rico SWMU 67		
PROJ. NO.:	119197, 6.5	BORING NO.:	67SB07
COORDINATES:	EAST: 933236.6677	NORTH:	804608.8535
ELEVATION:	SURFACE: 118.2	TOP OF PVC CASING:	121.04

Rig:	Geoprobe 6610DT				Date	Progress (Ft.)	Weather	Depth to Water (Ft.)
	MC Sampler	Casing	Augers	Core Barrel				
Size (ID)	1-5/8"	--	3 1/4"	--	3/23/2010	0.0 - 20.0	Sunny, mid+ 80s	
Length	4'	--	5'	--				
Type	Acetate	--	HSA	--				
Hammer Wt.	--	--	--	--				
Fall	--	--	--	--				

Remarks: PID background (BKG) - 0.0.

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	2"	~+2.5	10.0
Schedule 40 PVC Screen	2"	10.0	20.0

Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab ID	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. Datum)
1, 2, 3, 4	D-1 (4.0)	3.2 80%		67SB07-00, 67SB07-01	BKG	TOPSOIL (organics) 0.3; CLAY to FINE SAND, some course sand to coarse gravel (1.7 - 2.0'); dry to damp; non plasticity; loose (fill) 3.5	cement grout to surface	117.9; 114.7
5, 6, 7, 8	D-2 (8.0)	4.0 100%			BKG	FINE SAND, some coarse sand; pinkish white; dry to damp; non plastic; loose (fill) 4.0; CLAY w/ silt to fine sand; brown and dark gray; damp; slight plasticity; stiff 4.4; CLAY, some silt; orange brown w/ some light gray, rust and black mottling; med plasticity, med still	2" PVC Riser; Bentonite 5 to 7.5'	114.2; 113.8
9, 10	D-3	3.5 88%		67SB07-05	BKG	CLAY, little silt; olive and light gray; damp; med plasticity; med hard (weathered BR/saprolite) 10.4	Sand 7.5 to 20'; 2" PVC Screen 10 to 20'	107.8

DRILLING CO.:	GeoEnviroTech, Inc.	BAKER REP.:	Robert Roselius
DRILLER:	William Rodrigez	BORING NO.:	67SB07 SHEET 1 OF 2

Baker

Michael Baker Jr., Inc.

TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: Naval Activity Puerto Rico SWMU 67

PROJ. NO.: 119197, 6.5 BORING NO.: 67SB07

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

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. Datum)
11		D-3	3.5 88%			BKG	Continued from Sheet 1		
12	12.0								
13							same as above but orange brown and olive		
14		D-4	3.1 78%			BKG		Sand 7.5 to 20'	
15									
16	16.0								
17									
18		D-5	3.4 85%			BKG		2" PVC Screen 10 to 20'	
19									
20	20.0								98.2
21							End of Boring at 20.0'		
22									
23									
24									
25									
26									
27									
28									
29									
30									

DRILLING CO.: GeoEnviroTech, Inc. BAKER REP.: Robert Roselius

DRILLER: William Rodrigez BORING NO.: 67SB07 SHEET 2 OF 2

Baker

Michael Baker Jr., Inc.

TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT:	Naval Activity Puerto Rico SWMU 67		
PROJ. NO.:	119197, 6.5	BORING NO.:	67SB08
COORDINATES:	EAST: 933005.9762	NORTH:	804707.0271
ELEVATION:	SURFACE: 119.3	TOP OF PVC CASING:	122.13

Rig:	Geoprobe 6610DT				Date	Progress (Ft.)	Weather	Depth to Water (Ft.)
	MC Sampler	Casing	Augers	Core Barrel				
Size (ID)	1-5/8"	--	3 1/4"	--	3/22/2010	0.0 - 20.0	Sunny, mid+ 80s	
Length	4'	--	5'	--				
Type	Acetate	--	HSA	--				
Hammer Wt.	--	--	--	--				
Fall	--	--	--	--				

Remarks: PID background (BKG) - 0.0.

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	2"	~+2.5	10.0
Schedule 40 PVC Screen	2"	10.0	20.0

Depth (Ft.)		Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab ID	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. Datum)
1					67SB08-00 + duplicate		TOPSOIL (organics) 0.1		119.2
2		D-1	3.5 88%		67SB08-01	BKG	CLAY, little silt; maroon w/ little light grey, yellow and brown; dry to damp; slight plasticity; med hard (FILL) 1.3	cement grout to surface	118.0
3							CLAY, some fine sand, trace coarse sand fine gravel; brown; slight plasticity; med stiff (FILL) 4.0		
4	4.0							2" PVC Riser	115.3
5							SILT and FINE SAND; brown; slight, plasticity; med stiff (FILL)		
6		D-2	3.9 98%			BKG		Bentonite 5 to 7.5'	
7									
8	8.0								
9							9.0	Sand 7.5 to 20'	110.3
10		D-3	3.4 85%		67SB08-05	BKG	CLAY, some silt, little fine sand; dk olive, blk & white; damp; slight plasticity, med stiff (saprolite)	2" PVC Screen 10 to 20'	

DRILLING CO.:	GeoEnviroTech, Inc.	BAKER REP.:	Robert Roselius
DRILLER:	William Rodrigez	BORING NO.:	67SB08

Baker

Michael Baker Jr., Inc.

TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: Naval Activity Puerto Rico SWMU 67

PROJ. NO.: 119197, 6.5 BORING NO.: 67SB08

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

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. Datum)
11		D-3	3.4 85%			BKG	Continued from Sheet 1		
12	12.0								
13							same as above w/ iron/rust staining 12 - 15.5'; damp to moist		
14		D-4	3.5 88%			BKG		Sand 7.5 to 20'	
15									
16	16.0								
17							same as above w/ less iron/rust staining (olive, blk & white); moist (liner is wet)		
18		D-5	3.1 78%			BKG		2" PVC Screen 10 to 20'	
19									
20	20.0						iron/rust staining 19.0 - 19.1'		99.3
21							End of Boring at 20.0'		
22									
23									
24									
25									
26									
27									
28									
29									
30									

DRILLING CO.: GeoEnviroTech, Inc. BAKER REP.: Robert Roselius

DRILLER: William Rodrigez BORING NO.: 67SB08 SHEET 2 OF 2

GROUNDWATER SAMPLING FORMS

WELL DETAIL AND SAMPLING LOG

Well ID #: 67GW01 DATE: 3-27-10

PROJECT: 67 Phase I RFI WEATHER: Sunny + Warm 88° F

WELL DATA

(CONDITIONS): (G = Good, F = Fair, P = Poor)

Pad G Well Cap G PVC Locking Cap/Plug G

Cap Lock G Cover Bolts N/A Water over PVC? Y / N

Casing (outer) G Casing (inner) 2" SWL Reference Mark ____ Reference Mark Location? TOC N

Casing Dia.: 4" Sample Pro-Top Casing Material: PVC Flushmount / Stickup

Comments:

(OTHER): Static Water Level (ft.): 9.01 Time: 1332 (Pre-Pump Installation)

Depth to Product (ft.): —

Water Level (ft.): 8.03 Time: 1341 (Post-Pump Installation, Pre-Purge)

Total Well Depth (ft.) - Post Sampling: 12.44 Time: 1553

PID Reading (PPM) - Unopened: Background Opened: Background

PURGE DATA

Pump Type: Bladder Pump

From Boring Log: Total Depth (ft.): 16.16 Screened Interval (ft.): 6.16 - 16.16 Top of Casing

Pump Intake Set @ (ft.): 13.0 Controller Settings / Pressure: CPU 5

Comments:

SAMPLE DATA

Sample ID #: 67GW01 Dup.: Y / N - (ID#:)

Sample Time: 1535 MS / MSD: Y / N Field Filtered: Y / N

Sampled By: A. Garvey Signature:

Sample Description:

SAMPLE CONTAINERS

Bottle Type	Qty.	Preservative	Analysis
40 ml VOA Vials	3	HCL	App. IX VOCs
40 ml VOA Vials	2	HCL	App IX VOCs
1 L Amber	2	—	App IX SVOC.
1 L Amber	2	—	TPH DRO
1000 ml (HDPE)	1	HNO_3	App IX. Metals
1000 ml (HDPE)	1	HNO_3	App IX. Metals (Dissolved)

GENERAL COMMENTS

Final SWL (Pump in) = 12.10

Final SWL (Pump out) = 12.44

12.10

LOW FLOW PURGE DATA SHEET

WELL ID: 67GW01
DATE: 3-27-10
PROJECT: 67 Phase I RFI

SAMPLER (s): A. Geiley
SAMPLE ID: 67GW01

TIME [3-5 min.]	DEPTH TO WATER (ft) [<0.3 ft.]	VOL. (ml)	PURGE RATE (ml/min) [250-500 ml/min]	TEMP. (°C)	SP. COND. (mS/cm) [+/- 3%]	D.O. (mg/l) [+/- 10%]	pH (S.U.) [+/- 0.1]	ORP (mV) [+/- 10]	TURBIDITY (NTU) [+/- 10%]	COMMENTS (Sample descrip.: color, clarity, odor - issues and adjustments, etc.)
1341	8.03	- (Water Level : Post-Pump Installation, Pre-Start)								
1345	- (Start of Purging)									
1352	9.15	300	60	27.69	4.939	2.36	6.98	-82.1	1000	Turbid - No odor
1357	9.34	200	40	27.84	4.940	1.98	6.96	-87.5	1000	Turbid - No odor
1402	9.40	350	70	27.99	4.949	2.34	6.96	-89.1	858	" "
1407	9.51	350	70	27.83	4.956	1.96	6.96	-90.3	569	" "
1412	9.60	400	80	27.78	4.949	1.52	6.96	-90.0	451	" "
1417	9.65	400	80	27.61	4.954	1.27	6.96	-85.9	253	Clearing slightly - No odor
1422	9.75	380	76	27.52	4.959	1.28	6.95	-78.4	166	Clearing - No odor
1427	9.82	380	76	27.42	4.965	1.30	6.95	-69.7	112	" "
1432	9.91	400	80	27.31	4.970	1.22	6.95	-64.1	90.9	" "
1437	9.95	350	70	27.38	4.970	1.05	6.95	-58.2	81.0	" "
1442	9.97	200	40	27.48	4.972	1.00	6.96	-54.5	71.8	Pump Adjust " "
1447	10.0	200	40	27.59	4.975	0.95	6.96	-50.5	70.6	Clearing - No odor
1452	10.04	380	76	27.45	4.974	0.89	6.96	-60.8	79.1	" "
1457	10.12	380	76	27.32	4.967	0.87	6.96	-61.3	72.7	" "
1502	10.14	350	70	27.40	4.970	0.76	6.96	-53.2	60.7	" "
1507	10.17	250	50	27.45	4.974	0.71	6.97	-47.9	56.4	" "
1512	10.22	200	40	27.36	4.978	0.73	6.98	-51.8	41.6	" "
1517	10.25	250	50	27.25	4.979	0.72	6.96	-48.2	39.2	" "
1522	10.35	250	50	27.27	4.976	0.72	6.96	-47.8	34.0	" "
1527	10.40	250	50	27.19	4.978	0.71	6.96	-46.7	38.9	Clearing
	- Sample Time (Note: Flow rate to be btwn. 100 - 250 ml/min.)									Sampler Signature:

Note: Stability achieved when 3 consecutive readings fall within specific parameter ranges shown in the above header.

WELL DETAIL AND SAMPLING LOG

Well ID #: 67GW02 DATE: 3-28-10

PROJECT: 67 Phase I RFI WEATHER: Sunny 81°F

WELL DATA

(CONDITIONS): (G = Good, F = Fair, P = Poor)

Pad G Well Cap G PVC Locking Cap/Plug G

Cap Lock G Cover Bolts N/A Water over PVC? Y / (N)

Casing (outer) G Casing (inner) 2" SWL Reference Mark ____ Reference Mark Location? TOC N

Casing Dia.: 4" Sample Pro-Top Casing Material: PVC Flushmount / (Stickup)

Comments:

(OTHER): Static Water Level (ft.): 12.09 Time: 0920 (Pre-Pump Installation)

Depth to Product (ft.): —

Water Level (ft.): 11.83 Time: 0930 (Post-Pump Installation, Pre-Purge)

Total Well Depth (ft.) - Post Sampling: 16.35 Time: 1010

PID Reading (PPM) - Unopened: Background Opened: Background

PURGE DATA

Pump Type: Bladder Pump

From Boring Log: Total Depth (ft.): Screened Interval (ft.): 6.21 - 16.21 (TOC) (3 - 13 bgs)

Pump Intake Set @ (ft.): 15.0 (From TOC) Controller Settings / Pressure: 5

Comments:

SAMPLE DATA

Sample ID #: 67GW02 Dup.: Y / (N) - (ID#:)

Sample Time: 0940 MS / MSD: Y / (N) Field Filtered: Y / (N)

Sampled By: A. Gainey Signature:

Sample Description: Very Low Yield - Sample obtained at 0940.

SAMPLE CONTAINERS

Bottle Type	Qty.	Preservative	Analysis
3 VOA Vials (40ml)	3	HCL	App. IX VOC
VOA Vials (40ml)	2	HCL	TPH GRO
1L Amber	2	—	App. IX SVOC
1L Amber	2	—	TPH DRO
1000 ml (HDPE)	1	HNO_3	App. IX Metals
1000 ml (HDPE)	1	HNO_3	App. IX Metals (Dissolved)

GENERAL COMMENTS

Final SWL = 15.27 (Pump out)

LOW FLOW PURGE DATA SHEET

WELL ID: 67GW02
DATE: 3-28-10
PROJECT: PHASE I RFI
67

SAMPLER (s): A. Gaiey
SAMPLE ID: 67GW02

TIME [3-5 min.]	DEPTH TO WATER (ft) [<0.3 ft.]	VOL. (ml)	PURGE RATE (ml/min) [250-500 ml/min]	TEMP. (°C)	SP. COND. (mS/cm) [+/- 3%]	D.O. (mg/l) [+/- 10%]	pH (S.U.) [+/- 0.1]	ORP (mV) [+/- 10]	TURBIDITY (NTU) [+/- 10%]	COMMENTS (Sample descrip.: color, clarity, odor - issues and adjustments, etc.)
0930	11.83	- (Water Level : Post-Pump Installation, Pre-Start)								
	- (Start of Purging)									
0940		Very low Yield - Sample obtained								
	- Sample Time (Note: Flow rate to be btwn. 100 - 250 ml/min.)									Sampler Signature:

Note: Stability achieved when 3 consecutive readings fall within specific parameter ranges shown in the above header.

WELL DETAIL AND SAMPLING LOG

Well ID #: 67GW03 DATE: 3/30/10

PROJECT: SWMU 67 WEATHER: P. Cloudy MID 80s

WELL DATA

(CONDITIONS): (G = Good, F = Fair, P = Poor)

Pad G1 Well Cap G1 PVC Locking Cap/Plug G1

Cap Lock G1 Cover Bolts N/A Water over PVC? Y / (N)

Casing (outer) G1 Casing (inner) 2" SWL Reference Mark ____ Reference Mark Location? TOC N

Casing Dia.: 4" SQUARE PRO-TOP Casing Material: PVC Flushmount / (Stickup)

Comments: 18.15' TD TOC

(OTHER): Static Water Level (ft.): 11.33' TOC Time: 0900 (Pre-Pump Installation)

Depth to Product (ft.): NA

Water Level (ft.): 11.20' TOC Time: 0905 (Post-Pump Installation, Pre-Purge)

Total Well Depth (ft.) - Post Sampling: 18.15' TOC Time: 1045

PID Reading (PPM) - Unopened: BKG Opened: BKG (BKG 0.0 ppm)

PURGE DATA

Pump Type: BLADDER

From Boring Log: Total Depth (ft.): 15' bgs Screened Interval (ft.): 5-15' bgs

Pump Intake Set @ (ft.): 12' bgs / 15±' TOC Controller Settings / Pressure: 10±

Comments:

SAMPLE DATA

Sample ID #: 67GW03 Dup.: Y / (N) (ID#:)

Sample Time: 1030 MS / MSD: Y / (N) Field Filtered: (Y) / N

Sampled By: ROBERT ROSELINS Signature: [signature]

Sample Description: CLEAR

SAMPLE CONTAINERS

Bottle Type	Qty.	Preservative	Analysis
40 ml VOA VIALS	3	HCL	APP IX VOCs
"	2	"	TPH GRO
1 L AMBER	2	—	SVOCS
"	2	—	TPH DRO
1 L (HDPE)	1	HNO_3	METALS (TOTAL)
"	1	"	METALS (DISSOLVED)

GENERAL COMMENTS

SWL 11.95' POST PUMP.

LOW FLOW PURGE DATA SHEET

WELL ID: 67GW03
DATE: 3/30/10
PROJECT: SWMU 67

SAMPLER (s): Robert Roselius
SAMPLE ID: 67GW03

TIME [3-5 min.]	DEPTH TO WATER (ft) [<0.3 ft.]	VOL. (ml)	PURGE RATE (ml/min) [250-500 ml/min]	TEMP. (°C)	SP. COND. (mS/cm) [+/- 3%]	D.O. (mg/l) [+/- 10%]	pH (S.U.) [+/- 0.1]	ORP (mV) [+/- 10]	TURBIDITY (NTU) [+/- 10%]	COMMENTS (Sample descrip.: color, clarity, odor - issues and adjustments, etc.)
0905	11.20	- (Water Level : Post-Pump Installation, Pre-Start)								
0917	- (Start of Purging)									ALLOW FLOW CELL TO FILL, ADJUST PUMP
0925	11.60	1300	162.5	28.16	2.296	2.15	7.03	84.1	264	
0930	11.60	600	120	28.12	2.313	3.17	7.02	76.3	193	
0935	11.62	800	160	28.14	2.321	2.27	7.01	68.0	107	ADJUST PUMP
0940	11.60	600	120	28.16	2.329	2.03	7.01	63.2	80.8	
0945	11.60	575	115	28.19	2.334	1.83	7.01	62.3	43.0	
0950	11.59	550	110	28.26	2.338	1.63	7.02	61.9	30.8	
0955	11.61	625	125	28.24	2.340	1.56	7.02	59.5	25.3	
1000	11.61	600	120	28.25	2.337	1.60	7.02	56.7	21.1	
1005	11.61	600	120	28.30	2.333	1.51	7.03	55.4	16.4	
1010	11.60	575	115	28.33	2.331	1.47	7.03	54.6	13.2	
1015	11.60	575	115	28.37	2.332	1.39	7.03	54.1	10.9	
1020	11.60	575	115	28.40	2.332	1.37	7.03	53.4	11.1	
	- **Sample Time** (Note: Flow rate to be btwn. 100 - 250 ml/min.)									Sampler Signature:

Note: Stability achieved when 3 consecutive readings fall within specific parameter ranges shown in the above header.

WELL DETAIL AND SAMPLING LOG

Well ID #: 67GW04 DATE: 3-28-10

PROJECT: 67 Phase I RFI WEATHER: Sunny + Hot 89° F

WELL DATA

(CONDITIONS): (G = Good, F = Fair, P = Poor)

Pad G Well Cap G PVC Locking Cap/Plug G

Cap Lock G Cover Bolts N/A Water over PVC? Y / N

Casing (outer) G Casing (inner) 2" SWL Reference Mark Reference Mark Location? TOC N

Casing Dia.: 4" Square Pro-Tect Casing Material: PVC Flushmount / Stickup

Comments:

(OTHER): Static Water Level (ft.): 12.89 Time: 1220 (Pre-Pump Installation)

Depth to Product (ft.): —

Water Level (ft.): 12.76 Time: 1225 (Post-Pump Installation, Pre-Purge)

Total Well Depth (ft.) - Post Sampling: 18.77 Time: 1343

PID Reading (PPM) - Unopened: Background Opened: Background

PURGE DATA

Pump Type: Bladder Pump

From Boring Log: Total Depth (ft.): 18.50 (TOC) Screened Interval (ft.): 9.50 - 18.50 (TOC)

Pump Intake Set @ (ft.): 16.50 (TOC) Controller Settings / Pressure: 5

Comments:

SAMPLE DATA

Sample ID #: 67GW04 Dup.: Y / N (ID#:)

Sample Time: 1320 MS / MSD: Y / N Field Filtered: Y / N yes

Sampled By: A. Gentry Signature:

Sample Description:

SAMPLE CONTAINERS

Bottle Type	Qty.	Preservative	Analysis
40 mL VOA Vials	3	HCL	App IX VOC
40 mL VOA Vials	2	HCL	TPH GRO
1L Amber	2	—	SVOC
1L Amber	2	—	TPH DRO
1000 mL (HDPE)	1	HNO_3	METALS
1000 mL (HDPE)	1	HNO_3	METALS (Dissolved)

GENERAL COMMENTS

Final SWL = 15.81 (pump out)

LOW FLOW PURGE DATA SHEET

WELL ID: 67GW04
DATE: 3-25-10
PROJECT: 67 Phase I RFI

SAMPLER (s): A. Gaboey
SAMPLE ID: 67GW04

TIME [3-5 min.]	DEPTH TO WATER (ft) [<0.3 ft.]	VOL. (ml)	PURGE RATE (ml/min) [250-500 ml/min]	TEMP. (°C)	SP. COND. (mS/cm) [+/- 3%]	D.O. (mg/l) [+/- 10%]	pH (S.U.) [+/- 0.1]	ORP (mV) [+/- 10]	TURBIDITY (NTU) [+/- 10%]	COMMENTS (Sample descrip.: color, clarity, odor - issues and adjustments, etc.)
1225	12.76	- (Water Level : Post-Pump Installation, Pre-Start)								
1230	- (Start of Purging)									
1235	13.10	1000	200	30.98	4.702	3.14	6.99	15.6	32.6	Clear. No odor. [Pump Adjust]
1240	13.18	350	70	30.45	4.711	2.37	6.96	18.9	16.2	" "
1245	13.24	250	50	30.78	4.709	1.65	6.97	31.9	10.9	" "
1250	13.29	200	40	31.10	4.714	1.52	6.95	35.4	8.85	" "
1255	13.43	300	60	30.93	4.726	1.14	6.94	42.2	7.80	" "
1300	13.53	300	60	30.94	4.720	0.92	6.93	41.8	6.91	Clear. No odor
1305	13.57	300	60	30.67	4.721	0.97	6.93	41.1	5.94	Clear. No odor
	- **Sample Time** (Note: Flow rate to be btwn. 100 - 250 ml/min.)									Sampler Signature:

Note: Stability achieved when 3 consecutive readings fall within specific parameter ranges shown in the above header.

WELL DETAIL AND SAMPLING LOG

Well ID #: 67GW05 DATE: 3-27-10

PROJECT: SWMU 67 Phase I RFI WEATHER: Sunny and warm 81°F

WELL DATA

(CONDITIONS): (G = Good, F = Fair, P = Poor)

Pad: G Well Cap: G PVC Locking Cap/Plug: G

Cap Lock: G Cover Bolts: N/A Water over PVC? Y / (N)

Casing (outer): G Casing (inner): 2" SWL Reference Mark: Reference Mark Location? TOC N

Casing Dia.: 4" Sanoke Pro-Top Casing Material: PVC Flushmount / (Stickup)

Comments:

(OTHER): Static Water Level (ft.): 12.89 Time: 1113 (Pre-Pump Installation)

Depth to Product (ft.): —

Water Level (ft.): 12.70 Time: 1125 (Post-Pump Installation, Pre-Purge)

Total Well Depth (ft.) - Post Sampling: 18.95 Time: 1202

PID Reading (PPM) - Unopened: Background Opened: Background

PURGE DATA

Pump Type: Bladder Pump

From Boring Log: Total Depth (ft.): 18.95 Screened Interval (ft.):

Pump Intake Set @ (ft.): 17.95 Controller Settings / Pressure: Approx. 5.

Comments:

SAMPLE DATA

Sample ID #: 67GW05 Dup.: Y / (N) - (ID#:)

Sample Time: 1130 MS / MSD: Y / (N) Field Filtered: (Y) / N

Sampled By: A. Gainey Signature:

Sample Description: Very low yield well - Sample obtained and No Parameters were Taken. Water Sampled was Clear with No odor.

SAMPLE CONTAINERS

Bottle Type	Qty.	Preservative	Analysis
40 ml VOA	3	HCl	App IX VOC
40 ml VOA	2	HCl	TPH GRO
1L Amber	2	—	App. SVOC
1L Amber	2	—	TPH DRO
1000 ml HDPE	1	HNO_3	Metals
1000 ml HDPE	1	HNO_3	Metals (Dissolved)

GENERAL COMMENTS

Final SWL = 15.47

Final SWL (Pump out) = 15.77

LOW FLOW PURGE DATA SHEET

WELL ID: 67GW05
DATE: 3-27-10
PROJECT: 67 Phase I RFI

SAMPLER (s): A. Gaire
SAMPLE ID: 67GW05

TIME [3-5 min.]	DEPTH TO WATER (ft) [<0.3 ft.]	VOL. (ml)	PURGE RATE (ml/min) [250-500 ml/min]	TEMP. (°C)	SP. COND. (mS/cm) [+/- 3%]	D.O. (mg/l) [+/- 10%]	pH (S.U.) [+/- 0.1]	ORP (mV) [+/- 10]	TURBIDITY (NTU) [+/- 10%]	COMMENTS (Sample descrip.: color, clarity, odor - issues and adjustments, etc.)
1113	12.89	- (Water Level : Post-Pump Installation, Pre-Start)								
	- (Start of Purging)									
1130	Very Low Yield - Sample Taken.									
	- **Sample Time** (Note: Flow rate to be btwn. 100 - 250 ml/min.)									Sampler Signature:

Note: Stability achieved when 3 consecutive readings fall within specific parameter ranges shown in the above header.

WELL DETAIL AND SAMPLING LOG

Well ID #: 67GW06 DATE: 3-27-10

PROJECT: SWMU 67 Phase I RFI WEATHER: Mostly Sunny - upper 70's

WELL DATA

(CONDITIONS): (G = Good, F = Fair, P = Poor)

Pad: G Well Cap: G PVC Locking Cap/Plug: G

Cap Lock: G Cover Bolts: N/A Water over PVC? Y/(N)

Casing (outer): G Casing (inner): 2" SWL Reference Mark: Reference Mark Location? TOC N

Casing Dia.: 4" Square Pro-Top Casing Material: PVC Flushmount / (Stickup)

Comments:

(OTHER): Static Water Level (ft.): 12.69 Time: 0820 (Pre-Pump Installation)

Depth to Product (ft.): —

Water Level (ft.): 12.55 Time: 0830 (Post-Pump Installation, Pre-Purge)

Total Well Depth (ft.) - Post Sampling: 20.91 Time: 1032

PID Reading (PPM) - Unopened: Background Opened: Background

PURGE DATA

Pump Type: Bladder Pump

From Boring Log: Total Depth (ft.): 20.82 Screened Interval (ft.): 8.0 - 18.0 Bgs

Pump Intake Set @ (ft.): ~~15~~ 14.50 Bgs Controller Settings / Pressure: 5

Comments:

SAMPLE DATA

Sample ID #: 67GW06 Dup.: Y/(N) (ID#:)

Sample Time: 0940 MS / MSD: Y/(N) Field Filtered: (Y)/N

Sampled By: A. Gainey Signature:

Sample Description: Formation Water. Clear and No odor.

SAMPLE CONTAINERS

Bottle Type	Qty.	Preservative	Analysis
40 mL VOA Vials	3	HCL	App. IX VOC
40 mL VOA Vials	2	HCL	TPH GRO
1L Amber	2	—	App IX. SVOC
1L Amber	2	—	TPH DRO
1000 mL (HDPE)	1	HNO_3	App. IX Metals
1000 mL (HDPE)	1	HNO_3	App. IX Metals (Dissolved)

GENERAL COMMENTS

water level at 1005 = 14.50

Final SWL (Post Sampling) = 15.25

Final SWL (Pump out) = 15.44

LOW FLOW PURGE DATA SHEET

WELL ID: 67GW06
DATE: 3-27-10
PROJECT: SWMU 67 Phase I RFI

SAMPLER (s): A. Gailey
SAMPLE ID: 67GW06

TIME [3-5 min.]	DEPTH TO WATER (ft) [<0.3 ft.]	VOL. (ml)	PURGE RATE (ml/min) [250-500 ml/min]	TEMP. (°C)	SP. COND. (mS/cm) [+/- 3%]	D.O. (mg/l) [+/- 10%]	pH (S.U.) [+/- 0.1]	ORP (mV) [+/- 10]	TURBIDITY (NTU) [+/- 10%]	COMMENTS (Sample descrip.: color, clarity, odor - issues and adjustments, etc.)
0830	12.55	- (Water Level : Post-Pump Installation, Pre-Start)								
0835	- (Start of Purging)									
0840	12.90	1000	200	27.96	4.449	4.48	6.42	30.6	12.7	Clear - No odor
0845	12.95	150	30	27.80	4.442	3.85	6.53	-13.1	14.3	Clear - No odor.
0850	13.10	300	60	28.01	4.407	2.90	6.73	9.2	12.2	" "
0855	13.20	350	70	28.11	4.391	2.38	6.86	28.4	10.7	" "
0900	13.27	350	70	28.16	4.382	2.07	6.92	31.0	9.70	" "
0905	13.36	300	60	28.29	4.381	2.14	6.97	15.9	9.46	" "
0910	13.46	400	80	28.45	4.389	2.04	6.99	7.0	10.1	" "
0915	13.52	350	70	28.53	4.401	1.96	7.00	8.9	9.09	" "
0920	13.57	300	60	28.57	4.409	1.89	7.01	8.3	8.69	
0925	13.67	350	70	28.57	4.412	1.90	7.01	7.8	9.91	
	- **Sample Time** (Note: Flow rate to be btwn. 100 - 250 ml/min.)									**Sampler Signature:**

Note: Stability achieved when 3 consecutive readings fall within specific parameter ranges shown in the above header.

WELL DETAIL AND SAMPLING LOG

Well ID #: 67GW07 DATE: 3/26/10

PROJECT: NAPR - SWMU 67 WEATHER: Sunny, breezy, ~85°F

WELL DATA

(CONDITIONS): (G = Good, F = Fair, P = Poor)

Pad New Well Well Cap G PVC Locking Cap/Plug G

Cap Lock New Well Cover Bolts N/A Water over PVC? Y / (N)

Casing (outer) G Casing (inner) G SWL Reference Mark G Reference Mark Location? PVC

Casing Dia.: 2" Casing Material: PVC Flushmount / (Stickup)

Comments:

(OTHER): Static Water Level (ft.): 14.72 Time: 1237 (Pre-Pump Installation)

Depth to Product (ft.): —

Water Level (ft.): 14.7 Time: 1245 (Post-Pump Installation, Pre-Purge)

Total Well Depth (ft.) - Post Sampling: 22.75 Time:

PID Reading (PPM) - Unopened: 0 Opened: 0

PURGE DATA

Pump Type: Geotech 1.66SS18 Bladder

From Boring Log: Total Depth (ft.): 22.75 (Field Measured) Screened Interval (ft.):

Pump Intake Set @ (ft.): 20.5 Controller Settings / Pressure: CPM4 10/5, P = 30'

Comments:

SAMPLE DATA

Sample ID #: 67GW07 Dup.: Y / (N) (ID#:)

Sample Time: 1325 MS / MSD: Y / (N) Field Filtered: (Y) N

Sampled By: D. Hupe Signature: [signature]

Sample Description: Clear. No odor

SAMPLE CONTAINERS

Bottle Type	Qty.	Preservative	Analysis
40 ml	3	HCL	VOC's
"	2	"	GRO
1 l Amber	2	None	DRO
" "	2	"	SVOC / PAH
1 l pl	1	HNO3	T. Metals
" "	1	"	Diss. Metals

GENERAL COMMENTS

LOW FLOW PURGE DATA SHEET

WELL ID: 67GW07
DATE: 3/26/10
PROJECT: NAPR - SWMU67

SAMPLER (s): D. Hope
SAMPLE ID: 67GW07

TIME [3-5 min.]	DEPTH TO WATER (ft) [<0.3 ft.]	VOL. (ml)	PURGE RATE (ml/min) [250-500 ml/min]	TEMP. (°C)	SP. COND. (mS/cm) [+/- 3%]	D.O. (mg/l) [+/- 10%]	pH (S.U.) [+/- 0.1]	ORP (mV) [+/- 10]	TURBIDITY (NTU) [+/- 10%]	COMMENTS (Sample descrip.: color, clarity, odor - issues and adjustments, etc.)
1245	14.70	- (Water Level : Post-Pump Installation, Pre-Start)								
1250	- (Start of Purging)									
1255	14.94	1300	260	28.83	3.498	0.83	6.93	89	30	clear, No odor
1300	14.93	2500	240	28.72	3.482	1.17	6.93	85	10.6	
1305	14.95	3650	230	28.68	3.475	0.73	6.93	80	5.6	
1310	14.94	4800	230	28.65	3.476	0.55	6.93	75	5.1	
1315	14.94	5950	230	28.65	3.475	0.53	6.93	73	4.8	
1320	14.95	7200	250	28.66	3.475	0.51	6.92	72	4.7	
1325	- **Sample Time** (Note: Flow rate to be btwn. 100 - 250 ml/min.)									Sampler Signature:

Note: Stability achieved when 3 consecutive readings fall within specific parameter ranges shown in the above header.

WELL DETAIL AND SAMPLING LOG

Well ID #: 67GW08 DATE: 3/26/10

PROJECT: NAPR - SWMU67 WEATHER: Mostly Sunny, breezy, ~85°F

WELL DATA

(CONDITIONS): (G = Good, F = Fair, P = Poor)

Pad G Well Cap G PVC Locking Cap/Plug G

Cap Lock New Well Cover Bolts N/A Water over PVC? Y (N)

Casing (outer) G Casing (inner) G SWL Reference Mark G Reference Mark Location? PVC

Casing Dia.: 2" Casing Material: PVC Flushmount / (Stickup)

Comments:

(OTHER): Static Water Level (ft.): 15.01 Time: 0818 (Pre-Pump Installation)

Depth to Product (ft.): N/A

Water Level (ft.): 15.01 Time: 0829 (Post-Pump Installation, Pre-Purge)

Total Well Depth (ft.) - Post Sampling: 22.25 Time:

PID Reading (PPM) - Unopened: 0 Opened: 0

PURGE DATA

Pump Type: Geotech 1.66SS18 Bladder

From Boring Log: Total Depth (ft.): 22.25 (Field Measured) Screened Interval (ft.):

Pump Intake Set @ (ft.): 20.0 Controller Settings / Pressure: CPM4 10/5

Comments:

SAMPLE DATA

Sample ID #: 67GW08 Dup. (Y) N - (ID#: 67GW08D)

Sample Time: 1000 MS / MSD: (Y) N Field Filtered: (Y) N

Sampled By: D. Hupe Signature: [signature]

Sample Description: clear. No odor

SAMPLE CONTAINERS

Bottle Type	Qty.	Preservative	Analysis
40 ml	3	HCL	VOC's
" "	2	"	GRO
1l Amber	2	None	PRO
" "	2	"	SVOC / PAH
1l 500ml pl	1	HNO3	T. Metals
1l pl.	1	"	Diss. Metals

GENERAL COMMENTS

LOW FLOW PURGE DATA SHEET

WELL ID: 67GW08
DATE: 3/26/10
PROJECT: NAPR-SWMU67

SAMPLER (s): D. Hupe
SAMPLE ID: 67GW08

TIME [3-5 min.]	DEPTH TO WATER (ft) [<0.3 ft.]	VOL. (ml)	PURGE RATE (ml/min) [250-500 ml/min]	TEMP. (°C)	SP. COND. (mS/cm) [+/- 3%]	D.O. (mg/l) [+/- 10%]	pH (S.U.) [+/- 0.1]	ORP (mV) [+/- 10]	TURBIDITY (NTU) [+/- 10%]	COMMENTS (Sample descrip.: color, clarity, odor - issues and adjustments, etc.)
0829	15.01	- (Water Level : Post-Pump Installation, Pre-Start)								
0834	- (Start of Purging)									
0839	15.06	900	180	28.20	3.404	5.49	7.09	-29	over	very Turbid.
0844	15.02	1650	150	28.23	3.399	4.70	7.08	-38	over	
0849	15.02	2400	150	28.10	3.388	2.47	7.07	-63	684	Emptied Flow Cell
0855	15.01	~	—	28.53	3.375	2.53	7.10	-50	363	
0900	15.02	650	130	28.57	3.381	1.17	7.06	-74	191	
0905	15.02	1300	130	28.81	3.375	0.92	7.06	-84	71	
0910	15.02	1950	130	28.52	3.366	0.78	7.05	-90	37	
0915	15.02	2900	190	28.04	3.356	0.64	7.04	-100	27	clear
0920	15.03	3500	120	28.76	3.354	0.56	7.04	-88	19.3	
0925	15.03	4200	140	28.77	3.363	0.52	7.04	-100	15.5	
0930	15.03	5200	200	28.69	3.360	0.43	7.04	-105	12.0	
0935	15.03	5900	140	28.86	3.362	0.42	7.04	-109	10.5	
0940	15.02	6400	100	28.79	3.363	0.43	7.04	-109	10.0	
0945	15.04	7150	150	28.81	3.361	0.38	7.04	-112	8.5	
0950	15.04	7900	150	28.94	3.365	0.38	7.03	-112	8.2	
0955	15.04	8600	140	28.84	3.365	0.38	7.03	-110	7.9	
1000	- **Sample Time** (Note: Flow rate to be btwn. 100 - 250 ml/min.)									Sampler Signature:

Note: Stability achieved when 3 consecutive readings fall within specific parameter ranges shown in the above header.

DAILY METER CALIBRATION RECORDS

DAILY METER CALIBRATION RECORD

Model: YSI 556 MPS
Serial #: 05C1158

Date: 3/26/10
Time: 1010

		Initial	Adjusted
pH (Std. Units)			
Buffer:	4	3.93	4.00
Buffer:	7	6.97	7.00
Buffer:	10	9.84	10.00
ORP (mV's)			
Std.:	231	237	231
Sp.Cond. (mS/cm)			
Std.:	1.409	1.289	1.409
D.O. (mg/l)			
Baro. Pressure (mm/Hg):	760	8.43	8.91
Temp. (Celsius)		23.42	N/A

Model: RAE 2000
Serial #: U49922X

Date: _____
Time: _____

	Initial	Adjusted
Isobutylene (100ppm)	94	100

Model: Hanna
Serial #: 98703

Date: _____
Time: _____

		Initial	Adjusted
Turbidity (NTU's)			
Std.:	~~10~~ 15	14.3	15.00

DAILY METER CALIBRATION RECORD

Model: YSI 556 MPS
Serial #:

Model: RAE 2000
Serial #:

Date: 3-27-10
Time: 0707

Date: _____
Time: _____

		Initial	Adjusted
pH (Std. Units)			
Buffer:	4	4.12	4.00
Buffer:	7	7.02	7.00
Buffer:	10	9.93	10.00
ORP (mV's)			
Std.:	231	227.1	231.0
Sp.Cond. (mS/cm)			
Std.:	1.409	1.386	1.409
D.O. (mg/l)			
Baro. Pressure (mm/Hg):	760	8.62	8.64
Temp. (Celsius)		23.11	N/A

	Initial	Adjusted
Isobutylene (100ppm)		

HANNA Turbidimeter

Model: ~~Lamotte 2020~~
Serial #: 456029X

(Pre-Sampling Calibration) ·Sampling Calibration)

Date: 3-27-10
Time: 0736

		Initial	Adjusted
Turbidity (NTU's)			
Std.:	15 ~~10~~	15.3	15.0

DAILY METER CALIBRATION RECORD

Model: YSI 556 MPS
Serial #: 050158 AT

Model: RAE 2000
Serial #:

Date: 3-28-10
Time: 0730

Date:
Time:

		Initial	Adjusted
pH (Std. Units)			
Buffer:	4	4.20	4.00
Buffer:	7	6.93	7.00
Buffer:	10	9.97	10.00
ORP (mV's)			
Std.:	231	228.9	231.0
Sp.Cond. (mS/cm)			
Std.:	1.409	1.425	1.411
D.O. (mg/l)			
Baro. Pressure (mm/Hg):	760	9.36	9.45
Temp. (Celsius)		24.82	N/A

	Initial	Adjusted
Isobutylene (100ppm)		

HANNA Turbidity Meter

Model: ~~Lamotte 2020~~
Serial #: HI 98703

(Pre-Sampling Calibration) -Sampling Calibration)
Date: 3-28-10
Time: 0900

		Initial	Adjusted
Turbidity (NTU's)			
Std.:	~~10~~ 15	15.0	15.0

DAILY METER CALIBRATION RECORD

Model: YSI 556 MPS
Serial #:

Model: RAE 2000
Serial #:

Date: 3-30-10
Time: 0825

Date:
Time:

		Initial	Adjusted
pH (Std. Units)			
Buffer:	4	3.91	4.00
Buffer:	7	7.00	7.00
Buffer:	10	10.03	10.00
ORP (mV's)			
Std.:	231	232.4	231.0
Sp.Cond. (mS/cm)			
Std.:	1.409	1.415	1.409
D.O. (mg/l)			
Baro. Pressure (mm/Hg):	760	6.88 ~~12.19~~ ABC 3-30-10	8.38
Temp. (Celsius)		24.25	N/A

	Initial	Adjusted
Isobutylene (100ppm)		

HANNA Turbidity Meter

Model: ~~Lamotte 2020~~
Serial #: HI 98703

(Pre-Sampling Calibration) -Sampling Calibration)
Date: 3-30-10
Time: 0840

		Initial	Adjusted
Turbidity (NTU's)			
Std.:	~~10~~ 15	15.0	15.0

CHAIN-OF-CUSTODY FORMS

№ 03848

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CompuChem
a division of Liberty Analytical Corp.

501 Madison Ave.
Cary, NC 27513
Phone: 919-379-4100 Fax 919-379-4040

CHAIN OF CUSTODY

Residual Chlorine Present? Yes ____ No ✓

Courier: FedEx
Airbill No. 8685 9528 4927
Sampling Complete? Y or (N)

Client/Reporting Information	Project Information
Company Name: Baker Environmental, Inc.	Project Name: SWMU 67
Address: 100 Airside Drive	Sampling Location: Puerto Rico
City / State / Zip: Moon Twp., PA 15108	Turnaround time: Standard
Project Contact: Mark Kimes	Batch QC or Project Specific? If Specific, which Sample ID?
Phone #: 412-269-2009	Are aqueous samples field filtered for metals? Y or N
Sampler's Name: A. Gailey/R. Roselius	Are high concentrations expected? Y or (N)? If yes, which ID(s)?

Matrices: GW - Ground water; WW - Waste water; SW - Surface water; SO - Soil/Sediment; TB - Trip Blank; RI - Rinsate; WP - Wipe; O - Other

CompuChem No. (Lab Use)	Field ID	Collection Date	Collection Time	Matrix	# of bottles	HCl	NaOH	HNO3	H2SO4	MEOH	Other Sodium Bisulfate	App IX VOCs	App IX SVOCs	App IX Metals	App IX Metals (Dissolved)	TPH DRO	TPH GRO					pH/Sample Info (Lab Use) Metals	Preservatives			
1003194-07	67SB08-00	3/22/10	1325	SO	6					1	2	3	1	1		✓	1					/				
-08	67SB08-00 D	↓	1325	SO	6					1	2	3	1	1		✓	1					/				
-09	67SB08-01	↓	1330	SO	6					1	2	3	1	1		✓	1					/				
-10	67SB08-05	3/22/10	1350	SO	6					1	2	3	1	1		✓	1					/				
-11	67SB07-00	3/23/10	0805	SO	6					1	2	3	1	1		✓	1					/				
-12	67SB07-01	↓	0810	SO	6					1	2	3	1	1		✓	1					/				
-13	67SB07-05	↓	0830	SO	6					1	2	3	1	1		✓	1					/				
1003197-04	67FB01	↓	1030	O	10	3	1					3	2	~~1~~		2	2					*2				
1003197-03	67ER02	3/23/10	1045	RI	10	3	1					3	2	1		2	2					*2				
1003197-05	67TB01	3/22/10		TB	2	2*						2(3)					( )					/				

Requested Analysis (include method and bottle type)

Lab Use Only

Sample Unpacked By: K. Manning
Sample Order Entry By: [signature]
Samples Received in Good Condition? Y or N
If no, explain:

Cyanide samples checked for sulfide & chlorine? Y or NA
625 & Phenol samples checked for chlorine? Y or NA
608 samples checked for pH between 5.0-9.0? Y or NA

Comments KM 03.24.10
(1) 3-TB's (67TB01) recd.; marked as "2" on COC (recd 3 vials)
recd 3-40ml vials labeled "GRO"

Sample Custody

Relinquished by: [signature]	Date/Time: 3-23-10 1700	Received by: K. Manning	Date/Time: 03.24.10 0910
Relinquished by:	Date/Time:	Received by:	Date/Time:
Subcontact? Y or (N) If yes, where?	Custody Seal(s) intact? (Y) or N	On Ice? (Y) or N	Cooler Temp: 08, 2.1, 1.3 °C

Samples stored 60 days after date report mailed at no extra charge.

White & Yellow copy to lab • Pink copy for customer 6N0010

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Residual Chlorine Present? Yes _____ No ✓

CHAIN OF CUSTODY

501 Madison Ave.
Cary, NC 27513
Phone: 919-379-4100 Fax 919-379-4040

Courier FedEx
Airbill No. 8685 9528 4927
Sampling Complete? Y or (N)

Client/Reporting Information

Company Name: Baker Environmental, Inc.
Address: 100 Airside Drive
City: Moon Twp., State: PA Zip: 15108
Project Contact: Mark Kimes
Phone #: 412-269-2009
Sampler's Name: A. Gailey/R. Roselius

Project Information

Project Name: SWMU 67
Sampling Location: Puerto Rico
Turnaround time: Standard
Batch QC or Project Specific? If Specific, which Sample ID?
Are aqueous samples field filtered for metals? Y or N
Are high concentrations expected? Y or N? If yes, which ID(s)?

Requested Analysis (include method and bottle type)

Matrices: GW - Ground water; WW - Waste water; SW - Surface water; SO - Soil/Sediment; TB - Trip Blank; RI - Rinsate; WP - Wipe; O - Other

CompuChem No (Lab Use)	Field ID	Collection Date	Collection Time	Matrix	# of bottles	HCl	NaOH	HNO3	H2SO4	MEOH	Other Sodium Bisulfate	App IX VOCs	App IX SVOCs (8oz)	App IX Metals (2oz)	App IX Metals (Dissolved)	TPH DRO *	TPH GRO	TOC (1-8oz.)				pH / Sample Info (Lab Use) Metals	EC/OS Wash			
1003194-01	67SD01	3/22/10	1400	SO	7			~~3~~ 1		1	2	3	1	1		✓	1	1				/	/			
~~1003197-01~~ 1003198-01	67SW03		1310	SW	12	6		2		1	2	3	2	1	1	2	3					<2	<2			
1003194-02	67SD02		1530	SO	7					1	2	3	1	1		✓	1	1				/	/			
-03	67SD03		1310	SO	7					1	2	3	1	1		✓	1	1				/	/			
-04	67SD01 D	*		SO	7					1	2	3	1	1		✓	1	1 *	did not receive			/	/			
1003194-01	67SD01 MS	*		SO	7					1	2	3	1	1		✓	1	1	container during			/	/			
	67SD01 MSD	*	1310	SO	7					1	2	3	1	1		✓	1	1	per Adam no TOC			/	/			
1003194-05	67SD04		1515	SO	7					1	2	3	1	1		✓	1	1	needed			/	/			
-06	67SD05	* 3/22/10	1510	SO	7					1	2	3	1	1		✓	1	1				/	/			
1003197-02	67ER01	3/22/10	1550	RI	10	5		2				3	2	1		2	2					<2	/			

Lab Use Only

Sample Unpacked By: K. Manning
Sample Order Entry By: [illegible]
Samples Received in Good Condition? (Y) or N
If no, explain:

Cyanide samples checked for sulfide & chlorine? Y or (NA)
625 & Phenol samples checked for chlorine? Y or (NA)
608 samples checked for pH between 5.0-9.0? Y or (NA)

Comments

* time on containers for 67SD01D, 67SD01MS & 67SD01MSD have 1400 for time on containers

Sample Custody

Relinquished by: [signature]	Date/Time: 3/23/10 1700	Received by: K. Manning	Date/Time: 03.24.10 0910
Relinquished by:	Date/Time:	Received by:	Date/Time:
Subcontact? Y or (N) If yes, where?	Custody Seal(s) intact? (Y) or N	On Ice? (Y) or N	Cooler Temp: 08, 2.1, 1.3 °C

Samples stored 60 days after date report mailed at no extra charge.

White & Yellow copy to lab • Pink copy for customer SN0010

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CHAIN OF CUSTODY

CompuChem
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501 Madison Ave
Cary, NC 27513
Phone: 919-379-4100 Fax 919-379-4040

Courier FedEx
Airbill No. 8685 9528 4721
Sampling Complete? Y or N

Client/Reporting Information

Company Name: Baker Environmental, Inc.
Address: 100 Airside Drive
City: Moon Twp., State: PA Zip: 15108
Project Contact: Mark Kimes
Phone #: 412-269-2009
Sampler's Name: A. Gailey/R. Roselius

Project Information

Project Name: SWMU 67
Sampling Location: Puerto Rico
Turnaround time: Standard
Batch QC or Project Specific? If Specific, which Sample ID?
Are aqueous samples field filtered for metals? Y or N
Are high concentrations expected? Y or N? If yes, which ID(s)?

Requested Analysis (include method and bottle type)

Matrices: GW - Ground water; WW - Waste water; SW - Surface water; SO - Soil/Sediment; TB - Trip Blank; RI - Rinsate; WP - Wipe; O - Other

CompuChem No (Lab Use)	Field ID	Collection Date	Collection Time	Matrix	# of bottles	HCl	NaOH	HNO3	H2SO4	MEOH	Other Sodium Bisulfate	App IX VOCs (2-Na2SO4 1-MeOH)	App IX SVOCs (2-AL)	App IX Metals (2oz/PL)	App IX Metals (Dissolved)	TPH DRO (2-AL)	TPH GRO (4oz/2oz)					pH / Sample Info. (Lab Use) Metals 5 pt
1003194-14	67SB05-00	3/24/10	0810	SO	6					1	2	3	1	1		✓	1					
-15	67SB05-01		0820		6					1	2	3	1	1		✓	1					
-16	67SB05-05		0835		6					1	2	3	1	1		✓	1					
-17	67SB01-00		1110		6					1	2	3	1	1		✓	1					
-18	67SB01-01		1115		6					1	2	3	1	1		✓	1					
-19	67SB01-01D		~~1125~~ 1115		6					1	2	3	1	1		✓	1					
-20	67SB01-03		1125	SO	6					1	2	3	1	1		✓	1					
1003197-06	67ER03	3/24/10	1610	RI	10	5		1				3	2	1		2	2					<2
-07	67ER04	3/25/10	0730	RI	10	5		1				3	2	1		2	2					<2
-09	67TB02	3/24/10		TB	5	5						3					2					

Lab Use Only

Sample Unpacked By: Jennifer Dyer
Sample Order Entry By: [illegible]
Samples Received in Good Condition? Y or N
If no, explain:

Cyanide samples checked for sulfide & chlorine? Y or NA
625 & Phenol samples checked for chlorine? Y or NA
608 samples checked for pH between 5.0-9.0? Y or NA

Comments

~~Residual Chlorine Present?~~
Yes ____ No ✓

Sample Custody

Relinquished by: [signature]	Date/Time: 3/25/10 1500	Received by: Jennifer Dyer	Date/Time: 3/26/10 0915
Relinquished by:	Date/Time:	Received by:	Date/Time:
Subcontact? Y or N If yes, where?		Custody Seal(s) intact? Y or N	On Ice? Y or N	Cooler Temp: 2.3, 2.4, 1.8 °C

Samples stored 60 days after date report mailed at no extra charge.

White & Yellow copy to lab • Pink copy for customer

SN0010

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CHAIN OF CUSTODY

501 Madison Av
Cary, NC 27511
Phone: 919-379-4100 Fax 919-379-4040

Courier FedEx
Airbill No. 8685 9528 4721
Sampling Complete? Y or N

Client/Reporting Information	Project Information
Company Name: Baker Environmental, Inc.	Project Name: SWMU 67
Address: 100 Airside Drive	Sampling Location: Puerto Rico
City State Zip: Moon Twp., PA 15108	Turnaround time: Standard
Project Contact: Mark Kimes	Batch QC or Project Specific? If Specific, which Sample ID?
Phone #: 412-269-2009	Are aqueous samples field filtered for metals? Y or N
Sampler's Name: A. Gailey/R. Roselius	Are high concentrations expected? Y or N? If yes, which ID(s)?

Requested Analysis (include method and bottle type): App IX VOCs (2-NaSO4 1-MeOH); App IX SVOCs (2-AL); App IX Metals (2oz/PL); App IX Metals (Dissolved); TPH DRO (2-AL); TPH GRO (4oz/2-40ml); 8021 (3-40ml)

Matrices: GW - Ground water; WW - Waste water; SW - Surface water; SO - Soil/Sediment; TB - Trip Blank; RI - Rinsate; WP - Wipe; O - Other

CompuChem No (Lab Use)	Field ID	Collection Date	Collection Time	Matrix	# of bottles	HCl	NaOH	HNO3	H2SO4	MEOH	Other (Zn,Ac B-S4O3)	App IX VOCs	App IX SVOCs	App IX Metals	App IX Metals (Dissolved)	TPH DRO	TPH GRO					pH / Sample Info (Lab Use)
1003212-01	67SB02-00	3/25/10	0815	SO	6					1	2	3	1	1		✓	1					Metals
	67SB02-00MS				3					1	2	3										
	67SB02-00MSD				3					1	2	3										
	67SB02-00/MS/MSD		0815		3								1	1		✓	1					
1003212-02	67SB02-01		0825		6					1	2	3	1	1		✓	1					
-03	67SB02-02	3/25/10	0840	SO	6					1	2	3	1	1		✓	1					
1003197-08*	67FB02	3/25/10	0740	O	10	5		1				3 (2)	2	1		2	2					<2

Received the following for VOC, SVOC, DRO, GRO & MTL:

67SB06-00	3/23/10	1350	1003212-04
67SB06-01	3/23/10	1355	-05
67SB06-01D	3/23/10	1355	-06
67SB06-05	3/23/10	1415	-07

Lab Use Only

Sample Unpacked By: Jennifer Doer
Sample Order Entry By: [illegible] 3/26/10
Samples Received in Good Condition? Y or N
If no, explain: see comments

Cyanide samples checked for sulfide & chlorine? Y or NA
625 & Phenol samples checked for chlorine? Y or NA
608 samples checked for pH between 5.0-9.0? Y or NA

Comments

~~Residual Chlorine Present?~~
~~Yes~~ ___ ~~No~~ ✓

*rec'd 1 VOC vial broken for 67FB02

Sample Custody

Relinquished by: [signature]	Date/Time: 3/25/10 1500	Received by: Jennifer Doer	Date/Time: 3/26/10 0915
Relinquished by:	Date/Time:	Received by:	Date/Time:
Subcontact? Y or N If yes, where?		Custody Seal(s) intact? Y or N	On Ice? Y or N — Cooler Temp: 2.3, 2.4, 1.8 °C

Samples stored 60 days after date report mailed at no extra charge.

White & Yellow copy to lab • Pink copy for customer

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CHAIN OF CUSTODY

501 Madison Ave.
Cary, NC 27513
Phone: 919-379-4100 Fax 919-379-4040

Courier FedEx
Airbill No. 8617 8652 7877
Sampling Complete? Y or N

Client/Reporting Information

Company Name: Baker Environmental, Inc.
Address: 100 Airside Drive
City: Moon Twp., State: PA Zip: 15108
Project Contact: Mark Kimes
Phone #: 412-269-2009
Sampler's Name: A. Gailey/R. Roselius

Project Information

Project Name: SWMU 67
Sampling Location: Puerto Rico
Turnaround time: Standard
Batch QC or Project Specific? If Specific, which Sample ID?
Are aqueous samples field filtered for metals? Y or N
Are high concentrations expected? Y or N If yes, which ID(s)?

Requested Analysis (include method and bottle type)

Matrices: GW - Ground water; WW - Waste water; SW - Surface water; SO - Soil/Sediment; TB - Trip Blank; RI - Rinsate; WP - Wipe; O - Other

CompuChem No (Lab Use)	Field ID	Collection Date	Collection Time	Matrix	# of bottles	HCl	NaOH	HNO3	H2SO4	MEOH	Other Sodium Bisulfate	App IX VOCs (3-40ml / 2-Na2S2O3 / 1-MeOH)	App IX SVOCs (2-AL)	App IX Metals (PL / 1-HNO3 / 2 oz)	App IX Metals (Dissolved) PL	TPH DRO (2-AL)	TPH GRO (4 oz)					pH / Sample Info (Lab Use) Methods
1003231-02	67SB04-00	3/25/10	1120	SO	6					1	2	3	1	1		✓	1					
1003231-01	67SB04-01		1125		6					1	2	3	1	1		✓	1					
	67SB04-01 MS		1125		3					1	2	3										
	67SB04-01 MSD		1125		3					1	2	3										
	67SB04-01 MS/MSD		1125		3								1	1		✓	1					
1003231-03	67SB04-03	3/25/10	1140	SO	6					1	2	3	1	1		✓	1					
1003197-13	67TB03	3/26/10		TB	5	5						3					2					
1003197-12	67ER05	3/26/10	1045	RI	10	5		1				3	2	1		2	2					<2
1003231-04	67SB03-00	3/26/10	0825	SO	6					1	2	3	1	1		✓	1					
-05	67SB03-01	3/26/10	0830	SO	6					1	2	3	1	1		✓	1					

Lab Use Only

Sample Unpacked By: Jennifer Doles
Sample Order Entry By: [illegible]
Samples Received in Good Condition? Y or N
If no, explain:

Cyanide samples checked for sulfide & chlorine? Y or NA
625 & Phenol samples checked for chlorine? Y or NA
608 samples checked for pH between 5.0-9.0? Y or NA

Comments

Residual Chlorine Present?
Yes ____ No ✓

Sample Custody

Relinquished by: [signature]	Date/Time: 3/26/10 1500	Received by: Joan Purdie	Date/Time: 3-27-10 1100
Relinquished by:	Date/Time:	Received by:	Date/Time:

Subcontact? Y or N If yes, where?
Custody Seal(s) intact? Y or N
On Ice? Y or N
Cooler Temp: 1.2, 1.2, 3.2 °C 0.8 °C

Samples stored 60 days after date report mailed at no extra charge.

White & Yellow copy to lab • Pink copy for customer

SN0010

16064

41

CHAIN OF CUSTODY

CompuChem
a division of Liberty Analytical Corp.

501 Madison Ave.
Cary, NC 27513
Phone: 919-379-4100 Fax 919-379-4040

Courier FedEx
Airbill No. 8617 8652 7877
Sampling Complete? Y or N

Client/Reporting Information

Company Name: Baker Environmental, Inc.
Address: 100 Airside Drive
City / State / Zip: Moon Twp., PA 15108
Project Contact: Mark Kimes
Phone #: 412-269-2009
Sampler's Name: A. Gailey/R. Roselius

Project Information

Project Name: SWMU 67
Sampling Location: Puerto Rico
Turnaround time: Standard
Batch QC or Project Specific? If Specific, which Sample ID?
Are aqueous samples field filtered for metals? Y or N
Are high concentrations expected? Y or N If yes, which ID(s)?

Requested Analysis (include method and bottle type)

Matrices: GW - Ground water; WW - Waste water; SW - Surface water; SO - Soil/Sediment; TB - Trip Blank; RI - Rinsate; WP - Wipe; O - Other

CompuChem No (Lab Use)	Field ID	Collection Date	Collection Time	Matrix	# of bottles	HCl	NaOH	HNO3	H2SO4	MEOH	Other Sodium Bisulfate	App IX VOCs (3-4 oz vial / 2-Na2S2O3 / 1-MeOH)	App IX SVOCs (2-AL)	App IX Metals (4/2 oz)	App IX Metals (Dissolved) PL	TPH DRO (2-AL)	TPH GRO (4 oz)					pH Sample Info (Lab Use) Metals	Diss. Metals
1003231-06	675B03-04	3/26/10	0840	So	6					1	2	3	1	1		✓	1						
1003197-10 1003198-02	67GW08	↓	↓	GW	11	5		2				3	2	1	1	2	2					<2	<2
1003197-11 1003198-03	67GW08D			GW	11	5		2				3	2	1	1	2	2					<2	<2
1003197-10 1003198-02	67GW08 MS			GW	11	5		2				3	2	1	1	2	2					<2	<2
1003197-10 1003198-02	67GW08 MSD	3/26/10	0840	GW	11	5		2				3	2	1	1	2	2					<2	<2

Lab Use Only

Sample Unpacked By: Jennifer [illegible]
Sample Order Entry By: [illegible]
Samples Received in Good Condition? Y or N
If no, explain:

Cyanide samples checked for sulfide & chlorine? Y or NA
625 & Phenol samples checked for chlorine? Y or NA
608 samples checked for pH between 5.0-9.0? Y or NA

Comments

~~Residual Chlorine Present?~~
Yes ____ No ✓

Sample Custody

Relinquished by: [signature]	Date/Time: 3-26-10 1500	Received by: [signature]	Date/Time: 3·27·10 1100
Relinquished by:	Date/Time:	Received by:	Date/Time:
Subcontact? Y or N If yes, where?		Custody Seal(s) intact? Y or N	On Ice? Y or N — Cooler Temp: 1.2, 1.2, 3.2, °C

Samples stored 60 days after date report mailed at no extra charge.

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0.8°C
SN0010 1.2

16063 AHG 3/29/10

Page 1 of 1

Residual Chlorine Present? Yes ____ No ✓

CHAIN OF CUSTODY

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501 Madison Ave.
Cary, NC 27513
Phone: 919-379-4100 Fax 919-379-4040

Courier FedEx
Airbill No. 8685 9528 4732
Sampling Complete? Y or (N)

Client/Reporting Information

Company Name: Baker Environmental, Inc.
Address: 100 Airside Drive
City / State / Zip: Moon Twp., PA 15108
Project Contact: Mark Kimes
Phone #: 412-269-2009
Sampler's Name: A. Gailey/R. Roselius

Project Information

Project Name: SWMU 67
Sampling Location: Puerto Rico
Turnaround time: Standard
Batch QC or Project Specific? If Specific, which Sample ID?
Are aqueous samples field filtered for metals? (Y) or N
Are high concentrations expected? Y or (N) If yes, which ID(s)?

Matrices: GW - Ground water; WW - Waste water; SW - Surface water; SO - Soil/Sediment; TB - Trip Blank; RI - Rinsate; WP - Wipe; O - Other

CompuChem No (Lab Use)	Field ID	Collection Date	Collection Time	Matrix	# of bottles	HCl	NaOH	HNO3	H2SO4	MEOH	Other	App IX VOCs (3-40ml)	App IX SVOCs (2-AL)	App IX Metals (1-PL) HNO3	App IX Metals (Dissolved) (1-PL) HNO3	TPH DRO (2-AL)	TPH GRO ~~(2-AL)~~ (2-40ml) KM 03-30-10					pH / Sample Info (Lab Use) Total Metals	Diss. Metals	KM 03-30-10
1003197-14 1003198-04	67GW07	3/26/10	1325	GW	11	5		2				3	2	1	1	2	2					<2	<2	<2
1003197-15 1003198-05	67GW05	3/27/10	1130	↓	11	5		2				3	2	1	1	2	2					<2	<2	<2
1003197-16 1003198-06	67GW06	3/27/10	0940	↓	11	5		2				3	2	1	1	2	2					<2	<2	<2
1003197-17 1003198-07	67GW01	3/27/10	1535	GW	11	5		2				3	2	1	1	2	2					<2	<2	
1003197-18	67ER06	3/27/10	1315	RI	10	5		1				3	2	1		2	2					<2	/	
1003197-19 1003198-08	67GW02	3/28/10	0940	GW	11	5		2				3	2	1	1	2	2					<2	<2	
	~~67GW07~~ ~~ER07~~	~~3/26/10~~	~~1045~~	~~RI~~	~~10~~	~~5~~		~~1~~				~~3~~	~~2~~	~~1~~		~~2~~	~~2~~					~~<2~~	~~<2~~	
1003197-20 1003198-09	67GW04	3/28/10	1320	GW	11	5		2				3	2	1	1	2	2					<2	<2	
1003197-22	67TB04	3/26/10		TB	5	5						3					2					/	/	
1003197-21	67ER07	3/28/10	1045	RI	10	5		1				3	2	1		2	2					<2	/	

AHG 3/29/10

Lab Use Only

Sample Unpacked By: K. Manning
Sample Order Entry By: [illegible]
Samples Received in Good Condition? (Y) or N
If no, explain:

Cyanide samples checked for sulfide & chlorine? Y or (NA)
625 & Phenol samples checked for chlorine? Y or (NA)
608 samples checked for pH between 5.0-9.0? Y or (NA)

Comments

*one AL for 67ER06 (SVOC) says 67FB03 on its label & written above it is: 67ER06; 67FB03 does not exist on COC.

Sample Custody

Relinquished by: [signature]	Date/Time: 3-29-10 1500	Received by: K. Manning	Date/Time: 03-30-10 0900
Relinquished by:	Date/Time:	Received by:	Date/Time:
Subcontact? Y or (N) If yes, where?	Custody Seal(s) intact? (Y) or N	On Ice? (Y) or N	Cooler Temp: 1.2 °C

Samples stored 60 days after date report mailed at no extra charge.

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SNC010

Residual Chlorine Present?
Yes ____ No ✓

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CHAIN OF CUSTODY

501 Madison Ave.
Cary, NC 27513
Phone: 919-379-4100 Fax 919-379-4040

SVOC + DRO in 1-8oz

16061

Page 1 of 1

77

Courier FedEx
Airbill No. 8685 9528 4743
Sampling Complete? (Y) or N

Client/Reporting Information	Project Information
Company Name: Baker Environmental, Inc.	Project Name: SWMU 67
Address: 100 Airside Drive	Sampling Location: Puerto Rico
City: Moon Twp., State: PA Zip: 15108	Turnaround time: Standard
Project Contact: Mark Kimes	Batch QC or Project Specific? If Specific, which Sample ID?
Phone #: 412-269-2009	Are aqueous samples field filtered for metals? (Y) or N
Sampler's Name: A. Gailey/R. Roselius	Are high concentrations expected? Y or (N)? If yes, which ID(s)?

Matrices: GW - Ground water; WW - Waste water; SW - Surface water; SO - Soil/Sediment; TB - Trip Blank; RI - Rinsate; WP - Wipe; O - Other

CompuChem No (Lab Use)	Field ID	Collection Date	Collection Time	Matrix	# of bottles	HCl	NaOH	HNO3	H2SO4	MEOH	Other Sodium Bisulfate	App IX VOCs 40ml	App IX SVOCs	App IX Metals 1-2oz or 1 PL	App IX Metals (Dissolved) PL	TPH DRO	TPH GRO 2-40ml or 1-4oz					pH / Sample Info (Lab Use) T-H Metal	Diss Metal
1003231-07	67SS01	3/30/10	0920	SO	6					1	2	3	1	1		✓	1						
✓ -08	67SS02	↓	0950	SO	6					1	2	3	1	1		✓	1						
1003197-23	67ER08		1005	RI	10	5		1				3	2	1		2	2					<2	
1003197-24 1003198-10	67GW03		1030	GW	11	5		2				3	2	1	1	2	2					<2	<2
1003197-25	67TB05	3/30/10		TB	5	5						3					2						
	recorded by lab personnel																						
1003249-01 1003249-02	67IDW01	3/30/10	1205	SO								TCLP VOA 3		TCLP metal 1		+RIC							
1003250-01 1003250-02	67IDW02	3/30/10	1215	WA								1 N		2 N		+RIC							

Lab Use Only

Sample Unpacked By: Diane Byrd
Sample Order Entry By: [illegible]
Samples Received in Good Condition? (Y) or N
If no, explain:

Cyanide samples checked for sulfide & chlorine? Y or (NA)
625 & Phenol samples checked for chlorine? Y or (NA)
608 samples checked for pH between 5.0-9.0? Y or (NA)

Comments
Rec'd ID: 67IDW02 - ~~2 SVOA(AL)~~ 1 VOA TCLP + 2(AL) TCLP MHL
Rec'd ID: 67IDW01 2-2oz + 1-4oz TCLP VOA + 1-8oz TCLP MHL Not listed on COC DB 3/31/10

Sample Custody

Relinquished by: [signature]	Date/Time: 3-30-10 1500	Received by: Diane Byrd	Date/Time: 3/31/10 1015
Relinquished by:	Date/Time:	Received by:	Date/Time:
Subcontact? Y or (N) If yes, where?	Custody Seal(s) intact? (Y) or N	On Ice? (Y) or N	Cooler Temp: 1.0, 4.1 °C

Samples stored 60 days after date report mailed at no extra charge.

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SN0015

APPENDIX C
LABORATORY ANALYTICAL RESULTS

SURFACE SOIL

APPENDIX C

SUMMARY OF ANALYTICAL RESULTS, SURFACE SOIL
SWMU 67 – FORMER GAS STATION
PHASE I RFI REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Site ID	67SS01	67SS02	67SB01	67SB02	67SB03
Sample ID	67SS01	67SS02	67SB01-00	67SB02-00	67SB03-00
Sample Date	3/30/2010	3/30/2010	3/24/2010	3/25/2010	3/26/2010
Sample Depth (ft bgs)	0.0 - 1.0	0.0 - 1.0	0.0 - 1.0	0.0 - 1.0	0.0 - 1.0
Volatiles (µg/kg)					
1,1,1,2-Tetrachloroethane	5.5 U	5.7 U	3.8 U	4.2 U	3.5 U
1,1,1-Trichloroethane	5.5 U	5.7 U	3.8 U	4.2 U	3.5 U
1,1,2,2-Tetrachloroethane	5.5 U	5.7 U	3.8 U	4.2 U	3.5 U
1,1,2-Trichloroethane	5.5 U	5.7 U	3.8 U	4.2 U	3.5 U
1,1-Dichloroethane	5.5 U	5.7 U	3.8 U	4.2 U	3.5 U
1,1-Dichloroethene	5.5 U	5.7 U	3.8 U	4.2 U	3.5 U
1,2,3-Trichloropropane	5.5 U	5.7 U	3.8 U	4.2 U	3.5 U
1,2-Dibromo-3-chloropropane (DBCP)	5.5 U	5.7 U	3.8 U	4.2 U	3.5 U
1,2-Dibromoethane (EDB)	5.5 U	5.7 U	3.8 U	4.2 U	3.5 U
1,2-Dichloroethane	5.5 U	5.7 U	3.8 U	4.2 U	3.5 U
1,2-Dichloroethene (trans)	5.5 U	5.7 U	3.8 U	4.2 U	3.5 U
1,2-Dichloropropane	5.5 UJ	5.7 UJ	3.8 UJ	4.2 UJ	3.5 UJ
1,3-Dichloropropene (cis)	5.5 U	5.7 U	3.8 U	4.2 U	3.5 U
1,3-Dichloropropene (trans)	5.5 U	5.7 U	3.8 U	4.2 U	3.5 U
1,4-Dichloro-2-butene (trans)	22 U	23 U	15 U	17 U	14 U
1,4-Dioxane (p-)	280 R	280 R	190 R	210 R	180 R
2-Butanone (MEK)	14 U	14 U	19	19 U	12
2-Chloro-1,3-butadiene (Chloroprene)	5.5 U	5.7 U	3.8 U	4.2 U	3.5 U
2-Hexanone (MBK)	14 U	14 U	9.5 U	10 U	8.8 U
3-Chloropropene (Allyl Chloride)	5.5 U	5.7 U	3.8 U	4.2 U	3.5 U
4-Methyl-2-pentanone (MIBK)	14 U	14 U	9.5 U	10 U	8.8 U
Acetone	14 R	14 R	240	220	140
Acetonitrile	5.5 U	5.7 U	3.8 U	4.2 U	3.5 U
Acrolein	55 R	57 R	38 R	42 R	35 R
Acrylonitrile	55 R	57 R	38 R	42 R	35 R
Benzene	5.5 U	5.7 U	3.8 U	4.2 U	3.5 U
Bromodichloromethane	5.5 U	5.7 U	3.8 U	4.2 U	3.5 U
Bromoform	5.5 U	5.7 U	3.8 U	4.2 U	3.5 U
Bromomethane	5.5 U	5.7 U	3.8 U	4.2 U	3.5 U
Carbon Disulfide	5.5 U	5.7 U	3.8 U	4.2 U	3.5 U
Carbon Tetrachloride	5.5 U	5.7 U	3.8 U	4.2 U	3.5 U
Chlorobenzene	5.5 U	5.7 U	3.8 U	4.2 U	3.5 U
Chloroethane	5.5 U	5.7 U	3.8 U	4.2 U	3.5 U
Chloroform	5.5 U	5.7 U	3.8 U	4.2 U	0.24 J
Chloromethane	5.5 UJ	5.7 UJ	3.8 U	4.2 U	3.5 U
Dibromochloromethane	5.5 U	5.7 U	3.8 U	4.2 U	3.5 U
Dibromomethane	5.5 U	5.7 U	3.8 U	4.2 U	3.5 U
Dichlorodifluoromethane (Freon-12)	5.5 U	5.7 U	3.8 U	4.2 U	3.5 U
Ethyl Methacrylate	55 U	57 U	38 U	42 U	35 U
Ethylbenzene	5.5 U	5.7 U	3.8 U	4.2 UJ	3.5 U
Isobutyl Alcohol	280 R	280 R	190 R	210 R	180 R
Methyl Acrylonitrile	55 U	57 U	38 U	42 U	35 U
Methyl Iodide	5.5 U	5.7 U	1.9 J	0.7 J	1.1 J

APPENDIX C

SUMMARY OF ANALYTICAL RESULTS, SURFACE SOIL
SWMU 67 – FORMER GAS STATION
PHASE I RFI REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Site ID	67SS01	67SS02	67SB01	67SB02	67SB03
Sample ID	67SS01	67SS02	67SB01-00	67SB02-00	67SB03-00
Sample Date	3/30/2010	3/30/2010	3/24/2010	3/25/2010	3/26/2010
Sample Depth (ft bgs)	0.0 - 1.0	0.0 - 1.0	0.0 - 1.0	0.0 - 1.0	0.0 - 1.0
Volatiles (µg/kg) (Cont)					
Methyl Methacrylate	55 R	57 R	38 R	42 R	35 R
Methylene Chloride	5.5 U	5.7 U	3.8 U	4.2 U	0.35 J
Pentachloroethane	5.5 U	5.7 U	3.8 U	4.2 U	3.5 U
Propionitrile (Ethyl Cyanide)	280 R	280 R	190 R	210 R	180 R
Styrene (Ethenylbenzene)	5.5 U	5.7 U	3.8 U	4.2 UJ	3.5 U
Tetrachloroethene (PCE)	5.5 U	5.7 U	3.8 U	4.2 U	3.5 U
Toluene	5.5 U	5.7 U	3.8 U	4.2 U	3.5 U
Trichloroethene (TCE)	5.5 U	5.7 U	3.8 U	4.2 U	3.5 U
Trichlorofluoromethane (Freon 11)	5.5 U	5.7 U	3.8 U	4.2 U	3.5 U
Vinyl Acetate	5.5 U	5.7 U	3.8 U	4.2 U	3.5 U
Vinyl Chloride	5.5 U	5.7 U	3.8 U	4.2 U	3.5 U
Xylene, m/p-	11 U	11 U	7.6 U	0.12 J	7 U
Xylene, o-	5.5 U	5.7 U	3.8 U	4.2 U	3.5 U
Xylenes, total	5.5 U	5.7 U	3.8 U	4.2 U	3.5 U
Semivolatiles (µg/kg)					
1,2,4,5-Tetrachlorobenzene	200 U	200 U	190 U	200 U	360 U
1,2,4-Trichlorobenzene	200 U	200 U	190 U	200 U	360 U
1,2-Dichlorobenzene (o-)	200 U	200 U	190 U	200 U	360 U
1,3,5-Trinitrobenzene (TNB)	200 U	200 U	190 U	200 U	360 U
1,3-Dichlorobenzene (m-)	200 U	200 U	190 U	200 U	360 U
1,3-Dinitrobenzene (m-)	200 U	200 U	190 U	200 U	360 U
1,4-Dichlorobenzene (p-)	200 U	200 U	190 U	200 U	360 U
1,4-Naphthoquinone	200 UJ	200 UJ	190 UJ	200 UJ	360 UJ
1,4-Phenylenediamine	2000 R	2000 R	1900 R	2000 R	3600 R
1-Naphthylamine	200 U	200 U	190 U	200 UJ	360 U
2,2'-Oxybis[1-chloropropane]	200 U	200 U	190 U	200 U	360 U
2,3,4,6-Tetrachlorophenol	380 U	380 U	380 U	390 U	710 U
2,4,5-Trichlorophenol	380 U	380 U	380 U	390 U	710 U
2,4,6-Trichlorophenol	380 U	380 U	380 U	390 U	710 U
2,4-Dichlorophenol	380 U	380 U	380 U	390 UJ	710 U
2,4-Dimethylphenol	380 U	380 U	380 U	390 U	710 U
2,4-Dinitrophenol	380 U	380 U	380 U	390 U	710 U
2,4-Dinitrotoluene (DNT)	200 U	200 U	190 U	200 U	360 U
2,6-Dichlorophenol	380 UJ	380 UJ	380 UJ	390 UJ	710 UJ
2,6-Dinitrotoluene (DNT)	200 U	200 U	190 U	200 U	360 U
2-Acetylaminofluorene	200 U	200 U	190 U	200 U	360 U
2-Chloronaphthalene	200 U	200 U	190 U	200 U	360 U
2-Chlorophenol	380 U	380 U	380 U	390 U	710 U
2-Methyl-5-nitroaniline	200 U	200 U	190 U	200 U	360 U
2-Methylphenol (o-Cresol)	380 U	380 U	380 U	390 U	710 U
2-Naphthylamine	200 U	200 U	190 U	200 UJ	360 U
2-Nitroaniline	200 U	200 U	190 U	200 U	360 U
2-Nitrophenol	380 U	380 U	380 U	390 U	710 U

APPENDIX C

SUMMARY OF ANALYTICAL RESULTS, SURFACE SOIL
SWMU 67 – FORMER GAS STATION
PHASE I RFI REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Site ID	67SS01	67SS02	67SB01	67SB02	67SB03
Sample ID	67SS01	67SS02	67SB01-00	67SB02-00	67SB03-00
Sample Date	3/30/2010	3/30/2010	3/24/2010	3/25/2010	3/26/2010
Sample Depth (ft bgs)	0.0 - 1.0	0.0 - 1.0	0.0 - 1.0	0.0 - 1.0	0.0 - 1.0
Semivolatiles (µg/kg) (Cont)					
2-Picoline	200 U	200 U	190 U	200 U	360 U
3,3'-Dichlorobenzidine	200 U	200 U	190 U	200 U	360 U
3,3'-Dimethylbenzidine	200 U	200 U	190 U	200 R	360 U
3-Methylcholanthrene	200 U	200 U	190 U	200 U	360 U
3-Methylphenol (m-Cresol)	290 U	290 U	280 UJ	290 UJ	540 U
3-Nitroaniline	380 U	380 U	380 U	390 U	710 U
4,6-Dinitro-2-methylphenol	380 U	380 U	380 U	390 U	710 U
4-Aminobiphenyl	200 U	200 U	190 U	200 UJ	360 U
4-Bromophenyl-phenylether	200 U	200 U	190 U	200 U	360 U
4-Chloro-3-methylphenol	380 U	380 U	380 U	390 U	710 U
4-Chloroaniline	380 U	380 U	380 U	390 U	710 U
4-Chlorophenyl-phenylether	200 U	200 U	190 U	200 U	360 U
4-Dimethylaminoazobenzene (p-)	200 U	200 U	190 U	200 U	360 U
4-Methylphenol (p-Cresol)	290 U	290 U	280 U	290 U	540 U
4-Nitroaniline	380 U	380 U	380 U	390 U	710 U
4-Nitrophenol	380 U	380 U	380 U	390 U	710 U
4-Nitroquinoline-1-oxide	200 UJ	200 UJ	190 UJ	200 UJ	360 UJ
7,12-Dimethylbenz(a)anthracene	200 UJ	200 UJ	190 UJ	200 UJ	360 UJ
Acetophenone	200 U	200 U	190 U	200 U	360 U
Aniline	200 U	200 U	190 U	200 U	360 U
Aramite	200 U	200 U	190 U	200 U	360 U
Benzyl Alcohol	200 U	200 U	190 U	200 U	360 U
Bis(2-chloroethoxy)methane	200 U	200 U	190 U	200 U	360 U
Bis(2-chloroethyl)ether	200 U	200 U	190 U	200 U	360 U
Bis(2-ethylhexyl) Phthalate (BEHP)	100 J	64 J	190 U	200 U	360 U
Butyl Benzyl Phthalate	200 U	200 U	190 U	200 U	360 U
Diallate (cis)	200 U	200 U	190 U	200 U	360 U
Diallate (total)	200 U	200 U	190 U	200 U	360 U
Diallate (trans)	200 UJ	200 UJ	190 UJ	200 UJ	360 UJ
Dibenzofuran	200 U	200 U	190 U	200 U	360 U
Diethyl Phthalate (DEP)	200 U	200 U	190 U	200 U	360 U
Dimethyl Phthalate	200 U	200 U	190 U	200 U	360 U
Di-n-butyl Phthalate (DBP)	200 U	200 U	190 U	200 U	360 U
Di-n-octyl Phthalate	200 U	200 U	190 U	200 U	360 U
Dinoseb	200 U	200 U	190 U	200 U	360 U
Ethyl Methane Sulfonate (EMS)	200 U	200 U	190 U	200 U	360 U
Hexachloro-1,3-butadiene	200 U	200 U	190 U	200 U	360 U
Hexachlorobenzene	200 U	200 U	190 U	200 U	360 U
Hexachlorocyclopentadiene	200 U	200 U	190 U	200 UJ	360 U
Hexachloroethane	200 U	200 U	190 U	200 U	360 U
Hexachloropropene	200 UJ	200 UJ	190 UJ	200 UJ	360 UJ
Indeno(1,2,3-cd)pyrene	200 U	200 U	190 U	200 U	360 UJ
Isophorone	200 U	200 U	190 U	200 U	360 U

APPENDIX C

SUMMARY OF ANALYTICAL RESULTS, SURFACE SOIL
SWMU 67 – FORMER GAS STATION
PHASE I RFI REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Site ID	67SS01	67SS02	67SB01	67SB02	67SB03
Sample ID	67SS01	67SS02	67SB01-00	67SB02-00	67SB03-00
Sample Date	3/30/2010	3/30/2010	3/24/2010	3/25/2010	3/26/2010
Sample Depth (ft bgs)	0.0 - 1.0	0.0 - 1.0	0.0 - 1.0	0.0 - 1.0	0.0 - 1.0
Semivolatiles (µg/kg) (Cont)					
Isosafrole	200 U	200 U	190 U	200 U	360 U
Methapyrilene	200 U	200 U	190 UJ	200 R	360 U
Methyl Methane Sulfonate	200 U	200 U	190 U	200 U	360 U
Nitrobenzene	200 U	200 U	190 U	200 U	360 U
n-Nitrosodiethylamine	200 U	200 U	190 U	200 U	360 U
n-Nitrosodimethylamine (NDMA)	200 U	200 U	190 U	200 U	360 U
n-Nitroso-di-n-butylamine	200 U	200 U	190 U	200 U	360 U
n-Nitrosodi-n-propylamine	200 U	200 U	190 U	200 U	360 U
n-Nitrosodiphenylamine	200 U	200 U	190 U	200 U	360 U
n-Nitrosomethylethylamine	200 U	200 U	190 U	200 U	360 U
n-Nitrosomorpholine	200 U	200 U	190 U	200 U	360 U
n-Nitrosopiperidine	200 U	200 U	190 U	200 U	360 U
n-Nitrosopyrrolidine	200 U	200 U	190 U	200 U	360 U
o-Toluidine	200 U	200 U	190 U	200 U	360 U
Pentachlorobenzene	200 U	200 U	190 U	200 U	360 U
Pentachloronitrobenzene	200 U	200 U	190 U	200 U	360 U
Pentachlorophenol	380 U	380 U	380 U	390 U	710 U
Phenacetin	200 U	200 U	190 U	200 U	360 U
Phenol	380 U	380 U	380 U	390 U	710 U
Pronamide	380 U	380 U	380 U	390 U	710 U
Pyridine	200 U	200 U	190 U	200 U	360 U
Safrole	200 U	200 U	190 U	200 U	360 U
PAHs (µg/kg) - Low Molecular Weight					
2-Methylnaphthalene	9.5 U	9.5 U	9.4 U	0.81 J	8.9 U
Acenaphthene	1.1 J	0.75 J	9.4 U	9.8 U	8.9 U
Acenaphthylene	3.6 J	1.9 J	9.4 U	1.2 J	8.9 U
Anthracene	2.5 J	1.5 J	0.5 J	0.69 J	0.72 J
Fluoranthene	17	15	9.4 U	5.9 J	5.9 J
Fluorene	9.5 U	9.5 U	9.4 UJ	9.8 U	8.9 U
Naphthalene	9.5 U	9.5 U	9.4 U	9.8 U	8.9 U
Phenanthrene	8.2 J	6 J	9.4 U	2.8 J	2.7 J
PAHs (µg/kg) - High Molecular Weight					
Benzo(a)anthracene	11	8.6 J	1.2 J	2.7 J	3.8 J
Benzo(a)pyrene (BaP)	11	10	1.6 J	9.8 U	4.8 J
Benzo(b)fluoranthene	6.7 J	6.5 J	1.4 J	4.1 J	5.1 J
Benzo(g,h,i)perylene	9.2 J	8.8 J	1.7 J	3.4 J	3.7 J
Benzo(k)fluoranthene	8 J	6.6 J	1.9 J	3.1 J	8.9 U
Chrysene	10	7.4 J	1.5 J	3.5 J	3.1 J
Dibenz(a,h)anthracene	2 J	1.6 J	0.5 J	9.8 UJ	0.81 J
Indeno(1,2,3-cd)pyrene	8.8 J	9.6	2 J	4.5 J	3.6 J
Pyrene	16	16	1 J	4.7 J	6 J
PAH totals (µg/kg)					
Low molecular weight PAHs	60.9	53.65	66.3	40.8	53.82
High molecular weight PAHs	82.7	75.1	12.8	45.6	39.81

APPENDIX C

SUMMARY OF ANALYTICAL RESULTS, SURFACE SOIL
SWMU 67 – FORMER GAS STATION
PHASE I RFI REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Site ID	67SS01	67SS02	67SB01	67SB02	67SB03
Sample ID	67SS01	67SS02	67SB01-00	67SB02-00	67SB03-00
Sample Date	3/30/2010	3/30/2010	3/24/2010	3/25/2010	3/26/2010
Sample Depth (ft bgs)	0.0 - 1.0	0.0 - 1.0	0.0 - 1.0	0.0 - 1.0	0.0 - 1.0
TPH (mg/kg)					
Diesel Range Organics (DRO)	11 U	11 U	11 U	12	11 U
Gasoline Range Organics (GRO)	0.57 U	0.57 U	0.57 U	0.59 UJ	0.54 U
Total TPH	11.57 U	11.57 U	11.57 U	12.59	11.54 U
Inorganics (mg/kg)					
Antimony	0.21 J	0.17 J	1.1 UJ	0.52 J	0.14 J
Arsenic	2.9	5	0.23 J	1	0.52 U
Barium	116	108	127	130	203
Beryllium	0.34 J	0.3 J	0.29 J	0.35 J	0.4 J
Cadmium	0.35 J	0.35 J	0.26 J	0.36 J	0.17 J
Chromium	28 J	47.9 J	41.8	41.3 J	47.4 J
Cobalt	28.9	25.7	23.2 J	38.1 J	24.7
Copper	102	150	115 J	277 J	50.7
Lead	23.8	31.5	13.4 J	62.4	4.3
Mercury	0.081	0.054	0.041	0.066	0.037
Nickel	11.2	16.6	13.6	16.3 J	11.5
Selenium	1.3 J	1 J	1.2 J	1.5 J	0.58 J
Silver	0.077 J	0.049 J	0.57 U	0.082 J	0.52 U
Thallium	0.075 J	0.051 J	0.085 J	0.3 J	0.037 J
Tin	5.7 UJ	5.6 UJ	5.7 U	5.9 U	5.2 UJ
Vanadium	227	149	147 J	213 J	150
Zinc	71.5 J	63.8 J	46.3	85.7 J	32.8 J

Notes:

ft bgs - feet below ground surface
µg/kg - micrograms per kilogram
mg/kg - milligrams per kilogram
PAH - Polyaromatic Hydrocarbons
TPH - Total Petroleum Hydrocarbons

U - Not detected
UJ - Reported quantitation limit is estimated
J - Analyte present - estimated value
R - Result is rejected and unusable

APPENDIX C

SUMMARY OF ANALYTICAL RESULTS, SURFACE SOIL
SWMU 67 – FORMER GAS STATION
PHASE I RFI REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Site ID	67SB04	67SB05	67SB06	67SB07	67SB08	67SB08
Sample ID	67SB04-00	67SB05-00	67SB06-00	67SB07-00	67SB08-00	67SB08-00D
Sample Date	3/25/2010	3/24/2010	3/23/2010	3/23/2010	3/22/2010	3/22/2010
Sample Depth (ft bgs)	0.0 - 1.0	0.0 - 1.0	0.0 - 1.0	0.0 - 1.0	0.0 - 1.0	0.0 - 1.0
Volatiles (µg/kg)						
1,1,1,2-Tetrachloroethane	4.4 U	5.1 U	4.2 U	6.4 UJ	5.2 U	4.6 U
1,1,1-Trichloroethane	4.4 U	5.1 U	4.2 U	6.4 UJ	5.2 U	4.6 U
1,1,2,2-Tetrachloroethane	4.4 U	5.1 U	4.2 U	6.4 UJ	5.2 U	4.6 U
1,1,2-Trichloroethane	4.4 U	5.1 U	4.2 U	6.4 UJ	5.2 U	4.6 U
1,1-Dichloroethane	4.4 U	5.1 U	4.2 U	6.4 UJ	5.2 U	4.6 U
1,1-Dichloroethene	4.4 U	5.1 U	4.2 U	6.4 UJ	5.2 U	4.6 U
1,2,3-Trichloropropane	4.4 U	5.1 U	4.2 U	6.4 UJ	5.2 U	4.6 U
1,2-Dibromo-3-chloropropane (DBCP)	4.4 U	5.1 U	4.2 U	6.4 UJ	5.2 U	4.6 U
1,2-Dibromoethane (EDB)	4.4 U	5.1 U	4.2 U	6.4 UJ	5.2 U	4.6 U
1,2-Dichloroethane	4.4 U	5.1 U	4.2 U	6.4 UJ	5.2 U	4.6 U
1,2-Dichloroethene (trans)	4.4 U	5.1 U	4.2 U	6.4 UJ	5.2 U	4.6 U
1,2-Dichloropropane	4.4 UJ	5.1 UJ	4.2 UJ	6.4 UJ	5.2 UJ	4.6 UJ
1,3-Dichloropropene (cis)	4.4 U	5.1 U	4.2 U	6.4 UJ	5.2 U	4.6 U
1,3-Dichloropropene (trans)	4.4 U	5.1 U	4.2 U	6.4 UJ	5.2 U	4.6 U
1,4-Dichloro-2-butene (trans)	18 U	20 U	17 U	26 UJ	21 U	18 U
1,4-Dioxane (p-)	220 R	250 R	210 R	320 R	260 R	230 R
2-Butanone (MEK)	5.6 J	13 U	11 U	20 J	6.8 J	13
2-Chloro-1,3-butadiene (Chloroprene)	4.4 U	5.1 U	4.2 U	6.4 UJ	5.2 U	4.6 U
2-Hexanone (MBK)	11 U	13 U	11 U	16 UJ	13 U	12 U
3-Chloropropene (Allyl Chloride)	4.4 U	5.1 U	4.2 U	6.4 UJ	5.2 U	4.6 U
4-Methyl-2-pentanone (MIBK)	11 U	13 U	11 U	16 UJ	13 U	12 U
Acetone	63	79	110	280 J	110	170
Acetonitrile	4.4 U	5.1 U	4.2 U	6.4 UJ	5.2 U	4.6 U
Acrolein	44 R	51 R	42 R	64 R	52 R	46 R
Acrylonitrile	44 R	51 R	42 R	64 R	52 R	46 R
Benzene	4.4 U	5.1 U	4.2 U	0.59 J	5.2 U	4.6 U
Bromodichloromethane	4.4 U	5.1 U	4.2 U	6.4 UJ	5.2 U	4.6 U
Bromoform	4.4 U	5.1 U	4.2 U	6.4 UJ	5.2 U	4.6 U
Bromomethane	4.4 U	5.1 U	4.2 U	6.4 UJ	5.2 U	4.6 U
Carbon Disulfide	0.92 J	5.1 U	4.2 U	6.4 UJ	5.2 U	4.6 U
Carbon Tetrachloride	4.4 U	5.1 U	4.2 U	6.4 UJ	5.2 U	4.6 U
Chlorobenzene	4.4 U	5.1 U	4.2 U	6.4 UJ	5.2 U	4.6 U
Chloroethane	4.4 U	5.1 U	4.2 U	6.4 UJ	5.2 U	4.6 U
Chloroform	0.3 J	5.1 U	4.2 U	6.4 UJ	5.2 U	4.6 U
Chloromethane	4.4 U	5.1 U	0.42 J	6.4 UJ	5.2 U	4.6 U
Dibromochloromethane	4.4 U	5.1 U	4.2 U	6.4 UJ	5.2 U	4.6 U
Dibromomethane	4.4 U	5.1 U	4.2 U	6.4 UJ	5.2 U	4.6 U
Dichlorodifluoromethane (Freon-12)	4.4 U	5.1 U	4.2 U	6.4 UJ	5.2 U	4.6 U
Ethyl Methacrylate	44 U	51 U	42 U	64 UJ	52 U	46 U
Ethylbenzene	4.4 U	5.1 U	4.2 U	6.4 UJ	5.2 U	4.6 U
Isobutyl Alcohol	220 R	250 R	210 R	320 R	260 R	230 R
Methyl Acrylonitrile	44 U	51 U	42 U	64 UJ	52 U	46 U
Methyl Iodide	4.4 U	5.1 U	1.6 J	6.4 UJ	1.8 J	2.9 J

APPENDIX C

SUMMARY OF ANALYTICAL RESULTS, SURFACE SOIL
SWMU 67 – FORMER GAS STATION
PHASE I RFI REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Site ID	67SB04	67SB05	67SB06	67SB07	67SB08	67SB08
Sample ID	67SB04-00	67SB05-00	67SB06-00	67SB07-00	67SB08-00	67SB08-00D
Sample Date	3/25/2010	3/24/2010	3/23/2010	3/23/2010	3/22/2010	3/22/2010
Sample Depth (ft bgs)	0.0 - 1.0	0.0 - 1.0	0.0 - 1.0	0.0 - 1.0	0.0 - 1.0	0.0 - 1.0
Volatiles (µg/kg) (Cont)						
Methyl Methacrylate	44 R	51 R	42 R	64 R	52 R	46 R
Methylene Chloride	4.4 U	5.1 U	4.2 U	6.4 UJ	5.2 U	4.6 U
Pentachloroethane	4.4 U	5.1 U	4.2 U	6.4 UJ	5.2 U	4.6 U
Propionitrile (Ethyl Cyanide)	220 R	250 R	210 R	320 R	260 R	230 R
Styrene (Ethenylbenzene)	4.4 U	5.1 U	4.2 U	6.4 UJ	5.2 U	4.6 U
Tetrachloroethene (PCE)	4.4 U	5.1 U	4.2 U	6.4 UJ	5.2 U	4.6 U
Toluene	4.4 U	5.1 U	4.2 U	6.4 UJ	5.2 U	4.6 U
Trichloroethene (TCE)	4.4 U	5.1 U	4.2 U	6.4 UJ	5.2 U	4.6 U
Trichlorofluoromethane (Freon 11)	4.4 U	5.1 U	4.2 U	6.4 UJ	5.2 U	4.6 U
Vinyl Acetate	4.4 U	5.1 U	4.2 U	6.4 UJ	5.2 U	4.6 U
Vinyl Chloride	4.4 U	5.1 U	4.2 U	6.4 UJ	5.2 U	4.6 U
Xylene, m/p-	8.8 U	10 U	8.5 U	13 UJ	10 U	9.2 U
Xylene, o-	4.4 U	5.1 U	4.2 U	6.4 UJ	5.2 U	4.6 U
Xylenes, total	4.4 U	5.1 U	4.2 U	6.4 UJ	5.2 U	4.6 U
Semivolatiles (µg/kg)						
1,2,4,5-Tetrachlorobenzene	180 U	200 U	200 U	210 U	220 U	220 U
1,2,4-Trichlorobenzene	180 U	200 U	200 U	210 U	220 U	220 U
1,2-Dichlorobenzene (o-)	180 U	200 U	200 U	210 U	220 U	220 U
1,3,5-Trinitrobenzene (TNB)	180 U	200 U	200 U	210 U	220 U	220 U
1,3-Dichlorobenzene (m-)	180 U	200 U	200 U	210 U	220 U	220 U
1,3-Dinitrobenzene (m-)	180 U	200 U	200 U	210 U	220 U	220 U
1,4-Dichlorobenzene (p-)	180 U	200 U	200 U	210 U	220 U	220 U
1,4-Naphthoquinone	180 UJ	200 UJ	200 UJ	210 UJ	220 UJ	220 UJ
1,4-Phenylenediamine	1800 R	2000 R	2000 R	2100 R	2200 R	2200 R
1-Naphthylamine	180 U	200 U	200 U	210 U	220 U	220 U
2,2'-Oxybis[1-chloropropane]	180 U	200 U	200 U	210 U	220 U	220 U
2,3,4,6-Tetrachlorophenol	350 U	380 U	380 U	400 U	430 U	420 U
2,4,5-Trichlorophenol	350 U	380 U	380 U	400 U	430 U	420 U
2,4,6-Trichlorophenol	350 U	380 U	380 U	400 U	430 U	420 U
2,4-Dichlorophenol	350 U	380 U	380 UJ	400 U	430 U	420 U
2,4-Dimethylphenol	350 U	380 U	380 U	400 U	430 U	420 U
2,4-Dinitrophenol	350 U	380 U	380 U	400 U	430 U	420 U
2,4-Dinitrotoluene (DNT)	180 U	200 U	200 U	210 U	220 U	220 U
2,6-Dichlorophenol	350 UJ	380 UJ	380 UJ	400 UJ	430 UJ	420 UJ
2,6-Dinitrotoluene (DNT)	180 U	200 U	200 U	210 U	220 U	220 U
2-Acetylaminofluorene	180 U	200 U	200 U	210 U	220 U	220 U
2-Chloronaphthalene	180 U	200 U	200 U	210 U	220 U	220 U
2-Chlorophenol	350 U	380 UJ	380 U	400 UJ	430 UJ	420 UJ
2-Methyl-5-nitroaniline	180 U	200 U	200 U	210 U	220 U	220 U
2-Methylphenol (o-Cresol)	350 U	380 U	380 U	400 U	430 U	420 U
2-Naphthylamine	180 U	200 U	200 U	210 U	220 U	220 U
2-Nitroaniline	180 U	200 U	200 U	210 U	220 U	220 U
2-Nitrophenol	350 U	380 U	380 U	400 U	430 U	420 U

APPENDIX C

SUMMARY OF ANALYTICAL RESULTS, SURFACE SOIL
SWMU 67 – FORMER GAS STATION
PHASE I RFI REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Site ID	67SB04	67SB05	67SB06	67SB07	67SB08	67SB08
Sample ID	67SB04-00	67SB05-00	67SB06-00	67SB07-00	67SB08-00	67SB08-00D
Sample Date	3/25/2010	3/24/2010	3/23/2010	3/23/2010	3/22/2010	3/22/2010
Sample Depth (ft bgs)	0.0 - 1.0	0.0 - 1.0	0.0 - 1.0	0.0 - 1.0	0.0 - 1.0	0.0 - 1.0
Semivolatiles (µg/kg) (Cont)						
2-Picoline	180 U	200 U	200 U	210 U	220 U	220 U
3,3'-Dichlorobenzidine	180 U	200 U	200 U	210 U	220 U	220 U
3,3'-Dimethylbenzidine	180 U	200 U	200 U	210 U	220 U	220 U
3-Methylcholanthrene	180 U	200 U	200 U	210 U	220 U	220 U
3-Methylphenol (m-Cresol)	260 U	290 U	290 UJ	300 U	320 U	320 U
3-Nitroaniline	350 U	380 U	380 U	400 U	430 U	420 U
4,6-Dinitro-2-methylphenol	350 U	380 U	380 U	400 U	430 U	420 U
4-Aminobiphenyl	180 U	200 U	200 U	210 U	220 U	220 U
4-Bromophenyl-phenylether	180 U	200 U	200 U	210 U	220 U	220 U
4-Chloro-3-methylphenol	350 U	380 U	380 U	400 U	430 U	420 U
4-Chloroaniline	350 U	380 U	380 U	400 U	430 U	420 U
4-Chlorophenyl-phenylether	180 U	200 U	200 U	210 U	220 U	220 U
4-Dimethylaminoazobenzene (p-)	180 U	200 U	200 U	210 U	220 U	220 U
4-Methylphenol (p-Cresol)	260 U	290 U	290 U	300 U	320 U	320 U
4-Nitroaniline	350 U	380 U	380 U	400 U	430 U	420 U
4-Nitrophenol	350 U	380 U	380 U	400 U	430 U	420 U
4-Nitroquinoline-1-oxide	180 UJ	200 UJ	200 UJ	210 UJ	220 UJ	220 UJ
7,12-Dimethylbenz(a)anthracene	180 UJ	200 UJ	200 UJ	210 UJ	220 UJ	220 UJ
Acetophenone	180 U	200 U	200 U	210 U	220 U	220 U
Aniline	180 U	200 UJ	200 U	210 UJ	220 UJ	220 UJ
Aramite	180 U	200 U	200 U	210 U	220 U	220 U
Benzyl Alcohol	180 U	200 UJ	200 U	210 UJ	220 UJ	220 UJ
Bis(2-chloroethoxy)methane	180 U	200 U	200 U	210 U	220 U	220 U
Bis(2-chloroethyl)ether	180 U	200 U	200 U	210 U	220 U	220 U
Bis(2-ethylhexyl) Phthalate (BEHP)	39 J	200 U	200 U	210 U	220 U	220 U
Butyl Benzyl Phthalate	180 U	200 U	200 U	210 U	220 U	220 U
Diallate (cis)	180 U	200 U	200 U	210 U	220 U	220 U
Diallate (total)	180 U	200 UJ	200 U	210 UJ	220 UJ	220 UJ
Diallate (trans)	180 UJ	200 UJ	200 UJ	210 UJ	220 UJ	220 UJ
Dibenzofuran	180 U	200 U	200 U	210 U	220 U	220 U
Diethyl Phthalate (DEP)	180 U	200 U	200 U	210 U	220 U	220 U
Dimethyl Phthalate	180 U	200 U	200 U	210 U	220 U	220 U
Di-n-butyl Phthalate (DBP)	180 U	200 U	200 U	23 J	220 U	220 U
Di-n-octyl Phthalate	180 U	200 U	200 U	210 U	220 U	220 U
Dinoseb	180 U	200 U	200 U	210 U	220 U	220 U
Ethyl Methane Sulfonate (EMS)	180 U	200 U	200 U	210 U	220 U	220 U
Hexachloro-1,3-butadiene	180 U	200 U	200 U	210 U	220 U	220 U
Hexachlorobenzene	180 U	200 U	200 U	210 U	220 U	220 U
Hexachlorocyclopentadiene	180 U	200 U	200 U	210 U	220 U	220 U
Hexachloroethane	180 U	200 U	200 U	210 U	220 U	220 U
Hexachloropropene	180 UJ	200 UJ	200 UJ	210 UJ	220 UJ	220 UJ
Indeno(1,2,3-cd)pyrene	180 UJ	200 U	200 U	210 U	220 U	220 U
Isophorone	180 U	200 U	200 U	210 U	220 U	220 U

APPENDIX C

SUMMARY OF ANALYTICAL RESULTS, SURFACE SOIL
SWMU 67 – FORMER GAS STATION
PHASE I RFI REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Site ID	67SB04	67SB05	67SB06	67SB07	67SB08	67SB08
Sample ID	67SB04-00	67SB05-00	67SB06-00	67SB07-00	67SB08-00	67SB08-00D
Sample Date	3/25/2010	3/24/2010	3/23/2010	3/23/2010	3/22/2010	3/22/2010
Sample Depth (ft bgs)	0.0 - 1.0	0.0 - 1.0	0.0 - 1.0	0.0 - 1.0	0.0 - 1.0	0.0 - 1.0
Semivolatiles (µg/kg) (Cont)						
Isosafrole	180 U	200 U	200 U	210 U	220 U	220 U
Methapyrilene	180 U	200 UJ	200 R	210 UJ	220 UJ	220 UJ
Methyl Methane Sulfonate	180 U	200 UJ	200 U	210 UJ	220 UJ	220 UJ
Nitrobenzene	180 U	200 U	200 U	210 U	220 U	220 U
n-Nitrosodiethylamine	180 U	200 U	200 U	210 U	220 U	220 U
n-Nitrosodimethylamine (NDMA)	180 U	200 U	200 U	210 U	220 U	220 U
n-Nitroso-di-n-butylamine	180 U	200 U	200 U	210 U	220 U	220 U
n-Nitrosodi-n-propylamine	180 U	200 UJ	200 U	210 UJ	220 UJ	220 UJ
n-Nitrosodiphenylamine	180 U	200 U	200 U	210 U	220 U	220 U
n-Nitrosomethylethylamine	180 U	200 U	200 U	210 U	220 U	220 U
n-Nitrosomorpholine	180 U	200 U	200 U	210 U	220 U	220 U
n-Nitrosopiperidine	180 U	200 U	200 U	210 U	220 U	220 U
n-Nitrosopyrrolidine	180 U	200 U	200 U	210 U	220 U	220 U
o-Toluidine	180 U	200 U	200 U	210 U	220 U	220 U
Pentachlorobenzene	180 U	200 U	200 U	210 U	220 U	220 U
Pentachloronitrobenzene	180 U	200 U	200 U	210 U	220 U	220 U
Pentachlorophenol	350 U	380 U	380 U	400 U	430 U	420 U
Phenacetin	180 U	200 U	200 U	210 U	220 U	220 U
Phenol	350 U	380 U	380 U	400 U	430 U	420 U
Pronamide	350 U	380 U	380 U	400 U	430 U	420 U
Pyridine	180 U	200 UJ	200 U	210 UJ	220 UJ	220 UJ
Safrole	180 U	200 U	200 U	210 U	220 U	220 U
PAHs (µg/kg) - Low Molecular Weight						
2-Methylnaphthalene	8.8 U	9.5 U	9.5 U	10 UJ	11 UJ	11 UJ
Acenaphthene	8.8 U	9.5 U	9.5 U	10 U	11 U	11 U
Acenaphthylene	1.4 J	9.5 U	9.5 U	10 U	11 U	11 U
Anthracene	1.4 J	9.5 U	9.5 U	10 U	11 U	11 U
Fluoranthene	17	9.5 U	9.5 U	10 U	11 U	11 U
Fluorene	8.8 U	9.5 UJ	9.5 U	10 U	11 U	11 U
Naphthalene	8.8 U	9.5 U	9.5 U	10 U	11 U	11 U
Phenanthrene	6.1 J	9.5 U	1.6 J	10 U	11 U	11 U
PAHs (µg/kg) - High Molecular Weight						
Benzo(a)anthracene	4.7 J	9.5 U	1 J	10 U	11 U	11 U
Benzo(a)pyrene (BaP)	6.9 J	0.6 J	1.6 J	10 U	11 U	11 U
Benzo(b)fluoranthene	5.2 J	9.5 UJ	2.5 J	10 UJ	11 UJ	11 UJ
Benzo(g,h,i)perylene	4.9 J	0.47 J	1.6 J	10 U	11 U	11 U
Benzo(k)fluoranthene	8.8 U	0.55 J	1.6 J	10 U	11 U	11 U
Chrysene	6.8 J	9.5 U	0.96 J	10 U	11 U	11 U
Dibenz(a,h)anthracene	1.2 J	9.5 U	9.5 UJ	10 U	11 U	11 U
Indeno(1,2,3-cd)pyrene	6.9 J	0.62 J	1.9 J	10 UJ	11 UJ	11 UJ
Pyrene	13	9.5 U	1.2 J	10 U	11 U	11 U
PAH totals (µg/kg)						
Low molecular weight PAHs	61.1	76	68.1	80	88	88
High molecular weight PAHs	58.4	49.7	21.86	90	99	99

APPENDIX C

SUMMARY OF ANALYTICAL RESULTS, SURFACE SOIL
SWMU 67 – FORMER GAS STATION
PHASE I RFI REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Site ID	67SB04	67SB05	67SB06	67SB07	67SB08	67SB08
Sample ID	67SB04-00	67SB05-00	67SB06-00	67SB07-00	67SB08-00	67SB08-00D
Sample Date	3/25/2010	3/24/2010	3/23/2010	3/23/2010	3/22/2010	3/22/2010
Sample Depth (ft bgs)	0.0 - 1.0	0.0 - 1.0	0.0 - 1.0	0.0 - 1.0	0.0 - 1.0	0.0 - 1.0
TPH (mg/kg)						
Diesel Range Organics (DRO)	11 U	110	11 U	12 U	23	17
Gasoline Range Organics (GRO)	0.53 U	0.57 U	0.57 U	0.61 U	0.65 U	0.63 U
Total TPH	11.5 U	111	11.57 U	12.61 U	23.7	17.63
Inorganics (mg/kg)						
Antimony	0.26 J	1.1 UJ	1.2 UJ	1.2 UJ	1.2 UJ	1.3 UJ
Arsenic	0.99	0.49 J	0.57 U	0.73	1.4	1.4
Barium	94.7	56.2	31.8	59.1	48.1 J	23.9 J
Beryllium	0.25 J	0.19 J	0.14 J	0.19 J	0.38 J	0.2 J
Cadmium	0.24 J	0.18 J	0.13 J	0.18 J	0.14 J	0.16 J
Chromium	33.6 J	13	16.4 J	24.1	25.2	32.8
Cobalt	26.5	21 J	15.6 J	24.4 J	10.6 J	10 J
Copper	99.2	80.1 J	55.7 J	78.4 J	44.4 J	37.6 J
Lead	9.3	2.2 J	2.1	3.7 J	4.2 J	8.7 J
Mercury	0.04	0.01 J	0.038 U	0.011 J	0.02 J	0.17
Nickel	15.2	6.7	12 J	9.8	7.4 J	4.1 J
Selenium	0.42 J	0.43 J	0.34 J	0.49 J	1.6 J	2.2 J
Silver	0.06 J	0.56 U	0.57 U	0.59 U	0.61 U	0.63 U
Thallium	0.05 J	0.02 J	0.57 U	0.04 J	0.61 U	0.024 J
Tin	5.3 UJ	5.6 U	5.6 U	5.9 U	6.1 U	6.3 U
Vanadium	170	177 J	88.5 J	151 J	320 J	272 J
Zinc	67.1 J	61.2	36.8 J	61.3	25.5	33.3

Notes:

ft bgs - feet below ground surface
µg/kg - micrograms per kilogram
mg/kg - milligrams per kilogram
PAH - Polyaromatic Hydrocarbons
TPH - Total Petroleum Hydrocarbons

U - Not detected
UJ - Reported quantitation limit is estimated
J - Analyte present - estimated value
R - Result is rejected and unusable

SUBSURFACE SOIL

APPENDIX C

SUMMARY OF ANALYTICAL RESULTS, SUBSURFACE SOIL
SWMU 67 – FORMER GAS STATION
PHASE I RFI REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Site ID	67SB01	67SB01	67SB01	67SB02	67SB02
Sample ID	67SB01-01	67SB01-01D	67SB01-03	67SB02-01	67SB02-02
Sample Date	3/24/2010	3/24/2010	3/24/2010	3/25/2010	3/25/2010
Sample Depth (ft bgs)	1.0 - 3.0	1.0 - 3.0	5.0 - 7.0	1.0 - 3.0	3.0 - 5.0
Volatiles (µg/kg)					
1,1,1,2-Tetrachloroethane	4.5 U	3.8 U	5.3 U	4.3 U	4.2 U
1,1,1-Trichloroethane	4.5 U	3.8 U	5.3 U	4.3 U	4.2 U
1,1,2,2-Tetrachloroethane	4.5 U	3.8 U	5.3 U	4.3 U	4.2 U
1,1,2-Trichloroethane	4.5 U	3.8 U	5.3 U	4.3 U	4.2 U
1,1-Dichloroethane	4.5 U	3.8 U	5.3 U	4.3 U	4.2 U
1,1-Dichloroethene	4.5 U	3.8 U	5.3 U	4.3 U	4.2 U
1,2,3-Trichloropropane	4.5 U	3.8 U	5.3 U	4.3 U	4.2 U
1,2-Dibromo-3-chloropropane (DBCP)	4.5 U	3.8 U	5.3 U	4.3 U	4.2 U
1,2-Dibromoethane (EDB)	4.5 U	3.8 U	5.3 U	4.3 U	4.2 U
1,2-Dichloroethane	4.5 U	3.8 U	5.3 U	4.3 U	4.2 U
1,2-Dichloroethene (trans)	4.5 U	3.8 U	5.3 U	4.3 U	4.2 U
1,2-Dichloropropane	4.5 UJ	3.8 UJ	5.3 UJ	4.3 UJ	4.2 UJ
1,3-Dichloropropene (cis)	4.5 U	3.8 U	5.3 U	4.3 U	4.2 U
1,3-Dichloropropene (trans)	4.5 U	3.8 U	5.3 U	4.3 U	4.2 U
1,4-Dichloro-2-butene (trans)	18 U	15 U	21 U	17 U	17 U
1,4-Dioxane (p-)	220 R	190 R	260 R	210 R	210 R
2-Butanone (MEK)	11 U	9.6 U	13 U	11 U	17 U
2-Chloro-1,3-butadiene (Chloroprene)	4.5 U	3.8 U	5.3 U	4.3 U	4.2 U
2-Hexanone (MBK)	11 U	9.6 U	13 U	11 U	1.5 J
3-Chloropropene (Allyl Chloride)	4.5 U	3.8 U	5.3 U	4.3 U	4.2 U
4-Methyl-2-pentanone (MIBK)	11 U	9.6 U	13 U	11 U	11 U
Acetone	130	120	61	54	150
Acetonitrile	4.5 U	3.8 U	5.3 U	4.3 U	4.2 U
Acrolein	45 R	38 R	53 R	43 R	42 R
Acrylonitrile	45 R	38 R	53 R	43 R	42 R
Benzene	4.5 U	0.3 J	5.3 U	4.3 U	0.44 J
Bromodichloromethane	4.5 U	3.8 U	5.3 U	4.3 U	4.2 U
Bromoform	4.5 U	3.8 U	5.3 U	4.3 U	4.2 U
Bromomethane	4.5 U	3.8 U	5.3 U	4.3 U	4.2 U
Carbon Disulfide	4.5 U	3.8 U	4.9 J	4.3 U	0.72 J
Carbon Tetrachloride	4.5 U	3.8 U	5.3 U	4.3 U	4.2 U
Chlorobenzene	4.5 U	3.8 U	5.3 U	4.3 U	4.2 U
Chloroethane	4.5 U	3.8 U	5.3 U	4.3 U	4.2 U
Chloroform	4.5 U	3.8 U	5.3 U	4.3 U	4.2 U
Chloromethane	4.5 U	3.8 U	0.92 J	0.3 J	4.2 U
Dibromochloromethane	4.5 U	3.8 U	5.3 U	4.3 U	4.2 U
Dibromomethane	4.5 U	3.8 U	5.3 U	4.3 U	4.2 U
Dichlorodifluoromethane (Freon-12)	4.5 U	3.8 U	5.3 U	4.3 U	4.2 U
Ethyl Methacrylate	45 U	38 U	53 U	43 U	42 U
Ethylbenzene	4.5 U	3.8 U	5.3 U	4.3 U	4.2 U
Isobutyl Alcohol	220 R	190 R	260 R	210 R	210 R
Methyl Acrylonitrile	45 U	38 U	53 U	43 U	42 U
Methyl Iodide	1.9 J	1 J	5.3 U	0.78 J	4.1 J
Methyl Methacrylate	45 R	38 R	53 R	43 R	42 R

APPENDIX C

SUMMARY OF ANALYTICAL RESULTS, SUBSURFACE SOIL
SWMU 67 – FORMER GAS STATION
PHASE I RFI REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Site ID	67SB01	67SB01	67SB01	67SB02	67SB02
Sample ID	67SB01-01	67SB01-01D	67SB01-03	67SB02-01	67SB02-02
Sample Date	3/24/2010	3/24/2010	3/24/2010	3/25/2010	3/25/2010
Sample Depth (ft bgs)	1.0 - 3.0	1.0 - 3.0	5.0 - 7.0	1.0 - 3.0	3.0 - 5.0
Volatiles (µg/kg) (Cont)					
Methylene Chloride	4.5 U	3.8 U	5.3 U	4.3 U	4.2 U
Pentachloroethane	4.5 U	3.8 U	5.3 U	4.3 U	4.2 U
Propionitrile (Ethyl Cyanide)	220 R	190 R	260 R	210 R	210 R
Styrene (Ethenylbenzene)	4.5 U	3.8 U	5.3 U	4.3 U	4.2 U
Tetrachloroethene (PCE)	4.5 U	3.8 U	5.3 U	4.3 U	4.2 U
Toluene	4.5 U	3.8 U	5.3 U	4.3 U	4.2 U
Trichloroethene (TCE)	4.5 U	3.8 U	5.3 U	4.3 U	4.2 U
Trichlorofluoromethane (Freon 11)	4.5 U	3.8 U	5.3 U	4.3 U	4.2 U
Vinyl Acetate	4.5 U	3.8 U	5.3 U	4.3 U	4.2 U
Vinyl Chloride	4.5 U	3.8 U	5.3 U	4.3 U	4.2 U
Xylene, m/p-	9 U	7.6 U	11 U	8.5 U	8.5 U
Xylene, o-	4.5 U	3.8 U	5.3 U	4.3 U	4.2 U
Xylenes, total	4.5 U	3.8 U	5.3 U	4.3 U	4.2 U
Semivolatiles (µg/kg)					
1,2,4,5-Tetrachlorobenzene	180 U	180 U	210 U	200 U	190 U
1,2,4-Trichlorobenzene	180 U	180 U	210 U	200 U	190 U
1,2-Dichlorobenzene (o-)	180 U	180 U	210 U	200 U	190 U
1,3,5-Trinitrobenzene (TNB)	180 U	180 U	210 U	200 U	190 U
1,3-Dichlorobenzene (m-)	180 U	180 U	210 U	200 U	190 U
1,3-Dinitrobenzene (m-)	180 U	180 U	210 U	200 U	190 U
1,4-Dichlorobenzene (p-)	180 U	180 U	210 U	200 U	190 U
1,4-Naphthoquinone	180 UJ	180 UJ	210 UJ	200 UJ	190 UJ
1,4-Phenylenediamine	1800 R	1800 R	2100 R	2000 R	1900 R
1-Naphthylamine	180 U	180 U	210 U	200 U	190 U
2,2'-Oxybis[1-chloropropane]	180 U	180 U	210 U	200 U	190 U
2,3,4,6-Tetrachlorophenol	360 U	350 U	410 U	400 U	370 U
2,4,5-Trichlorophenol	360 U	350 U	410 U	400 U	370 U
2,4,6-Trichlorophenol	360 U	350 U	410 U	400 U	370 U
2,4-Dichlorophenol	360 U	350 U	410 U	400 UJ	370 UJ
2,4-Dimethylphenol	360 U	350 U	410 U	400 U	370 U
2,4-Dinitrophenol	360 U	350 U	410 U	400 U	370 U
2,4-Dinitrotoluene (DNT)	180 U	180 U	210 U	200 U	190 U
2,6-Dichlorophenol	360 UJ	350 UJ	410 UJ	400 UJ	370 UJ
2,6-Dinitrotoluene (DNT)	180 U	180 U	210 U	200 U	190 U
2-Acetylaminofluorene	180 U	180 U	210 U	200 U	190 U
2-Chloronaphthalene	180 U	180 U	210 U	200 U	190 U
2-Chlorophenol	360 U	350 U	410 U	400 U	370 U
2-Methyl-5-nitroaniline	180 U	180 U	210 U	200 U	190 U
2-Methylphenol (o-Cresol)	360 U	350 U	410 U	400 U	370 U
2-Naphthylamine	180 U	180 U	210 U	200 U	190 U
2-Nitroaniline	180 U	180 U	210 U	200 U	190 U
2-Nitrophenol	360 U	350 U	410 U	400 U	370 U
2-Picoline	180 U	180 U	210 U	200 U	190 U

APPENDIX C

SUMMARY OF ANALYTICAL RESULTS, SUBSURFACE SOIL
SWMU 67 – FORMER GAS STATION
PHASE I RFI REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Site ID	67SB01	67SB01	67SB01	67SB02	67SB02
Sample ID	67SB01-01	67SB01-01D	67SB01-03	67SB02-01	67SB02-02
Sample Date	3/24/2010	3/24/2010	3/24/2010	3/25/2010	3/25/2010
Sample Depth (ft bgs)	1.0 - 3.0	1.0 - 3.0	5.0 - 7.0	1.0 - 3.0	3.0 - 5.0
Semivolatiles (µg/kg) (Cont)					
3,3'-Dichlorobenzidine	180 U	180 U	210 U	200 U	190 U
3,3'-Dimethylbenzidine	180 U	180 U	210 U	200 U	190 U
3-Methylcholanthrene	180 U	180 U	210 U	200 U	190 U
3-Methylphenol (m-Cresol)	270 UJ	260 UJ	310 UJ	300 UJ	280 UJ
3-Nitroaniline	360 U	350 U	410 U	400 U	370 U
4,6-Dinitro-2-methylphenol	360 U	350 U	410 U	400 U	370 U
4-Aminobiphenyl	180 U	180 U	210 U	200 U	190 U
4-Bromophenyl-phenylether	180 U	180 U	210 U	200 U	190 U
4-Chloro-3-methylphenol	360 U	350 U	410 U	400 U	370 U
4-Chloroaniline	360 U	350 U	410 U	400 U	370 U
4-Chlorophenyl-phenylether	180 U	180 U	210 U	200 U	190 U
4-Dimethylaminoazobenzene (p-)	180 U	180 U	210 U	200 U	190 U
4-Methylphenol (p-Cresol)	270 U	260 U	310 U	300 U	280 U
4-Nitroaniline	360 U	350 U	410 U	400 U	370 U
4-Nitrophenol	360 U	350 U	410 U	400 U	370 U
4-Nitroquinoline-1-oxide	180 UJ	180 UJ	210 UJ	200 UJ	190 UJ
7,12-Dimethylbenz(a)anthracene	180 UJ	180 UJ	210 UJ	200 UJ	190 UJ
Acetophenone	180 U	180 U	210 U	200 U	190 U
Aniline	180 U	180 U	210 U	200 U	190 U
Aramite	180 U	180 U	210 U	200 U	190 U
Benzyl Alcohol	180 U	180 U	210 U	200 U	190 U
Bis(2-chloroethoxy)methane	180 U	180 U	210 U	200 U	190 U
Bis(2-chloroethyl)ether	180 U	180 U	210 U	200 U	190 U
Bis(2-ethylhexyl) Phthalate (BEHP)	180 U	61 J	210 U	200 U	190 U
Butyl Benzyl Phthalate	180 U	180 U	210 U	200 U	190 U
Diallate (cis)	180 U	180 U	210 U	200 U	190 U
Diallate (total)	180 U	180 U	210 U	200 U	190 U
Diallate (trans)	180 UJ	180 UJ	210 UJ	200 UJ	190 UJ
Dibenzofuran	180 U	180 U	210 U	200 U	190 U
Diethyl Phthalate (DEP)	180 U	180 U	210 U	200 U	190 U
Dimethyl Phthalate	180 U	180 U	210 U	200 U	190 U
Di-n-butyl Phthalate (DBP)	180 U	180 U	210 U	200 U	190 U
Di-n-octyl Phthalate	180 U	180 U	210 U	200 U	190 U
Dinoseb	180 U	180 U	210 U	200 U	190 U
Ethyl Methane Sulfonate (EMS)	180 U	180 U	210 U	200 U	190 U
Hexachloro-1,3-butadiene	180 U	180 U	210 U	200 U	190 U
Hexachlorobenzene	180 U	180 U	210 U	200 U	190 U
Hexachlorocyclopentadiene	180 U	180 U	210 U	200 U	190 U
Hexachloroethane	180 U	180 U	210 U	200 U	190 U
Hexachloropropene	180 UJ	180 UJ	210 UJ	200 UJ	190 UJ
Indeno(1,2,3-cd)pyrene	180 U	180 U	210 U	200 U	190 U
Isophorone	180 U	180 U	210 U	200 U	190 U
Isosafrole	180 U	180 U	210 U	200 U	190 U

APPENDIX C

SUMMARY OF ANALYTICAL RESULTS, SUBSURFACE SOIL
SWMU 67 – FORMER GAS STATION
PHASE I RFI REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Site ID	67SB01	67SB01	67SB01	67SB02	67SB02
Sample ID	67SB01-01	67SB01-01D	67SB01-03	67SB02-01	67SB02-02
Sample Date	3/24/2010	3/24/2010	3/24/2010	3/25/2010	3/25/2010
Sample Depth (ft bgs)	1.0 - 3.0	1.0 - 3.0	5.0 - 7.0	1.0 - 3.0	3.0 - 5.0
Semivolatiles (µg/kg) (Cont)					
Methapyrilene	180 UJ	180 UJ	210 UJ	200 R	190 R
Methyl Methane Sulfonate	180 U	180 U	210 U	200 U	190 U
Nitrobenzene	180 U	180 U	210 U	200 U	190 U
n-Nitrosodiethylamine	180 U	180 U	210 U	200 U	190 U
n-Nitrosodimethylamine (NDMA)	180 U	180 U	210 U	200 U	190 U
n-Nitroso-di-n-butylamine	180 U	180 U	210 U	200 U	190 U
n-Nitrosodi-n-propylamine	180 U	180 U	210 U	200 U	190 U
n-Nitrosodiphenylamine	180 U	180 U	210 U	200 U	190 U
n-Nitrosomethylethylamine	180 U	180 U	210 U	200 U	190 U
n-Nitrosomorpholine	180 U	180 U	210 U	200 U	190 U
n-Nitrosopiperidine	180 U	180 U	210 U	200 U	190 U
n-Nitrosopyrrolidine	180 U	180 U	210 U	200 U	190 U
o-Toluidine	180 U	180 U	210 U	200 U	190 U
Pentachlorobenzene	180 U	180 U	210 U	200 U	190 U
Pentachloronitrobenzene	180 U	180 U	210 U	200 U	190 U
Pentachlorophenol	360 U	350 U	410 U	400 U	370 U
Phenacetin	180 U	180 U	210 U	200 U	190 U
Phenol	360 U	350 U	410 U	400 U	370 U
Pronamide	360 U	350 U	410 U	400 U	370 U
Pyridine	180 U	180 U	210 U	200 U	190 U
Safrole	180 U	180 U	210 U	200 U	190 U
PAHs (µg/kg) - Low Molecular Weight					
2-Methylnaphthalene	9 U	8.8 U	10 U	10 U	9.3 U
Acenaphthene	9 U	8.8 U	10 U	10 U	9.3 U
Acenaphthylene	9 U	8.8 U	10 U	10 U	0.67 J
Anthracene	9 U	0.63 J	10 U	10 U	9.3 U
Fluoranthene	9 U	8.8 U	10 U	10 U	9.3 U
Fluorene	9 UJ	8.8 UJ	10 UJ	10 U	9.3 U
Naphthalene	9 U	8.8 U	1.4 J	10 U	9.3 U
Phenanthrene	9 U	8.8 U	10 U	10 U	9.3 U
PAHs (µg/kg) - High Molecular Weight					
Benzo(a)anthracene	9 U	1.5 J	10 U	10 UJ	9.3 UJ
Benzo(a)pyrene (BaP)	0.45 J	1.6 J	10 U	10 U	9.3 U
Benzo(b)fluoranthene	9 UJ	1.1 J	10 UJ	10 UJ	9.3 UJ
Benzo(g,h,i)perylene	9 U	1.5 J	0.56 J	10 U	9.3 U
Benzo(k)fluoranthene	0.48 J	1.5 J	10 U	10 U	9.3 U
Chrysene	9 U	1.3 J	10 U	10 U	9.3 U
Dibenz(a,h)anthracene	9 U	8.8 UJ	10 U	10 UJ	9.3 UJ
Indeno(1,2,3-cd)pyrene	0.49 J	1.8 J	0.67 J	10 UJ	9.3 UJ
Pyrene	9 U	1.1 J	0.74 J	0.68 J	9.3 U
PAH totals (µg/kg)					
Low molecular weight PAHs	72	62.2	71.4	80	65.77
High molecular weight PAHs	55.42	20.2	61.97	80.7	83.7

APPENDIX C

SUMMARY OF ANALYTICAL RESULTS, SUBSURFACE SOIL
SWMU 67 – FORMER GAS STATION
PHASE I RFI REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Site ID	67SB01	67SB01	67SB01	67SB02	67SB02
Sample ID	67SB01-01	67SB01-01D	67SB01-03	67SB02-01	67SB02-02
Sample Date	3/24/2010	3/24/2010	3/24/2010	3/25/2010	3/25/2010
Sample Depth (ft bgs)	1.0 - 3.0	1.0 - 3.0	5.0 - 7.0	1.0 - 3.0	3.0 - 5.0
TPH (mg/kg)					
Diesel Range Organics (DRO)	11 U	11 U	12 U	12 U	13
Gasoline Range Organics (GRO)	0.54 U	0.53 U	0.62 U	0.6 U	0.56 U
Total TPH	11.54 U	11.5 U	12.62 U	12.6 U	13.56
Inorganics (mg/kg)					
Antimony	1.1 UJ	1.1 UJ	6.2 UJ	1.2 UJ	1.1 UJ
Arsenic	0.66	0.63	3.1 U	0.6 U	1.2
Barium	114	153	652	251	282
Beryllium	0.32 J	0.35 J	4.9	0.78	0.55 J
Cadmium	0.22 J	0.2 J	0.85 J	0.2 J	0.45 J
Chromium	34.7	37.6	233	57.6 J	48.8 J
Cobalt	27.4 J	30.7 J	472 J	28.8 J	99.2 J
Copper	91.4 J	98.2 J	681 J	138 J	56.2 J
Lead	142 R	7.5 R	12.3 J	4.5	8.5
Mercury	0.024 J	0.03 J	0.041 U	0.02 J	0.098
Nickel	12.5	14.3	310	26.6 J	15.4 J
Selenium	0.95 J	0.96 J	5.9 J	1 J	1.7 J
Silver	0.69	0.53 U	3.1 U	0.6 U	0.56 U
Thallium	0.26 J	0.31 J	4.2	0.58 J	0.21 J
Tin	5.3 U	5.3 U	6.2 U	5.6 U	5.6 U
Vanadium	196 J	200 J	1480 J	228 J	306 J
Zinc	62.8	72	541	97 J	67.4 J

Notes:

ft bgs - feet below ground surface
µg/kg - micrograms per kilogram
mg/kg - milligrams per kilogram
TPH - Total Petroleum Hydrocarbons
PAH - Polyaromatic Hydrocarbons
U - Not detected
J - Analyte present; value is estimated
R - Result is rejected and unusable
UJ - Reported quantitation limit is estimated
JN - Estimated: The analyte was tentatively identified; the quantitation is an estimation

APPENDIX C

SUMMARY OF ANALYTICAL RESULTS, SUBSURFACE SOIL
SWMU 67 – FORMER GAS STATION
PHASE I RFI REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Site ID	67SB03	67SB03	67SB04	67SB04	67SB05
Sample ID	67SB03-01	67SB03-04	67SB04-01	67SB04-03	67SB05-01
Sample Date	3/26/2010	3/26/2010	3/25/2010	3/25/2010	3/24/2010
Sample Depth (ft bgs)	1.0 - 3.0	7.0 - 9.0	1.0 - 3.0	5.0 - 7.0	1.0 - 3.0
Volatiles (µg/kg)					
1,1,1,2-Tetrachloroethane	4.4 U	4.5 U	3.7 U	4.6 U	4.7 U
1,1,1-Trichloroethane	4.4 U	4.5 U	3.7 U	4.6 U	4.7 U
1,1,2,2-Tetrachloroethane	4.4 U	4.5 U	3.7 U	4.6 U	4.7 U
1,1,2-Trichloroethane	4.4 U	4.5 U	3.7 U	4.6 U	4.7 U
1,1-Dichloroethane	4.4 U	4.5 U	3.7 U	4.6 U	4.7 U
1,1-Dichloroethene	4.4 U	4.5 U	3.7 U	4.6 U	4.7 U
1,2,3-Trichloropropane	4.4 U	4.5 U	3.7 U	4.6 U	4.7 U
1,2-Dibromo-3-chloropropane (DBCP)	4.4 U	4.5 U	3.7 U	4.6 U	4.7 U
1,2-Dibromoethane (EDB)	4.4 U	4.5 U	3.7 U	4.6 U	4.7 U
1,2-Dichloroethane	4.4 U	4.5 U	3.7 U	4.6 U	4.7 U
1,2-Dichloroethene (trans)	4.4 U	4.5 U	3.7 U	4.6 U	4.7 U
1,2-Dichloropropane	4.4 UJ	4.5 UJ	3.7 UJ	4.6 UJ	4.7 UJ
1,3-Dichloropropene (cis)	4.4 U	4.5 U	3.7 U	4.6 U	4.7 U
1,3-Dichloropropene (trans)	4.4 U	4.5 U	3.7 U	4.6 U	4.7 U
1,4-Dichloro-2-butene (trans)	18 U	18 U	15 U	18 U	19 U
1,4-Dioxane (p-)	220 R	230 R	190 R	230 R	230 R
2-Butanone (MEK)	11 U	8 J	9.3 U	7.2 J	12 U
2-Chloro-1,3-butadiene (Chloroprene)	4.4 U	4.5 U	3.7 U	4.6 U	4.7 U
2-Hexanone (MBK)	11 U	11 U	9.3 U	11 U	12 U
3-Chloropropene (Allyl Chloride)	4.4 U	4.5 U	3.7 U	4.6 U	4.7 U
4-Methyl-2-pentanone (MIBK)	11 U	11 U	9.3 U	11 U	12 U
Acetone	23 J	120 J	19 U	61	47
Acetonitrile	4.4 U	4.5 U	3.7 U	4.6 U	4.7 U
Acrolein	44 R	45 R	37 R	46 R	47 R
Acrylonitrile	44 R	45 R	37 R	46 R	47 R
Benzene	0.4 J	4.5 U	0.5 J	4.6 U	4.7 U
Bromodichloromethane	4.4 U	4.5 U	3.7 U	4.6 U	4.7 U
Bromoform	4.4 U	4.5 U	3.7 U	4.6 U	4.7 U
Bromomethane	4.4 U	4.5 U	3.7 U	4.6 U	4.7 U
Carbon Disulfide	4.4 U	0.95 J	3.7 U	5	4.7 U
Carbon Tetrachloride	4.4 U	4.5 U	3.7 U	4.6 U	4.7 U
Chlorobenzene	4.4 U	4.5 U	3.7 U	4.6 U	4.7 U
Chloroethane	4.4 U	4.5 U	3.7 U	4.6 U	4.7 U
Chloroform	4.4 U	4.5 U	3.7 U	4.6 U	4.7 U
Chloromethane	4.4 UJ	0.44 J	3.7 U	4.6 U	4.7 U
Dibromochloromethane	4.4 U	4.5 U	3.7 U	4.6 U	4.7 U
Dibromomethane	4.4 U	4.5 U	3.7 U	4.6 U	4.7 U
Dichlorodifluoromethane (Freon-12)	4.4 U	4.5 U	3.7 U	4.6 U	4.7 U
Ethyl Methacrylate	44 U	45 U	37 U	46 U	47 U
Ethylbenzene	4.4 U	4.5 U	3.7 U	4.6 U	4.7 U
Isobutyl Alcohol	220 R	230 R	190 R	230 R	230 R
Methyl Acrylonitrile	44 U	45 U	37 U	46 U	47 U
Methyl Iodide	4.4 U	1.6 J	3.7 U	1.5 J	4.7 U
Methyl Methacrylate	44 R	45 R	37 R	46 R	47 R

APPENDIX C

SUMMARY OF ANALYTICAL RESULTS, SUBSURFACE SOIL
SWMU 67 – FORMER GAS STATION
PHASE I RFI REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Site ID	67SB03	67SB03	67SB04	67SB04	67SB05
Sample ID	67SB03-01	67SB03-04	67SB04-01	67SB04-03	67SB05-01
Sample Date	3/26/2010	3/26/2010	3/25/2010	3/25/2010	3/24/2010
Sample Depth (ft bgs)	1.0 - 3.0	7.0 - 9.0	1.0 - 3.0	5.0 - 7.0	1.0 - 3.0
Volatiles (µg/kg) (Cont)					
Methylene Chloride	4.4 U	4.5 U	3.7 U	4.6 U	4.7 U
Pentachloroethane	4.4 U	4.5 U	3.7 U	4.6 U	4.7 U
Propionitrile (Ethyl Cyanide)	220 R	230 R	190 R	230 R	230 R
Styrene (Ethenylbenzene)	4.4 U	4.5 U	3.7 U	4.6 U	4.7 U
Tetrachloroethene (PCE)	4.4 U	4.5 U	3.7 U	4.6 U	4.7 U
Toluene	4.4 U	4.5 U	3.7 U	4.6 U	4.7 U
Trichloroethene (TCE)	4.4 U	4.5 U	3.7 U	4.6 U	4.7 U
Trichlorofluoromethane (Freon 11)	4.4 U	4.5 U	3.7 U	4.6 U	4.7 U
Vinyl Acetate	4.4 U	4.5 U	3.7 U	4.6 U	4.7 U
Vinyl Chloride	4.4 U	4.5 U	3.7 U	4.6 U	4.7 U
Xylene, m/p-	8.8 U	9.1 U	7.5 U	9.1 U	9.3 U
Xylene, o-	4.4 U	4.5 U	3.7 U	4.6 U	4.7 U
Xylenes, total	4.4 U	4.5 U	3.7 U	4.6 U	4.7 U
Semivolatiles (µg/kg)					
1,2,4,5-Tetrachlorobenzene	180 U	210 U	180 U	210 U	210 U
1,2,4-Trichlorobenzene	180 U	210 U	180 U	210 U	210 U
1,2-Dichlorobenzene (o-)	180 U	210 U	180 U	210 U	210 U
1,3,5-Trinitrobenzene (TNB)	180 U	210 U	180 U	210 U	210 U
1,3-Dichlorobenzene (m-)	180 U	210 U	180 U	210 U	210 U
1,3-Dinitrobenzene (m-)	180 U	210 U	180 U	210 U	210 U
1,4-Dichlorobenzene (p-)	180 U	210 U	180 U	210 U	210 U
1,4-Naphthoquinone	180 UJ	210 UJ	180 UJ	210 UJ	210 UJ
1,4-Phenylenediamine	1800 R	2100 R	### R	2100 R	2100 R
1-Naphthylamine	180 U	210 U	180 R	210 U	210 U
2,2'-Oxybis[1-chloropropane]	180 U	210 U	180 U	210 U	210 U
2,3,4,6-Tetrachlorophenol	350 U	410 U	350 U	400 U	410 U
2,4,5-Trichlorophenol	350 U	410 U	350 U	400 U	410 U
2,4,6-Trichlorophenol	350 U	410 U	350 U	400 U	410 U
2,4-Dichlorophenol	350 U	410 U	350 U	400 U	410 U
2,4-Dimethylphenol	350 U	410 U	350 U	400 U	410 U
2,4-Dinitrophenol	350 U	410 U	350 U	400 U	410 U
2,4-Dinitrotoluene (DNT)	180 U	210 U	180 U	210 U	210 U
2,6-Dichlorophenol	350 UJ	410 UJ	350 UJ	400 UJ	410 UJ
2,6-Dinitrotoluene (DNT)	180 U	210 U	180 U	210 U	210 U
2-Acetylaminofluorene	180 U	210 U	180 U	210 U	210 U
2-Chloronaphthalene	180 U	210 U	180 U	210 U	210 U
2-Chlorophenol	350 U	410 U	350 U	400 U	410 UJ
2-Methyl-5-nitroaniline	180 U	210 U	180 U	210 U	210 U
2-Methylphenol (o-Cresol)	350 U	410 U	350 U	400 U	410 U
2-Naphthylamine	180 U	210 U	180 U	210 U	210 U
2-Nitroaniline	180 U	210 U	180 U	210 U	210 U
2-Nitrophenol	350 U	410 U	350 U	400 U	410 U
2-Picoline	180 U	210 U	180 U	210 U	210 U

APPENDIX C

SUMMARY OF ANALYTICAL RESULTS, SUBSURFACE SOIL
SWMU 67 – FORMER GAS STATION
PHASE I RFI REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Site ID	67SB03	67SB03	67SB04	67SB04	67SB05
Sample ID	67SB03-01	67SB03-04	67SB04-01	67SB04-03	67SB05-01
Sample Date	3/26/2010	3/26/2010	3/25/2010	3/25/2010	3/24/2010
Sample Depth (ft bgs)	1.0 - 3.0	7.0 - 9.0	1.0 - 3.0	5.0 - 7.0	1.0 - 3.0
Semivolatiles (µg/kg) (Cont)					
3,3'-Dichlorobenzidine	180 U	210 U	180 U	210 U	210 U
3,3'-Dimethylbenzidine	180 U	210 U	180 R	210 U	210 U
3-Methylcholanthrene	180 U	210 U	180 U	210 U	210 U
3-Methylphenol (m-Cresol)	270 U	310 U	270 U	300 U	310 U
3-Nitroaniline	350 U	410 U	350 U	400 U	410 U
4,6-Dinitro-2-methylphenol	350 U	410 U	350 U	400 U	410 U
4-Aminobiphenyl	180 U	210 U	180 U	210 U	210 U
4-Bromophenyl-phenylether	180 U	210 U	180 U	210 U	210 U
4-Chloro-3-methylphenol	350 U	410 U	350 U	400 U	410 U
4-Chloroaniline	350 U	410 U	350 U	400 U	410 U
4-Chlorophenyl-phenylether	180 U	210 U	180 U	210 U	210 U
4-Dimethylaminoazobenzene (p-)	180 U	210 U	180 U	210 U	210 U
4-Methylphenol (p-Cresol)	270 U	310 U	270 U	300 U	310 U
4-Nitroaniline	350 U	410 U	350 U	400 U	410 U
4-Nitrophenol	350 U	410 U	350 U	400 U	410 U
4-Nitroquinoline-1-oxide	180 UJ	210 UJ	180 UJ	210 UJ	210 UJ
7,12-Dimethylbenz(a)anthracene	180 UJ	210 UJ	180 UJ	210 UJ	210 UJ
Acetophenone	180 U	210 U	180 U	210 U	210 U
Aniline	180 U	210 U	180 U	210 U	210 UJ
Aramite	180 U	210 U	180 U	210 U	210 U
Benzyl Alcohol	180 U	210 U	180 U	210 U	210 UJ
Bis(2-chloroethoxy)methane	180 U	210 U	180 U	210 U	210 U
Bis(2-chloroethyl)ether	180 U	210 U	180 U	210 U	210 U
Bis(2-ethylhexyl) Phthalate (BEHP)	46 J	210 U	49 J	61 J	210 U
Butyl Benzyl Phthalate	180 U	210 U	180 U	210 U	210 U
Diallate (cis)	180 U	210 U	180 U	210 U	210 U
Diallate (total)	180 U	210 U	180 U	210 U	210 UJ
Diallate (trans)	180 UJ	210 UJ	180 UJ	210 UJ	210 UJ
Dibenzofuran	180 U	210 U	180 U	210 U	210 U
Diethyl Phthalate (DEP)	180 U	210 U	180 U	210 U	210 U
Dimethyl Phthalate	180 U	210 U	180 U	210 U	210 U
Di-n-butyl Phthalate (DBP)	180 U	210 U	180 U	210 U	210 U
Di-n-octyl Phthalate	180 U	210 U	180 U	210 U	210 U
Dinoseb	180 U	210 U	180 U	210 U	210 U
Ethyl Methane Sulfonate (EMS)	180 U	210 U	180 U	210 U	210 U
Hexachloro-1,3-butadiene	180 U	210 U	180 U	210 U	210 U
Hexachlorobenzene	180 U	210 U	180 U	210 U	210 U
Hexachlorocyclopentadiene	180 U	210 U	180 U	210 U	210 U
Hexachloroethane	180 U	210 U	180 U	210 U	210 U
Hexachloropropene	180 UJ	210 UJ	180 UJ	210 UJ	210 UJ
Indeno(1,2,3-cd)pyrene	180 U	210 U	180 UJ	210 UJ	210 U
Isophorone	180 U	210 U	180 U	210 U	210 U
Isosafrole	180 U	210 U	180 U	210 U	210 U

APPENDIX C

SUMMARY OF ANALYTICAL RESULTS, SUBSURFACE SOIL
SWMU 67 – FORMER GAS STATION
PHASE I RFI REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Site ID	67SB03	67SB03	67SB04	67SB04	67SB05
Sample ID	67SB03-01	67SB03-04	67SB04-01	67SB04-03	67SB05-01
Sample Date	3/26/2010	3/26/2010	3/25/2010	3/25/2010	3/24/2010
Sample Depth (ft bgs)	1.0 - 3.0	7.0 - 9.0	1.0 - 3.0	5.0 - 7.0	1.0 - 3.0
Semivolatiles (µg/kg) (Cont)					
Methapyrilene	180 U	210 U	180 R	210 U	210 UJ
Methyl Methane Sulfonate	180 U	210 U	180 U	210 U	210 UJ
Nitrobenzene	180 U	210 U	180 U	210 U	210 U
n-Nitrosodiethylamine	180 U	210 U	180 U	210 U	210 U
n-Nitrosodimethylamine (NDMA)	180 U	210 U	180 U	210 U	210 U
n-Nitroso-di-n-butylamine	180 U	210 U	180 U	210 U	210 U
n-Nitrosodi-n-propylamine	180 U	210 U	180 U	210 U	210 UJ
n-Nitrosodiphenylamine	180 U	210 U	180 U	210 U	210 U
n-Nitrosomethylethylamine	180 U	210 U	180 U	210 U	210 U
n-Nitrosomorpholine	180 U	210 U	180 U	210 U	210 U
n-Nitrosopiperidine	180 U	210 U	180 U	210 U	210 U
n-Nitrosopyrrolidine	180 U	210 U	180 U	210 U	210 U
o-Toluidine	180 U	210 U	180 U	210 U	210 U
Pentachlorobenzene	180 U	210 U	180 U	210 U	210 U
Pentachloronitrobenzene	180 U	210 U	180 U	210 U	210 U
Pentachlorophenol	350 U	410 U	350 U	400 U	410 U
Phenacetin	180 U	210 U	180 U	210 U	210 U
Phenol	350 U	410 U	350 U	400 U	410 U
Pronamide	350 U	410 U	350 U	400 U	410 U
Pyridine	180 U	210 U	180 U	210 U	210 UJ
Safrole	180 U	210 U	180 U	210 U	210 U
PAHs (µg/kg) - Low Molecular Weight					
2-Methylnaphthalene	8.9 U	10 U	8.9 U	10 U	10 U
Acenaphthene	8.9 U	10 U	8.9 U	10 U	10 U
Acenaphthylene	8.9 U	10 U	1.2 J	10 U	10 U
Anthracene	8.9 U	10 U	1.5 J	10 U	10 U
Fluoranthene	8.9 U	10 U	16	10 U	10 U
Fluorene	8.9 U	10 U	8.9 U	10 U	10 UJ
Naphthalene	8.9 U	10 U	8.9 U	10 U	10 U
Phenanthrene	8.9 U	2.2 J	6.3 J	10 U	10 U
PAHs (µg/kg) - High Molecular Weight					
Benzo(a)anthracene	0.9 J	0.78 J	4.8 J	10 U	10 U
Benzo(a)pyrene (BaP)	0.66 J	10 U	5.6 J	10 U	10 U
Benzo(b)fluoranthene	1 JN	0.84 JN	4.6 J	10 U	10 UJ
Benzo(g,h,i)perylene	8.9 U	10 U	3.6 J	0.79 J	10 U
Benzo(k)fluoranthene	0.95 JN	0.79 JN	8.9 U	10 U	10 U
Chrysene	0.8 J	10 U	6.4 J	10 U	10 U
Dibenz(a,h)anthracene	8.9 U	10 U	8.9 U	10 U	10 U
Indeno(1,2,3-cd)pyrene	8.9 U	0.55 J	5.4 J	10 U	10 U
Pyrene	0.99 J	1.5 J	13	0.73 J	10 U
PAH totals (µg/kg)					
Low molecular weight PAHs	71.2	72.2	61	80	80
High molecular weight PAHs	32	44.46	61	71.5	90

APPENDIX C

SUMMARY OF ANALYTICAL RESULTS, SUBSURFACE SOIL
SWMU 67 – FORMER GAS STATION
PHASE I RFI REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Site ID	67SB03	67SB03	67SB04	67SB04	67SB05
Sample ID	67SB03-01	67SB03-04	67SB04-01	67SB04-03	67SB05-01
Sample Date	3/26/2010	3/26/2010	3/25/2010	3/25/2010	3/24/2010
Sample Depth (ft bgs)	1.0 - 3.0	7.0 - 9.0	1.0 - 3.0	5.0 - 7.0	1.0 - 3.0
TPH (mg/kg)					
Diesel Range Organics (DRO)	11 U	13 U	11 U	12 U	18
Gasoline Range Organics (GRO)	0.54 U	0.62 U	0.5 U	0.61 U	0.62 U
Total TPH	11.54 U	13.62 U	12 U	12.6 U	18.62
Inorganics (mg/kg)					
Antimony	0.14 J	6.1 UJ	1.1 UJ	0.2 J	1.2 UJ
Arsenic	0.37 J	3.1 U	0.9	0.95	1.4
Barium	58.8	18.3 J	67	139	22.6
Beryllium	0.19 J	0.32 J	0.2 J	0.57	0.21 J
Cadmium	0.21 J	3.1 U	0.3 J	0.4 J	0.13 J
Chromium	6.7 J	11.5 J	42 J	22.4 J	20.4
Cobalt	27.1	15	23	39.5	11.6 J
Copper	78.4	28.7	92	42.1	34.5 J
Lead	1.1	1.7 J	8.3	4.4	4.7 J
Mercury	0.035 U	0.082	0 U	0.12	0.22
Nickel	5.3	4.7	16	6.6	3.4
Selenium	0.22 J	1.4 J	0.4 J	2.2 J	2.4 J
Silver	0.05 J	3.1 U	0.5 U	0.1 J	0.62 U
Thallium	0.055 J	3.1 U	0 J	0.06 J	0.061 J
Tin	5.2 UJ	6.1 UJ	5.3 UJ	5.9 UJ	6.2 U
Vanadium	160	176	143	233	267 J
Zinc	64.5 J	48.1 J	56 J	63.4 J	19.6

Notes:

ft bgs - feet below ground surface
µg/kg - micrograms per kilogram
mg/kg - milligrams per kilogram
TPH - Total Petroleum Hydrocarbons
PAH - Polyaromatic Hydrocarbons
U - Not detected
J - Analyte present; value is estimated
R - Result is rejected and unusable
UJ - Reported quantitation limit is estimated
JN - Estimated: The analyte was tentatively identified; the quantitation is an estimation

APPENDIX C

SUMMARY OF ANALYTICAL RESULTS, SUBSURFACE SOIL
SWMU 67 – FORMER GAS STATION
PHASE I RFI REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Site ID	67SB05	67SB06	67SB06	67SB06	67SB07
Sample ID	67SB05-05	67SB06-01	67SB06-01D	67SB06-05	67SB07-01
Sample Date	3/24/2010	3/23/2010	3/23/2010	3/23/2010	3/23/2010
Sample Depth (ft bgs)	9.0 - 11.0	1.0 - 3.0	1.0 - 3.0	9.0 - 11.0	1.0 - 3.0
Volatiles (µg/kg)					
1,1,1,2-Tetrachloroethane	4.7 U	4.2 U	4 U	4.7 U	4.3 U
1,1,1-Trichloroethane	4.7 U	4.2 U	4 U	4.7 U	4.3 U
1,1,2,2-Tetrachloroethane	4.7 U	4.2 U	4 U	4.7 U	4.3 U
1,1,2-Trichloroethane	4.7 U	4.2 U	4 U	4.7 U	4.3 U
1,1-Dichloroethane	4.7 U	4.2 U	4 U	4.7 U	4.3 U
1,1-Dichloroethene	4.7 U	4.2 U	4 U	4.7 U	4.3 U
1,2,3-Trichloropropane	4.7 U	4.2 U	4 U	4.7 U	4.3 U
1,2-Dibromo-3-chloropropane (DBCP)	4.7 U	4.2 U	4 U	4.7 U	4.3 U
1,2-Dibromoethane (EDB)	4.7 U	4.2 U	4 U	4.7 U	4.3 U
1,2-Dichloroethane	4.7 U	4.2 U	4 U	4.7 U	4.3 U
1,2-Dichloroethene (trans)	4.7 U	4.2 U	4 U	4.7 U	4.3 U
1,2-Dichloropropane	4.7 UJ	4.2 UJ	4 UJ	4.7 UJ	4.3 UJ
1,3-Dichloropropene (cis)	4.7 U	4.2 U	4 U	4.7 U	4.3 U
1,3-Dichloropropene (trans)	4.7 U	4.2 U	4 U	4.7 U	4.3 U
1,4-Dichloro-2-butene (trans)	19 U	17 U	16 U	19 U	17 U
1,4-Dioxane (p-)	230 R	210 R	200 R	240 R	210 R
2-Butanone (MEK)	12 U	11 U	9.9 U	12 U	2.2 J
2-Chloro-1,3-butadiene (Chloroprene)	4.7 U	4.2 U	4 U	4.7 U	4.3 U
2-Hexanone (MBK)	12 U	11 U	9.9 U	12 U	11 U
3-Chloropropene (Allyl Chloride)	4.7 U	4.2 U	4 U	4.7 U	4.3 U
4-Methyl-2-pentanone (MIBK)	12 U	11 U	9.9 U	12 U	11 U
Acetone	12 U	88	52	21 U	29
Acetonitrile	4.7 U	4.2 U	4 U	4.7 U	4.3 U
Acrolein	47 R	42 R	40 R	47 R	43 R
Acrylonitrile	47 R	42 R	40 R	47 R	43 R
Benzene	4.7 U	4.2 U	4 U	4.7 U	4.3 U
Bromodichloromethane	4.7 U	4.2 U	4 U	4.7 U	4.3 U
Bromoform	4.7 U	4.2 U	4 U	4.7 U	4.3 U
Bromomethane	4.7 U	4.2 U	4 U	4.7 U	4.3 U
Carbon Disulfide	4.7 U	4.2 UJ	4.7 J	4.7 U	0.65 J
Carbon Tetrachloride	4.7 U	4.2 U	4 U	4.7 U	4.3 U
Chlorobenzene	4.7 U	4.2 U	4 U	4.7 U	4.3 U
Chloroethane	4.7 U	4.2 U	4 U	4.7 U	4.3 U
Chloroform	4.7 U	4.2 U	4 U	4.7 U	4.3 U
Chloromethane	4.7 U	4.2 U	4 U	4.7 U	4.3 U
Dibromochloromethane	4.7 U	4.2 U	4 U	4.7 U	4.3 U
Dibromomethane	4.7 U	4.2 U	4 U	4.7 U	4.3 U
Dichlorodifluoromethane (Freon-12)	4.7 U	4.2 U	4 U	4.7 U	4.3 U
Ethyl Methacrylate	47 U	42 U	40 U	47 U	43 U
Ethylbenzene	4.7 U	4.2 U	4 U	4.7 U	4.3 U
Isobutyl Alcohol	230 R	210 R	200 R	240 R	210 R
Methyl Acrylonitrile	47 U	42 U	40 U	47 U	43 U
Methyl Iodide	4.7 U	1.3 J	4 U	4.7 U	4.3 U
Methyl Methacrylate	47 R	42 R	40 R	47 R	43 R

APPENDIX C

SUMMARY OF ANALYTICAL RESULTS, SUBSURFACE SOIL
SWMU 67 – FORMER GAS STATION
PHASE I RFI REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Site ID	67SB05	67SB06	67SB06	67SB06	67SB07
Sample ID	67SB05-05	67SB06-01	67SB06-01D	67SB06-05	67SB07-01
Sample Date	3/24/2010	3/23/2010	3/23/2010	3/23/2010	3/23/2010
Sample Depth (ft bgs)	9.0 - 11.0	1.0 - 3.0	1.0 - 3.0	9.0 - 11.0	1.0 - 3.0
Volatiles (µg/kg) (Cont)					
Methylene Chloride	4.7 U	4.2 U	4 U	4.7 U	4.3 U
Pentachloroethane	4.7 U	4.2 U	4 U	4.7 U	4.3 U
Propionitrile (Ethyl Cyanide)	230 R	210 R	200 R	240 R	210 R
Styrene (Ethenylbenzene)	4.7 U	4.2 U	4 U	4.7 U	4.3 U
Tetrachloroethene (PCE)	4.7 U	4.2 U	4 U	4.7 U	4.3 U
Toluene	4.7 U	4.2 U	4 U	4.7 U	4.3 U
Trichloroethene (TCE)	4.7 U	4.2 U	4 U	4.7 U	4.3 U
Trichlorofluoromethane (Freon 11)	4.7 U	4.2 U	4 U	4.7 U	4.3 U
Vinyl Acetate	4.7 U	4.2 U	4 U	4.7 U	4.3 U
Vinyl Chloride	4.7 U	4.2 U	4 U	4.7 U	4.3 U
Xylene, m/p-	9.3 U	8.5 U	7.9 U	9.4 U	8.5 U
Xylene, o-	4.7 U	4.2 U	4 U	4.7 U	4.3 U
Xylenes, total	4.7 U	4.2 U	4 U	4.7 U	4.3 U
Semivolatiles (µg/kg)					
1,2,4,5-Tetrachlorobenzene	220 U	200 U	190 U	200 U	200 U
1,2,4-Trichlorobenzene	220 U	200 U	190 U	200 U	200 U
1,2-Dichlorobenzene (o-)	220 U	200 U	190 U	200 U	200 U
1,3,5-Trinitrobenzene (TNB)	220 U	200 U	190 U	200 U	200 U
1,3-Dichlorobenzene (m-)	220 U	200 U	190 U	200 U	200 U
1,3-Dinitrobenzene (m-)	220 U	200 U	190 U	200 U	200 U
1,4-Dichlorobenzene (p-)	220 U	200 U	190 U	200 U	200 U
1,4-Naphthoquinone	220 UJ	200 UJ	190 UJ	200 UJ	200 UJ
1,4-Phenylenediamine	2200 R	2000 R	1900 R	2000 R	2000 R
1-Naphthylamine	220 U	200 U	190 U	200 U	200 U
2,2'-Oxybis[1-chloropropane]	220 U	200 U	190 U	200 U	200 U
2,3,4,6-Tetrachlorophenol	430 U	380 U	370 U	400 U	380 U
2,4,5-Trichlorophenol	430 U	380 U	370 U	400 U	380 U
2,4,6-Trichlorophenol	430 U	380 U	370 U	400 U	380 U
2,4-Dichlorophenol	430 U	380 UJ	370 UJ	400 UJ	380 U
2,4-Dimethylphenol	430 U	380 U	370 U	400 U	380 U
2,4-Dinitrophenol	430 U	380 U	370 U	400 U	380 U
2,4-Dinitrotoluene (DNT)	220 U	200 U	190 U	200 U	200 U
2,6-Dichlorophenol	430 UJ	380 UJ	370 UJ	400 UJ	380 UJ
2,6-Dinitrotoluene (DNT)	220 U	200 U	190 U	200 U	200 U
2-Acetylaminofluorene	220 U	200 U	190 U	200 U	200 U
2-Chloronaphthalene	220 U	200 U	190 U	200 U	200 U
2-Chlorophenol	430 U	380 U	370 U	400 U	380 UJ
2-Methyl-5-nitroaniline	220 U	200 U	190 U	200 U	200 U
2-Methylphenol (o-Cresol)	430 U	380 U	370 U	400 U	380 U
2-Naphthylamine	220 U	200 U	190 U	200 U	200 U
2-Nitroaniline	220 U	200 U	190 U	200 U	200 U
2-Nitrophenol	430 U	380 U	370 U	400 U	380 U
2-Picoline	220 U	200 U	190 U	200 U	200 U

APPENDIX C

SUMMARY OF ANALYTICAL RESULTS, SUBSURFACE SOIL
SWMU 67 – FORMER GAS STATION
PHASE I RFI REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Site ID	67SB05	67SB06	67SB06	67SB06	67SB07
Sample ID	67SB05-05	67SB06-01	67SB06-01D	67SB06-05	67SB07-01
Sample Date	3/24/2010	3/23/2010	3/23/2010	3/23/2010	3/23/2010
Sample Depth (ft bgs)	9.0 - 11.0	1.0 - 3.0	1.0 - 3.0	9.0 - 11.0	1.0 - 3.0
Semivolatiles (µg/kg) (Cont)					
3,3'-Dichlorobenzidine	220 U	200 U	190 U	200 U	200 U
3,3'-Dimethylbenzidine	220 U	200 U	190 U	200 U	200 U
3-Methylcholanthrene	220 U	200 U	190 U	200 U	200 U
3-Methylphenol (m-Cresol)	320 UJ	290 UJ	280 U	300 U	290 U
3-Nitroaniline	430 U	380 U	370 U	400 U	380 U
4,6-Dinitro-2-methylphenol	430 U	380 U	370 U	400 U	380 U
4-Aminobiphenyl	220 U	200 U	190 U	200 U	200 U
4-Bromophenyl-phenylether	220 U	200 U	190 U	200 U	200 U
4-Chloro-3-methylphenol	430 U	380 U	370 U	400 U	380 U
4-Chloroaniline	430 U	380 U	370 U	400 U	380 U
4-Chlorophenyl-phenylether	220 U	200 U	190 U	200 U	200 U
4-Dimethylaminoazobenzene (p-)	220 U	200 U	190 U	200 U	200 U
4-Methylphenol (p-Cresol)	320 U	290 U	280 U	300 U	290 U
4-Nitroaniline	430 U	380 U	370 U	400 U	380 U
4-Nitrophenol	430 U	380 U	370 U	400 U	380 U
4-Nitroquinoline-1-oxide	220 UJ	200 UJ	190 UJ	200 UJ	200 UJ
7,12-Dimethylbenz(a)anthracene	220 UJ	200 UJ	190 UJ	200 UJ	200 UJ
Acetophenone	220 U	200 U	190 U	200 U	200 U
Aniline	220 U	200 U	190 U	200 U	200 UJ
Aramite	220 U	200 U	190 U	200 U	200 U
Benzyl Alcohol	220 U	200 U	190 U	200 U	200 UJ
Bis(2-chloroethoxy)methane	220 U	200 U	190 U	200 U	200 U
Bis(2-chloroethyl)ether	220 U	200 U	190 U	200 U	200 U
Bis(2-ethylhexyl) Phthalate (BEHP)	220 U	200 U	190 U	200 U	200 U
Butyl Benzyl Phthalate	220 U	200 U	190 U	200 U	200 U
Diallate (cis)	220 U	200 U	190 U	200 U	200 U
Diallate (total)	220 U	200 U	190 U	200 U	200 UJ
Diallate (trans)	220 UJ	200 UJ	190 UJ	200 UJ	200 UJ
Dibenzofuran	220 U	200 U	190 U	200 U	200 U
Diethyl Phthalate (DEP)	220 U	200 U	190 U	200 U	200 U
Dimethyl Phthalate	220 U	200 U	190 U	200 U	200 U
Di-n-butyl Phthalate (DBP)	220 U	200 U	190 U	200 U	24 J
Di-n-octyl Phthalate	220 U	200 U	190 U	200 U	200 U
Dinoseb	220 U	200 U	190 U	200 U	200 U
Ethyl Methane Sulfonate (EMS)	220 U	200 U	190 U	200 U	200 U
Hexachloro-1,3-butadiene	220 U	200 U	190 U	200 U	200 U
Hexachlorobenzene	220 U	200 U	190 U	200 U	200 U
Hexachlorocyclopentadiene	220 U	200 U	190 U	200 U	200 U
Hexachloroethane	220 U	200 U	190 U	200 U	200 U
Hexachloropropene	220 UJ	200 UJ	190 UJ	200 UJ	200 UJ
Indeno(1,2,3-cd)pyrene	220 U	200 U	190 UJ	200 UJ	200 U
Isophorone	220 U	200 U	190 U	200 U	200 U
Isosafrole	220 U	200 U	190 U	200 U	200 U

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SUMMARY OF ANALYTICAL RESULTS, SUBSURFACE SOIL
SWMU 67 – FORMER GAS STATION
PHASE I RFI REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Site ID	67SB05	67SB06	67SB06	67SB06	67SB07
Sample ID	67SB05-05	67SB06-01	67SB06-01D	67SB06-05	67SB07-01
Sample Date	3/24/2010	3/23/2010	3/23/2010	3/23/2010	3/23/2010
Sample Depth (ft bgs)	9.0 - 11.0	1.0 - 3.0	1.0 - 3.0	9.0 - 11.0	1.0 - 3.0
Semivolatiles (µg/kg) (Cont)					
Methapyrilene	220 UJ	200 R	190 R	200 R	200 UJ
Methyl Methane Sulfonate	220 U	200 U	190 U	200 U	200 UJ
Nitrobenzene	220 U	200 U	190 U	200 U	200 U
n-Nitrosodiethylamine	220 U	200 U	190 U	200 U	200 U
n-Nitrosodimethylamine (NDMA)	220 U	200 U	190 U	200 U	200 U
n-Nitroso-di-n-butylamine	220 U	200 U	190 U	200 U	200 U
n-Nitrosodi-n-propylamine	220 U	200 U	190 U	200 U	200 UJ
n-Nitrosodiphenylamine	220 U	200 U	190 U	200 U	200 U
n-Nitrosomethylethylamine	220 U	200 U	190 U	200 U	200 U
n-Nitrosomorpholine	220 U	200 U	190 U	200 U	200 U
n-Nitrosopiperidine	220 U	200 U	190 U	200 U	200 U
n-Nitrosopyrrolidine	220 U	200 U	190 U	200 U	200 U
o-Toluidine	220 U	200 U	190 U	200 U	200 U
Pentachlorobenzene	220 U	200 U	190 U	200 U	200 U
Pentachloronitrobenzene	220 U	200 U	190 U	200 U	200 U
Pentachlorophenol	430 U	380 U	370 U	400 U	380 U
Phenacetin	220 U	200 U	190 U	200 U	200 U
Phenol	430 U	380 U	370 U	400 U	380 U
Pronamide	430 U	380 U	370 U	400 U	380 U
Pyridine	220 U	200 U	190 U	200 U	200 UJ
Safrole	220 U	200 U	190 U	200 U	200 U
PAHs (µg/kg) - Low Molecular Weight					
2-Methylnaphthalene	11 U	9.7 U	9.3 U	0.93 J	9.5 UJ
Acenaphthene	11 U	9.7 U	9.3 U	10 U	9.5 U
Acenaphthylene	11 U	9.7 U	9.3 U	10 U	9.5 U
Anthracene	11 U	0.52 J	9.3 U	10 U	9.5 U
Fluoranthene	11 U	1.6 J	9.3 U	10 U	9.5 U
Fluorene	11 UJ	9.7 U	9.3 UJ	10 U	9.5 U
Naphthalene	11 U	9.7 U	9.3 U	10 U	9.5 U
Phenanthrene	11 U	2.2 J	9.3 U	10 U	9.5 U
PAHs (µg/kg) - High Molecular Weight					
Benzo(a)anthracene	11 U	0.83 J	9.3 U	10 UJ	9.5 U
Benzo(a)pyrene (BaP)	11 U	0.47 J	9.3 U	10 U	9.5 U
Benzo(b)fluoranthene	11 UJ	0.79 J	9.3 UJ	10 UJ	9.5 UJ
Benzo(g,h,i)perylene	11 U	1 J	9.3 U	10 U	9.5 U
Benzo(k)fluoranthene	11 U	0.51 J	9.3 U	10 U	9.5 U
Chrysene	11 U	0.74 J	9.3 U	10 U	9.5 U
Dibenz(a,h)anthracene	11 U	9.7 UJ	9.3 U	10 UJ	9.5 U
Indeno(1,2,3-cd)pyrene	11 U	0.5 J	9.3 U	10 UJ	9.5 UJ
Pyrene	11 U	1.4 J	9.3 U	10 U	9.5 U
PAH totals (µg/kg)					
Low molecular weight PAHs	88	52.82	74.4	70.9	76
High molecular weight PAHs	99	15.94	83.7	90	85.5

APPENDIX C

SUMMARY OF ANALYTICAL RESULTS, SUBSURFACE SOIL
SWMU 67 – FORMER GAS STATION
PHASE I RFI REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Site ID	67SB05	67SB06	67SB06	67SB06	67SB07
Sample ID	67SB05-05	67SB06-01	67SB06-01D	67SB06-05	67SB07-01
Sample Date	3/24/2010	3/23/2010	3/23/2010	3/23/2010	3/23/2010
Sample Depth (ft bgs)	9.0 - 11.0	1.0 - 3.0	1.0 - 3.0	9.0 - 11.0	1.0 - 3.0
TPH (mg/kg)					
Diesel Range Organics (DRO)	13 U	12 U	11 U	12 U	14
Gasoline Range Organics (GRO)	0.65 U	0.58 U	0.56 U	0.6 U	0.57 U
Total TPH	13.65 U	12.58 U	11.6 U	12.6 U	14.57
Inorganics (mg/kg)					
Antimony	1.2 UJ	1.2 UJ	1.1 UJ	1.2 UJ	1.1 UJ
Arsenic	0.97	1.8	0.6	0.28 J	0.71
Barium	55.4	122 J	174 J	4.5 J	99
Beryllium	0.097 J	0.63	0.31 J	0.23 J	0.15 J
Cadmium	0.59 U	0.38 J	0.21 J	0.07 J	0.16 J
Chromium	9.6	36.6 J	14.6 J	2.5 J	7.5
Cobalt	1.9 J	105 J	44 J	5.2 J	29.6 J
Copper	29.3 J	44.9 J	37.8 J	13.6 J	71 J
Lead	2.1 J	9 J	4.3 J	2.5	0.91 J
Mercury	0.043 U	0.13	0.03 J	0.04 U	0.038 U
Nickel	1.3	9.4 J	5.3 J	1.6 J	6
Selenium	1.3 J	2.4 J	1.1 J	0.59 J	0.41 J
Silver	0.59 U	0.58 U	0.56 U	0.6 U	0.53 U
Thallium	0.035 J	0.2 J	0.08 J	0.6 U	0.036 J
Tin	5.9 U	5.7 U	5.3 U	5.8 U	5.9 U
Vanadium	155 J	325 J	188 J	105 J	161 J
Zinc	15.6	72.7 J	36.8 J	40 J	68.3

Notes:

ft bgs - feet below ground surface
µg/kg - micrograms per kilogram
mg/kg - milligrams per kilogram
TPH - Total Petroleum Hydrocarbons
PAH - Polyaromatic Hydrocarbons
U - Not detected
J - Analyte present; value is estimated
R - Result is rejected and unusable
UJ - Reported quantitation limit is estimated
JN - Estimated: The analyte was tentatively identified; the quantitation is an estimation

APPENDIX C

SUMMARY OF ANALYTICAL RESULTS, SUBSURFACE SOIL
SWMU 67 – FORMER GAS STATION
PHASE I RFI REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Site ID	67SB07	67SB08	67SB08
Sample ID	67SB07-05	67SB08-01	67SB08-05
Sample Date	3/23/2010	3/22/2010	3/22/2010
Sample Depth (ft bgs)	9.0 - 11.0	1.0 - 3.0	9.0 - 11.0
Volatiles (µg/kg)			
1,1,1,2-Tetrachloroethane	5.5 U	3.8 UJ	4.4 U
1,1,1-Trichloroethane	5.5 U	3.8 UJ	4.4 U
1,1,2,2-Tetrachloroethane	5.5 U	3.8 UJ	4.4 U
1,1,2-Trichloroethane	5.5 U	3.8 UJ	4.4 U
1,1-Dichloroethane	5.5 U	3.8 UJ	4.4 U
1,1-Dichloroethene	5.5 U	3.8 UJ	4.4 U
1,2,3-Trichloropropane	5.5 U	3.8 UJ	4.4 U
1,2-Dibromo-3-chloropropane (DBCP)	5.5 U	3.8 UJ	4.4 U
1,2-Dibromoethane (EDB)	5.5 U	3.8 UJ	4.4 U
1,2-Dichloroethane	5.5 U	3.8 UJ	4.4 U
1,2-Dichloroethene (trans)	5.5 U	3.8 UJ	4.4 U
1,2-Dichloropropane	5.5 UJ	3.8 UJ	4.4 UJ
1,3-Dichloropropene (cis)	5.5 U	3.8 UJ	4.4 U
1,3-Dichloropropene (trans)	5.5 U	3.8 UJ	4.4 U
1,4-Dichloro-2-butene (trans)	22 U	15 UJ	18 U
1,4-Dioxane (p-)	280 R	190 R	220 R
2-Butanone (MEK)	14 U	9.6 UJ	11 U
2-Chloro-1,3-butadiene (Chloroprene)	5.5 U	3.8 UJ	4.4 U
2-Hexanone (MBK)	14 U	9.6 UJ	11 U
3-Chloropropene (Allyl Chloride)	5.5 U	3.8 UJ	4.4 U
4-Methyl-2-pentanone (MIBK)	14 U	9.6 UJ	11 U
Acetone	17 U	61 J	11 U
Acetonitrile	5.5 U	3.8 UJ	4.4 U
Acrolein	55 R	38 R	44 R
Acrylonitrile	55 R	38 R	44 R
Benzene	5.5 U	3.8 UJ	4.4 U
Bromodichloromethane	5.5 U	3.8 UJ	4.4 U
Bromoform	5.5 U	3.8 UJ	4.4 U
Bromomethane	5.5 U	3.8 UJ	4.4 U
Carbon Disulfide	5.5 U	3.8 UJ	4.4 U
Carbon Tetrachloride	5.5 U	3.8 UJ	4.4 U
Chlorobenzene	5.5 U	3.8 UJ	4.4 U
Chloroethane	5.5 U	3.8 UJ	4.4 U
Chloroform	5.5 U	3.8 UJ	4.4 U
Chloromethane	5.5 U	3.8 UJ	4.4 U
Dibromochloromethane	5.5 U	3.8 UJ	4.4 U
Dibromomethane	5.5 U	3.8 UJ	4.4 U
Dichlorodifluoromethane (Freon-12)	5.5 U	3.8 UJ	4.4 U
Ethyl Methacrylate	55 U	38 UJ	44 U
Ethylbenzene	5.5 U	3.8 UJ	4.4 U
Isobutyl Alcohol	280 R	190 R	220 R
Methyl Acrylonitrile	55 U	38 UJ	44 U
Methyl Iodide	5.5 U	3.8 UJ	4.4 U
Methyl Methacrylate	55 R	38 R	44 R

APPENDIX C

SUMMARY OF ANALYTICAL RESULTS, SUBSURFACE SOIL
SWMU 67 – FORMER GAS STATION
PHASE I RFI REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Site ID	67SB07	67SB08	67SB08
Sample ID	67SB07-05	67SB08-01	67SB08-05
Sample Date	3/23/2010	3/22/2010	3/22/2010
Sample Depth (ft bgs)	9.0 - 11.0	1.0 - 3.0	9.0 - 11.0
Volatiles (µg/kg) (Cont)			
Methylene Chloride	5.5 U	3.8 UJ	4.4 U
Pentachloroethane	5.5 U	3.8 UJ	4.4 U
Propionitrile (Ethyl Cyanide)	280 R	190 R	220 R
Styrene (Ethenylbenzene)	5.5 U	3.8 UJ	4.4 U
Tetrachloroethene (PCE)	5.5 U	3.8 UJ	4.4 U
Toluene	5.5 U	3.8 UJ	4.4 U
Trichloroethene (TCE)	5.5 U	3.8 UJ	4.4 U
Trichlorofluoromethane (Freon 11)	5.5 U	3.8 UJ	4.4 U
Vinyl Acetate	5.5 U	3.8 UJ	4.4 U
Vinyl Chloride	5.5 U	3.8 UJ	4.4 U
Xylene, m/p-	0.32 J	7.7 UJ	8.8 U
Xylene, o-	5.5 U	3.8 UJ	4.4 U
Xylenes, total	5.5 U	3.8 UJ	4.4 U
Semivolatiles (µg/kg)			
1,2,4,5-Tetrachlorobenzene	220 U	200 U	220 U
1,2,4-Trichlorobenzene	220 U	200 U	220 U
1,2-Dichlorobenzene (o-)	220 U	200 U	220 U
1,3,5-Trinitrobenzene (TNB)	220 U	200 U	220 U
1,3-Dichlorobenzene (m-)	220 U	200 U	220 U
1,3-Dinitrobenzene (m-)	220 U	200 U	220 U
1,4-Dichlorobenzene (p-)	220 U	200 U	220 U
1,4-Naphthoquinone	220 UJ	200 UJ	220 UJ
1,4-Phenylenediamine	2200 R	2000 R	2200 R
1-Naphthylamine	220 U	200 U	220 U
2,2'-Oxybis[1-chloropropane]	220 U	200 U	220 U
2,3,4,6-Tetrachlorophenol	430 U	380 U	420 U
2,4,5-Trichlorophenol	430 U	380 U	420 U
2,4,6-Trichlorophenol	430 U	380 U	420 U
2,4-Dichlorophenol	430 U	380 U	420 U
2,4-Dimethylphenol	430 U	380 U	420 U
2,4-Dinitrophenol	430 U	380 U	420 U
2,4-Dinitrotoluene (DNT)	220 U	200 U	220 U
2,6-Dichlorophenol	430 UJ	380 UJ	420 UJ
2,6-Dinitrotoluene (DNT)	220 U	200 U	220 U
2-Acetylaminofluorene	220 U	200 U	220 U
2-Chloronaphthalene	220 U	200 U	220 U
2-Chlorophenol	430 UJ	380 UJ	420 UJ
2-Methyl-5-nitroaniline	220 U	200 U	220 U
2-Methylphenol (o-Cresol)	430 U	380 U	420 U
2-Naphthylamine	220 U	200 U	220 U
2-Nitroaniline	220 U	200 U	220 U
2-Nitrophenol	430 U	380 U	420 U
2-Picoline	220 U	200 U	220 U

APPENDIX C

SUMMARY OF ANALYTICAL RESULTS, SUBSURFACE SOIL
SWMU 67 – FORMER GAS STATION
PHASE I RFI REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Site ID	67SB07	67SB08	67SB08
Sample ID	67SB07-05	67SB08-01	67SB08-05
Sample Date	3/23/2010	3/22/2010	3/22/2010
Sample Depth (ft bgs)	9.0 - 11.0	1.0 - 3.0	9.0 - 11.0
Semivolatiles (µg/kg) (Cont)			
3,3'-Dichlorobenzidine	220 U	200 U	220 U
3,3'-Dimethylbenzidine	220 U	200 U	220 U
3-Methylcholanthrene	220 U	200 U	220 U
3-Methylphenol (m-Cresol)	320 U	290 U	320 U
3-Nitroaniline	430 U	380 U	420 U
4,6-Dinitro-2-methylphenol	430 U	380 U	420 U
4-Aminobiphenyl	220 U	200 U	220 U
4-Bromophenyl-phenylether	220 U	200 U	220 U
4-Chloro-3-methylphenol	430 U	380 U	420 U
4-Chloroaniline	430 U	380 U	420 U
4-Chlorophenyl-phenylether	220 U	200 U	220 U
4-Dimethylaminoazobenzene (p-)	220 U	200 U	220 U
4-Methylphenol (p-Cresol)	320 U	290 U	320 U
4-Nitroaniline	430 U	380 U	420 U
4-Nitrophenol	430 U	380 U	420 U
4-Nitroquinoline-1-oxide	220 UJ	200 UJ	220 UJ
7,12-Dimethylbenz(a)anthracene	220 UJ	200 UJ	220 UJ
Acetophenone	220 U	200 U	220 U
Aniline	220 UJ	200 UJ	220 UJ
Aramite	220 U	200 U	220 U
Benzyl Alcohol	220 UJ	200 UJ	220 UJ
Bis(2-chloroethoxy)methane	220 U	200 U	220 U
Bis(2-chloroethyl)ether	220 U	200 U	220 U
Bis(2-ethylhexyl) Phthalate (BEHP)	220 U	200 U	220 U
Butyl Benzyl Phthalate	220 U	200 U	220 U
Diallate (cis)	220 U	200 U	220 U
Diallate (total)	220 UJ	200 UJ	220 UJ
Diallate (trans)	220 UJ	200 UJ	220 UJ
Dibenzofuran	220 U	200 U	220 U
Diethyl Phthalate (DEP)	220 U	200 U	220 U
Dimethyl Phthalate	220 U	200 U	220 U
Di-n-butyl Phthalate (DBP)	29 J	21 J	220 U
Di-n-octyl Phthalate	220 U	200 U	220 U
Dinoseb	220 U	200 U	220 U
Ethyl Methane Sulfonate (EMS)	220 U	200 U	220 U
Hexachloro-1,3-butadiene	220 U	200 U	220 U
Hexachlorobenzene	220 U	200 U	220 U
Hexachlorocyclopentadiene	220 U	200 U	220 U
Hexachloroethane	220 U	200 U	220 U
Hexachloropropene	220 UJ	200 UJ	220 UJ
Indeno(1,2,3-cd)pyrene	220 U	200 U	220 U
Isophorone	220 U	200 U	220 U
Isosafrole	220 U	200 U	220 U

APPENDIX C

SUMMARY OF ANALYTICAL RESULTS, SUBSURFACE SOIL
SWMU 67 – FORMER GAS STATION
PHASE I RFI REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Site ID	67SB07	67SB08	67SB08
Sample ID	67SB07-05	67SB08-01	67SB08-05
Sample Date	3/23/2010	3/22/2010	3/22/2010
Sample Depth (ft bgs)	9.0 - 11.0	1.0 - 3.0	9.0 - 11.0
Semivolatiles (µg/kg) (Cont)			
Methapyrilene	220 UJ	200 UJ	220 UJ
Methyl Methane Sulfonate	220 UJ	200 UJ	220 UJ
Nitrobenzene	220 U	200 U	220 U
n-Nitrosodiethylamine	220 U	200 U	220 U
n-Nitrosodimethylamine (NDMA)	220 U	200 U	220 U
n-Nitroso-di-n-butylamine	220 U	200 U	220 U
n-Nitrosodi-n-propylamine	220 UJ	200 UJ	220 UJ
n-Nitrosodiphenylamine	220 U	200 U	220 U
n-Nitrosomethylethylamine	220 U	200 U	220 U
n-Nitrosomorpholine	220 U	200 U	220 U
n-Nitrosopiperidine	220 U	200 U	220 U
n-Nitrosopyrrolidine	220 U	200 U	220 U
o-Toluidine	220 U	200 U	220 U
Pentachlorobenzene	220 U	200 U	220 U
Pentachloronitrobenzene	220 U	200 U	220 U
Pentachlorophenol	430 U	380 U	420 U
Phenacetin	220 U	200 U	220 U
Phenol	430 U	380 U	420 U
Pronamide	430 U	380 U	420 U
Pyridine	220 UJ	200 UJ	220 UJ
Safrole	220 U	200 U	220 U
PAHs (µg/kg) - Low Molecular Weight			
2-Methylnaphthalene	11 UJ	9.7 UJ	11 UJ
Acenaphthene	11 U	9.7 U	11 U
Acenaphthylene	11 U	9.7 U	11 U
Anthracene	11 U	9.7 U	11 U
Fluoranthene	11 U	9.7 U	11 U
Fluorene	11 U	9.7 U	11 U
Naphthalene	11 U	9.7 U	11 U
Phenanthrene	11 U	9.7 U	11 U
PAHs (µg/kg) - High Molecular Weight			
Benzo(a)anthracene	11 U	9.7 U	11 U
Benzo(a)pyrene (BaP)	11 U	9.7 U	11 U
Benzo(b)fluoranthene	11 UJ	9.7 UJ	11 UJ
Benzo(g,h,i)perylene	11 U	9.7 U	11 U
Benzo(k)fluoranthene	11 U	9.7 U	11 U
Chrysene	11 U	9.7 U	11 U
Dibenz(a,h)anthracene	11 U	9.7 U	11 U
Indeno(1,2,3-cd)pyrene	11 UJ	9.7 UJ	11 UJ
Pyrene	11 U	9.7 U	11 U
PAH totals (µg/kg)			
Low molecular weight PAHs	88	77.6	88
High molecular weight PAHs	99	87.3	99

APPENDIX C

SUMMARY OF ANALYTICAL RESULTS, SUBSURFACE SOIL
SWMU 67 – FORMER GAS STATION
PHASE I RFI REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Site ID	67SB07	67SB08	67SB08
Sample ID	67SB07-05	67SB08-01	67SB08-05
Sample Date	3/23/2010	3/22/2010	3/22/2010
Sample Depth (ft bgs)	9.0 - 11.0	1.0 - 3.0	9.0 - 11.0
TPH (mg/kg)			
Diesel Range Organics (DRO)	14	16	20
Gasoline Range Organics (GRO)	0.65 U	0.58 U	0.63 U
Total TPH	14.65	16.58	20.63
Inorganics (mg/kg)			
Antimony	5.9 UJ	1.1 UJ	1.2 UJ
Arsenic	3 U	0.95	0.62 U
Barium	87.4	112	58.6
Beryllium	1.4 J	0.42 J	0.071 J
Cadmium	0.31 J	0.33 J	0.15 J
Chromium	76.9	10.8	7.1
Cobalt	75.2 J	58.8 J	20.3 J
Copper	493 J	36 J	39.5 J
Lead	5.2 J	27.4 J	0.62 U
Mercury	0.043 U	0.093	0.042 U
Nickel	26	5	5.6
Selenium	2.6 J	1.8 J	0.33 J
Silver	3 U	0.57 U	0.62 U
Thallium	3 U	0.066 J	0.62 U
Tin	5.9 U	5.7 U	6.2 U
Vanadium	821 J	174 J	196 J
Zinc	298	64.6	56.8

Notes:

ft bgs - feet below ground surface
µg/kg - micrograms per kilogram
mg/kg - milligrams per kilogram
TPH - Total Petroleum Hydrocarbons
PAH - Polyaromatic Hydrocarbons
U - Not detected
J - Analyte present; value is estimated
R - Result is rejected and unusable
UJ - Reported quantitation limit is estimated
JN - Estimated: The analyte was tentatively identified; the quantitation is an estimation

GROUNDWATER

APPENDIX C

SUMMARY OF ANALYTICAL RESULTS, GROUNDWATER
SWMU 67 – FORMER GAS STATION
PHASE I RFI REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Site ID	67SB01	67SB02	67SB03	67SB04
Sample ID	67GW01	67GW02	67GW03	67GW04
Sample Date	3/27/2010	3/28/2010	3/30/2010	3/28/2010
Volatiles (µg/L)				
1,1,1,2-Tetrachloroethane	0.5 UJ	0.5 UJ	0.5 U	0.5 UJ
1,1,1-Trichloroethane	0.5 U	0.5 U	0.5 U	0.5 U
1,1,2,2-Tetrachloroethane	0.5 UJ	0.5 UJ	0.5 U	0.5 UJ
1,1,2-Trichloroethane	0.5 U	0.5 U	0.5 U	0.5 U
1,1-Dichloroethane	0.5 U	0.5 U	0.5 U	0.5 U
1,1-Dichloroethene	0.5 U	0.5 U	0.5 U	0.5 U
1,2,3-Trichloropropane	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dibromo-3-chloropropane (DBCP)	0.5 UJ	0.5 UJ	0.5 U	0.5 UJ
1,2-Dibromoethane (EDB)	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dichloroethane	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dichloroethene (trans)	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dichloropropane	0.5 U	0.5 U	0.5 U	0.5 U
1,3-Dichloropropene (cis)	0.5 U	0.5 U	0.5 U	0.5 U
1,3-Dichloropropene (trans)	0.5 U	0.5 U	0.5 U	0.5 U
1,4-Dichloro-2-butene (trans)	2 U	2 U	2 U	2 U
1,4-Dioxane (p-)	25 R	25 R	25 R	25 R
2-Butanone (MEK)	2.5 R	2.5 R	2.5 R	2.5 R
2-Chloro-1,3-butadiene (Chloroprene)	0.5 U	0.5 U	0.5 U	0.5 U
2-Hexanone (MBK)	2.5 U	2.5 U	2.5 U	2.5 U
3-Chloropropene (Allyl Chloride)	0.5 UJ	0.5 UJ	0.5 U	0.5 UJ
4-Methyl-2-pentanone (MIBK)	2.5 U	2.5 U	2.5 U	2.5 U
Acetone	11 J	12 J	2.5 R	7.9 J
Acetonitrile	0.5 UJ	0.5 UJ	0.5 U	0.5 UJ
Acrolein	5 R	5 R	5 R	5 R
Acrylonitrile	5 R	5 R	5 R	5 R
Benzene	0.031 J	0.5 U	0.5 U	0.5 U
Bromodichloromethane	0.5 U	0.5 U	0.5 U	0.5 U
Bromoform	0.5 U	0.5 U	0.5 U	0.5 U
Bromomethane	0.5 UJ	0.5 UJ	0.5 U	0.5 UJ
Carbon Disulfide	0.35 J	0.72	0.32 J	0.87
Carbon Tetrachloride	0.5 U	0.5 U	0.5 U	0.5 U
Chlorobenzene	0.5 U	0.5 U	0.5 U	0.5 U
Chloroethane	0.5 U	0.5 U	0.5 U	0.5 U
Chloroform	0.5 U	0.5 U	0.5 U	0.5 U
Chloromethane	0.5 U	0.5 U	0.5 U	0.5 U
Dibromochloromethane	0.5 UJ	0.5 UJ	0.5 U	0.5 UJ
Dibromomethane	0.5 U	0.5 U	0.5 U	0.5 U
Dichlorodifluoromethane (Freon-12)	0.5 UJ	0.5 UJ	0.5 U	0.5 UJ
Ethyl Methacrylate	5 U	5 U	5 U	5 U
Ethylbenzene	0.5 U	0.5 U	0.5 U	0.5 U
Isobutyl Alcohol	25 R	25 R	25 R	25 R
Methyl Acrylonitrile	5 UJ	5 UJ	5 U	5 UJ
Methyl Iodide	0.5 UJ	0.5 UJ	0.5 U	0.5 UJ
Methyl Methacrylate	5 U	5 U	5 U	5 U
Methylene Chloride	0.5 U	0.5 U	0.5 U	0.5 U

APPENDIX C

SUMMARY OF ANALYTICAL RESULTS, GROUNDWATER
SWMU 67 – FORMER GAS STATION
PHASE I RFI REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Site ID	67SB01	67SB02	67SB03	67SB04
Sample ID	67GW01	67GW02	67GW03	67GW04
Sample Date	3/27/2010	3/28/2010	3/30/2010	3/28/2010
Volatiles (µg/L) (Cont)				
Pentachloroethane	0.5 UJ	0.5 UJ	0.5 U	0.5 UJ
Propionitrile (Ethyl Cyanide)	25 R	25 R	25 R	25 R
Styrene (Ethenylbenzene)	0.5 U	0.5 U	0.5 U	0.5 U
Tetrachloroethene (PCE)	0.5 U	0.5 U	0.5 U	0.5 U
Toluene	0.5 U	0.5 U	0.5 U	0.5 U
Trichloroethene (TCE)	0.5 U	0.5 U	0.5 U	0.5 U
Trichlorofluoromethane (Freon 11)	0.5 U	0.5 U	0.5 U	0.5 U
Vinyl Acetate	1 U	1 U	1 U	1 U
Vinyl Chloride	0.5 U	0.5 U	0.5 U	0.5 U
Xylene, m/p-	1 U	1 U	1 U	1 U
Xylene, o-	0.5 U	0.5 U	0.5 U	0.5 U
Xylenes, total	0.5 U	0.5 U	0.5 U	0.5 U
Semivolatiles (µg/L)				
1,2,4,5-Tetrachlorobenzene	5 U	5.3 U	5.3 U	5.1 U
1,2,4-Trichlorobenzene	5 U	5.3 U	5.3 U	5.1 U
1,2-Dichlorobenzene (o-)	5 U	5.3 U	5.3 U	5.1 U
1,3,5-Trinitrobenzene (TNB)	5 U	5.3 U	5.3 U	5.1 U
1,3-Dichlorobenzene (m-)	5 U	5.3 U	5.3 U	5.1 U
1,3-Dinitrobenzene (m-)	5 U	5.3 U	5.3 U	5.1 U
1,4-Dichlorobenzene (p-)	5 U	5.3 U	5.3 U	5.1 U
1,4-Naphthoquinone	5 U	5.3 U	5.3 U	5.1 U
1,4-Phenylenediamine	51 R	54 R	54 R	52 R
1-Naphthylamine	5 UJ	5.3 UJ	5.3 UJ	5.1 UJ
2,2'-Oxybis[1-chloropropane]	5 U	5.3 U	5.3 U	5.1 U
2,3,4,6-Tetrachlorophenol	10 U	10 U	10 U	10 U
2,4,5-Trichlorophenol	10 U	10 U	10 U	10 U
2,4,6-Trichlorophenol	10 U	10 U	10 U	10 U
2,4-Dichlorophenol	10 U	10 U	10 U	10 U
2,4-Dimethylphenol	10 U	10 U	10 U	10 U
2,4-Dinitrophenol	10 U	10 U	10 U	10 U
2,4-Dinitrotoluene (DNT)	5 U	5.3 U	5.3 U	5.1 U
2,6-Dichlorophenol	10 U	10 U	10 U	10 U
2,6-Dinitrotoluene (DNT)	5 U	5.3 U	5.3 U	5.1 U
2-Acetylaminofluorene	5 UJ	5.3 UJ	5.3 UJ	5.1 UJ
2-Chloronaphthalene	5 U	5.3 U	5.3 U	5.1 U
2-Chlorophenol	10 U	10 U	10 U	10 U
2-Methyl-5-nitroaniline	5 UJ	5.3 UJ	5.3 UJ	5.1 UJ
2-Methylphenol (o-Cresol)	10 U	10 U	10 U	10 U
2-Naphthylamine	5 UJ	5.3 UJ	5.3 UJ	5.1 UJ
2-Nitroaniline	5 U	5.3 U	5.3 U	5.1 U
2-Nitrophenol	10 U	10 U	10 U	10 U
2-Picoline	5 UJ	5.3 UJ	5.3 UJ	5.1 UJ
3,3'-Dichlorobenzidine	5 U	5.3 U	5.3 U	5.1 U
3,3'-Dimethylbenzidine	5 UJ	5.3 UJ	5.3 UJ	5.1 UJ

APPENDIX C

SUMMARY OF ANALYTICAL RESULTS, GROUNDWATER
SWMU 67 – FORMER GAS STATION
PHASE I RFI REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Site ID	67SB01	67SB02	67SB03	67SB04
Sample ID	67GW01	67GW02	67GW03	67GW04
Sample Date	3/27/2010	3/28/2010	3/30/2010	3/28/2010
Semivolatiles (µg/L) (Cont)				
3-Methylcholanthrene	5 U	5.3 U	5.3 U	5.1 U
3-Methylphenol (m-Cresol)	8 U	8.4 U	8.4 U	8.2 U
3-Nitroaniline	5 U	5.3 U	5.3 U	5.1 U
4,6-Dinitro-2-methylphenol	10 UJ	10 UJ	10 UJ	10 UJ
4-Aminobiphenyl	5 UJ	5.3 UJ	5.3 UJ	5.1 UJ
4-Bromophenyl-phenylether	5 U	5.3 U	5.3 U	5.1 U
4-Chloro-3-methylphenol	10 U	10 U	10 U	10 U
4-Chloroaniline	5 U	5.3 U	5.3 U	5.1 U
4-Chlorophenyl-phenylether	5 U	5.3 U	5.3 U	5.1 U
4-Dimethylaminoazobenzene (p-)	5 UJ	5.3 UJ	5.3 UJ	5.1 UJ
4-Methylphenol (p-Cresol)	8 U	8.4 U	8.4 U	8.2 U
4-Nitroaniline	5 U	5.3 U	5.3 U	5.1 U
4-Nitrophenol	10 U	10 U	10 U	10 U
4-Nitroquinoline-1-oxide	5 UJ	5.3 UJ	5.3 UJ	5.1 UJ
7,12-Dimethylbenz(a)anthracene	5 U	5.3 U	5.3 U	5.1 U
Acetophenone	5 U	5.3 U	5.3 U	5.1 U
Aniline	5 U	5.3 U	5.3 U	5.1 U
Aramite	5 U	5.3 U	5.3 U	5.1 U
Benzyl Alcohol	5 U	5.3 U	5.3 U	5.1 U
Bis(2-chloroethoxy)methane	5 U	5.3 U	5.3 U	5.1 U
Bis(2-chloroethyl)ether	5 U	5.3 U	5.3 U	5.1 U
Bis(2-ethylhexyl) Phthalate (BEHP)	5 U	5.3 U	5.3 U	5.1 U
Butyl Benzyl Phthalate	5 U	5.3 U	5.3 U	5.1 U
Diallate (cis)	5 U	5.3 U	5.3 U	5.1 U
Diallate (total)	5 UJ	5.3 UJ	5.3 UJ	5.1 UJ
Diallate (trans)	5 UJ	5.3 UJ	5.3 UJ	5.1 UJ
Dibenzofuran	5 U	5.3 U	5.3 U	5.1 U
Diethyl Phthalate (DEP)	5 U	5.3 U	5.3 U	5.1 U
Dimethyl Phthalate	5 U	5.3 U	5.3 U	5.1 U
Di-n-butyl Phthalate (DBP)	5 U	5.3 U	5.3 U	5.1 U
Di-n-octyl Phthalate	5 U	5.3 U	5.3 U	5.1 U
Dinoseb	5 U	5.3 U	5.3 U	5.1 U
Ethyl Methane Sulfonate (EMS)	5 U	5.3 U	5.3 U	5.1 U
Hexachloro-1,3-butadiene	5 U	5.3 U	5.3 U	5.1 U
Hexachlorobenzene	5 U	5.3 U	5.3 U	5.1 U
Hexachlorocyclopentadiene	5 U	5.3 U	5.3 U	5.1 U
Hexachloroethane	5 U	5.3 U	5.3 U	5.1 U
Hexachloropropene	5 U	5.3 U	5.3 U	5.1 U
Indeno(1,2,3-cd)pyrene	5 UJ	5.3 UJ	5.3 UJ	5.1 UJ
Isophorone	5 U	5.3 U	5.3 U	5.1 U
Isosafrole	5 U	5.3 U	5.3 U	5.1 U
Methapyrilene	5 R	5.3 R	5.3 R	5.1 R
Methyl Methane Sulfonate	5 U	5.3 U	5.3 U	5.1 U
Nitrobenzene	5 UJ	5.3 UJ	5.3 UJ	5.1 UJ

APPENDIX C

SUMMARY OF ANALYTICAL RESULTS, GROUNDWATER
SWMU 67 – FORMER GAS STATION
PHASE I RFI REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Site ID	67SB01	67SB02	67SB03	67SB04
Sample ID	67GW01	67GW02	67GW03	67GW04
Sample Date	3/27/2010	3/28/2010	3/30/2010	3/28/2010
Semivolatiles (µg/L) (Cont)				
n-Nitrosodiethylamine	5 UJ	5.3 UJ	5.3 UJ	5.1 UJ
n-Nitrosodimethylamine (NDMA)	5 U	5.3 U	5.3 U	5.1 U
n-Nitroso-di-n-butylamine	5 U	5.3 U	5.3 U	5.1 U
n-Nitrosodi-n-propylamine	5 U	5.3 U	5.3 U	5.1 U
n-Nitrosodiphenylamine	5 UJ	5.3 UJ	5.3 UJ	5.1 UJ
n-Nitrosomethylethylamine	5 UJ	5.3 UJ	5.3 UJ	5.1 UJ
n-Nitrosomorpholine	5 UJ	5.3 UJ	5.3 UJ	5.1 UJ
n-Nitrosopiperidine	5 UJ	5.3 UJ	5.3 UJ	5.1 UJ
n-Nitrosopyrrolidine	5 UJ	5.3 UJ	5.3 UJ	5.1 UJ
o-Toluidine	5 UJ	5.3 UJ	5.3 UJ	5.1 UJ
Pentachlorobenzene	5 U	5.3 U	5.3 U	5.1 U
Pentachloronitrobenzene	5 UJ	5.3 UJ	5.3 UJ	5.1 UJ
Pentachlorophenol	10 UJ	10 UJ	10 UJ	10 UJ
Phenacetin	5 U	5.3 U	5.3 U	5.1 U
Phenol	10 U	10 U	10 U	10 U
Pronamide	10 U	10 U	10 U	10 U
Pyridine	5 U	5.3 U	5.3 U	5.1 U
Safrole	5 U	5.3 U	5.3 U	5.1 U
PAHs (µg/L) - Low Molecular Weight				
2-Methylnaphthalene	0.042 J	0.033 J	0.21 U	0.037 J
Acenaphthene	0.2 U	0.21 U	0.21 U	0.21 U
Acenaphthylene	0.2 U	0.046 J	0.21 U	0.21 U
Anthracene	0.2 U	0.21 U	0.21 U	0.21 U
Fluoranthene	0.01 J	0.034 J	0.016 J	0.01 J
Fluorene	0.2 U	0.21 U	0.21 U	0.21 U
Naphthalene	0.2 U	0.21 U	0.21 U	0.21 U
Phenanthrene	0.2 U	0.068 J	0.21 U	0.21 U
PAHs (µg/L) - High Molecular Weight				
Benzo(a)anthracene	0.2 U	0.21 U	0.21 U	0.21 U
Benzo(a)pyrene (BaP)	0.2 U	0.21 U	0.21 U	0.21 U
Benzo(b)fluoranthene	0.2 U	0.21 U	0.21 U	0.21 U
Benzo(g,h,i)perylene	0.2 U	0.21 U	0.21 U	0.21 U
Benzo(k)fluoranthene	0.2 U	0.21 U	0.21 U	0.21 U
Chrysene	0.2 U	0.21 U	0.21 U	0.21 U
Dibenz(a,h)anthracene	0.2 U	0.21 U	0.21 U	0.21 U
Indeno(1,2,3-cd)pyrene	0.2 U	0.21 U	0.21 U	0.21 U
Pyrene	0.2 U	0.019 J	0.21 U	0.21 U
PAH totals (µg/L)				
Low molecular weight PAHs	1.252	1.021	1.486	1.307
High molecular weight PAHs	1.8	1.699	1.89	1.89
TPH (mg/L)				
Diesel Range Organics (DRO)	0.5 U	0.5 U	0.53 U	0.5 U
Gasoline Range Organics (GRO)	0.5 U	0.5 U	0.5 U	0.5 U
Total TPH	1 U	1 U	1.03 U	1 U

APPENDIX C

SUMMARY OF ANALYTICAL RESULTS, GROUNDWATER
SWMU 67 – FORMER GAS STATION
PHASE I RFI REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Site ID	67SB01	67SB02	67SB03	67SB04
Sample ID	67GW01	67GW02	67GW03	67GW04
Sample Date	3/27/2010	3/28/2010	3/30/2010	3/28/2010
Dissolved Inorganics (µg/L)				
Antimony	0.48 J	0.35 J	0.41 J	0.48 J
Arsenic	2.3	2.1	3.1	6.4
Barium	84.9	13.6	12.3	36.7
Beryllium	1 U	1 U	1 U	1 U
Cadmium	0.1 J	0.053 J	1 U	0.066 J
Chromium	0.48 J	2 U	0.28 J	0.6 J
Cobalt	6.6	3.3	4.5	2.6
Copper	42.5	19.2	17.5	36.3
Lead	1 U	1 U	1 U	1 U
Mercury	0.2 U	0.2 U	0.2 U	0.2 U
Nickel	3.3	3.3	3.7	3.7
Selenium	7.6	4.1 J	6	23.7
Silver	1 U	1 U	1 U	1 U
Thallium	0.34 J	0.39 J	0.15 J	0.26 J
Tin	20 U	20 U	20 U	20 U
Vanadium	8.6 J	8.1 J	90.9 J	21.4 J
Zinc	7.3	6.9	5	5.2
Total Inorganics (µg/L)				
Antimony	2 U	2 U	2 U	2 U
Arsenic	2.2	2.2	2.9	9.8
Barium	108	24.2	12.4	65.4
Beryllium	1 U	1 U	1 U	1 U
Cadmium	0.068 J	0.094 J	1 U	0.14 J
Chromium	1.7 J	0.52 J	0.37 J	1.4 J
Cobalt	10.4	4.4	4.7	5.5
Copper	24.5	7.6	7.4	23.2
Lead	1 U	1 U	1 U	1 U
Mercury	0.19 J	0.2 U	0.2 U	0.2 U
Nickel	3.9	4	3.3	6.3
Selenium	7.3	4.5 J	5.3	37.2
Silver	1 U	1 U	1 U	1 U
Thallium	0.2 J	0.37 J	0.13 J	0.38 J
Tin	20 U	20 U	20 U	20 U
Vanadium	15	9.4	87.3	38.4
Zinc	9.2	13	7.6	15.4

Notes:
µg/L - micrograms per liter
mg/L - milligrams per liter
U - Not detected
UJ - Reported quantitation limit is estimated
J - Analyte present - value is estimated
R - Result is rejected and unusable
PAH - Polyaromatic Hydrocarbons
TPH - Total Petroleum Hydrocarbons

APPENDIX C

SUMMARY OF ANALYTICAL RESULTS, GROUNDWATER
SWMU 67 – FORMER GAS STATION
PHASE I RFI REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Site ID	67SB05	67SB06	67SB07	67SB08	67SB08
Sample ID	67GW05	67GW06	67GW07	67GW08	67GW08D
Sample Date	3/27/2010	3/27/2010	3/26/2010	3/26/2010	3/26/2010
Volatiles (µg/L)					
1,1,1,2-Tetrachloroethane	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ
1,1,1-Trichloroethane	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1,2,2-Tetrachloroethane	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ
1,1,2-Trichloroethane	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1-Dichloroethane	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1-Dichloroethene	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2,3-Trichloropropane	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dibromo-3-chloropropane (DBCP)	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ
1,2-Dibromoethane (EDB)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dichloroethane	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dichloroethene (trans)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dichloropropane	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,3-Dichloropropene (cis)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,3-Dichloropropene (trans)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,4-Dichloro-2-butene (trans)	2 U	2 U	2 U	2 U	2 U
1,4-Dioxane (p-)	25 R	25 R	25 R	25 R	25 R
2-Butanone (MEK)	5.2 J	2.5 R	2.5 R	2.5 R	2.5 R
2-Chloro-1,3-butadiene (Chloroprene)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
2-Hexanone (MBK)	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
3-Chloropropene (Allyl Chloride)	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ
4-Methyl-2-pentanone (MIBK)	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
Acetone	30 J	6 J	3.9 R	2.5 R	2.5 R
Acetonitrile	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ
Acrolein	5 R	5 R	5 R	5 R	5 R
Acrylonitrile	5 R	5 R	5 R	5 R	5 R
Benzene	0.11 J	0.053 J	0.5 U	0.5 U	0.5 U
Bromodichloromethane	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Bromoform	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Bromomethane	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ
Carbon Disulfide	2.2	0.82	0.04 J	0.048 J	0.048 J
Carbon Tetrachloride	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Chlorobenzene	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Chloroethane	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 UJ
Chloroform	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Chloromethane	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Dibromochloromethane	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ
Dibromomethane	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Dichlorodifluoromethane (Freon-12)	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ
Ethyl Methacrylate	5 U	5 U	5 U	5 U	5 U
Ethylbenzene	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Isobutyl Alcohol	25 R	25 R	25 R	25 R	25 R
Methyl Acrylonitrile	5 UJ	5 UJ	5 UJ	5 U	5 U
Methyl Iodide	0.25 J	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ
Methyl Methacrylate	5 U	5 U	5 U	5 U	5 U
Methylene Chloride	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U

APPENDIX C

SUMMARY OF ANALYTICAL RESULTS, GROUNDWATER
SWMU 67 – FORMER GAS STATION
PHASE I RFI REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Site ID	67SB05	67SB06	67SB07	67SB08	67SB08
Sample ID	67GW05	67GW06	67GW07	67GW08	67GW08D
Sample Date	3/27/2010	3/27/2010	3/26/2010	3/26/2010	3/26/2010
Volatiles (µg/L) (Cont)					
Pentachloroethane	0.5 UJ	0.5 UJ	0.5 UJ	0.5 U	0.5 U
Propionitrile (Ethyl Cyanide)	25 R	25 R	25 R	25 R	25 R
Styrene (Ethenylbenzene)	0.5 U	0.5 U	0.5 U	0.5 R	0.5 R
Tetrachloroethene (PCE)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Toluene	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Trichloroethene (TCE)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Trichlorofluoromethane (Freon 11)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Vinyl Acetate	1 U	1 U	1 U	1 U	1 U
Vinyl Chloride	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Xylene, m/p-	1 U	1 U	1 U	1 U	1 U
Xylene, o-	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Xylenes, total	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Semivolatiles (µg/L)					
1,2,4,5-Tetrachlorobenzene	5.6 U	5.1 U	5.6 U	5.3 U	5.3 U
1,2,4-Trichlorobenzene	5.6 U	5.1 U	5.6 U	5.3 U	5.3 U
1,2-Dichlorobenzene (o-)	5.6 U	5.1 U	5.6 U	5.3 U	5.3 U
1,3,5-Trinitrobenzene (TNB)	5.6 U	5.1 U	5.6 U	5.3 U	5.3 U
1,3-Dichlorobenzene (m-)	5.6 U	5.1 U	5.6 U	5.3 U	5.3 U
1,3-Dinitrobenzene (m-)	5.6 U	5.1 U	5.6 U	5.3 U	5.3 U
1,4-Dichlorobenzene (p-)	5.6 U	5.1 U	5.6 U	5.3 U	5.3 U
1,4-Naphthoquinone	5.6 U	5.1 U	5.6 U	5.3 U	5.3 U
1,4-Phenylenediamine	57 R	52 R	57 R	54 R	54 R
1-Naphthylamine	5.6 UJ	5.1 UJ	5.6 UJ	5.3 R	5.3 R
2,2'-Oxybis[1-chloropropane]	5.6 U	5.1 U	5.6 U	5.3 U	5.3 U
2,3,4,6-Tetrachlorophenol	11 U	10 U	11 U	10 U	10 U
2,4,5-Trichlorophenol	11 U	10 U	11 U	10 U	10 U
2,4,6-Trichlorophenol	11 U	10 U	11 U	10 U	10 U
2,4-Dichlorophenol	11 U	10 U	11 U	10 U	10 U
2,4-Dimethylphenol	11 U	10 U	11 U	10 R	10 R
2,4-Dinitrophenol	11 U	10 U	11 U	10 U	10 U
2,4-Dinitrotoluene (DNT)	5.6 U	5.1 U	5.6 U	5.3 U	5.3 U
2,6-Dichlorophenol	11 U	10 U	11 U	10 U	10 U
2,6-Dinitrotoluene (DNT)	5.6 U	5.1 U	5.6 U	5.3 U	5.3 U
2-Acetylaminofluorene	5.6 UJ	5.1 UJ	5.6 UJ	5.3 UJ	5.3 UJ
2-Chloronaphthalene	5.6 U	5.1 U	5.6 U	5.3 UJ	5.3 U
2-Chlorophenol	11 U	10 U	11 U	10 U	10 U
2-Methyl-5-nitroaniline	5.6 UJ	5.1 UJ	5.6 UJ	5.3 UJ	5.3 UJ
2-Methylphenol (o-Cresol)	11 U	10 U	11 U	10 U	10 U
2-Naphthylamine	5.6 UJ	5.1 UJ	5.6 UJ	5.3 R	5.3 R
2-Nitroaniline	5.6 U	5.1 U	5.6 U	5.3 U	5.3 U
2-Nitrophenol	11 U	10 U	11 U	10 U	10 U
2-Picoline	5.6 UJ	5.1 UJ	5.6 UJ	5.3 R	5.3 R
3,3'-Dichlorobenzidine	5.6 U	5.1 U	5.6 U	5.3 R	5.3 R
3,3'-Dimethylbenzidine	5.6 UJ	5.1 UJ	5.6 UJ	5.3 R	5.3 R

APPENDIX C

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PHASE I RFI REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Site ID	67SB05	67SB06	67SB07	67SB08	67SB08
Sample ID	67GW05	67GW06	67GW07	67GW08	67GW08D
Sample Date	3/27/2010	3/27/2010	3/26/2010	3/26/2010	3/26/2010
Semivolatiles (µg/L) (Cont)					
3-Methylcholanthrene	5.6 U	5.1 U	5.6 U	5.3 R	5.3 R
3-Methylphenol (m-Cresol)	8.9 U	8.2 U	8.9 U	8.4 U	8.4 U
3-Nitroaniline	5.6 U	5.1 U	5.6 U	5.3 U	5.3 U
4,6-Dinitro-2-methylphenol	11 U	10 U	11 UJ	10 U	10 UJ
4-Aminobiphenyl	5.6 UJ	5.1 UJ	5.6 UJ	5.3 R	5.3 R
4-Bromophenyl-phenylether	5.6 U	5.1 U	5.6 U	5.3 U	5.3 U
4-Chloro-3-methylphenol	11 U	10 U	11 U	10 U	10 U
4-Chloroaniline	5.6 U	5.1 U	5.6 U	5.3 R	5.3 R
4-Chlorophenyl-phenylether	5.6 U	5.1 U	5.6 U	5.3 U	5.3 U
4-Dimethylaminoazobenzene (p-)	5.6 UJ	5.1 UJ	5.6 UJ	5.3 R	5.3 R
4-Methylphenol (p-Cresol)	8.9 U	8.2 U	8.9 U	8.4 U	8.4 U
4-Nitroaniline	5.6 U	5.1 U	5.6 U	5.3 U	5.3 U
4-Nitrophenol	11 U	10 U	11 U	10 U	10 U
4-Nitroquinoline-1-oxide	5.6 UJ	5.1 UJ	5.6 UJ	5.3 UJ	5.3 UJ
7,12-Dimethylbenz(a)anthracene	5.6 U	5.1 U	5.6 U	5.3 R	5.3 R
Acetophenone	5.6 U	5.1 U	5.6 U	5.3 U	5.3 U
Aniline	5.6 U	5.1 U	5.6 U	5.3 R	5.3 R
Aramite	5.6 U	5.1 U	5.6 U	5.3 U	5.3 U
Benzyl Alcohol	5.6 U	5.1 U	5.6 U	5.3 U	5.3 U
Bis(2-chloroethoxy)methane	5.6 U	5.1 U	5.6 U	5.3 U	5.3 U
Bis(2-chloroethyl)ether	5.6 U	5.1 U	5.6 U	5.3 U	5.3 U
Bis(2-ethylhexyl) Phthalate (BEHP)	5.6 U	5.1 U	5.6 U	5.3 U	5.3 U
Butyl Benzyl Phthalate	5.6 U	5.1 U	5.6 U	5.3 U	5.3 U
Diallate (cis)	5.6 U	5.1 U	5.6 U	5.3 UJ	5.3 UJ
Diallate (total)	5.6 UJ	5.1 UJ	5.6 UJ	5.3 UJ	5.3 UJ
Diallate (trans)	5.6 UJ	5.1 UJ	5.6 UJ	5.3 UJ	5.3 UJ
Dibenzofuran	5.6 U	5.1 U	5.6 U	5.3 U	5.3 U
Diethyl Phthalate (DEP)	5.6 U	5.1 U	5.6 U	5.3 U	5.3 U
Dimethyl Phthalate	5.6 U	5.1 U	5.6 U	5.3 U	5.3 U
Di-n-butyl Phthalate (DBP)	5.6 U	5.1 U	5.6 U	5.3 U	5.3 U
Di-n-octyl Phthalate	5.6 U	5.1 U	5.6 U	5.3 U	5.3 U
Dinoseb	5.6 U	5.1 U	5.6 U	5.3 U	5.3 U
Ethyl Methane Sulfonate (EMS)	5.6 U	5.1 U	5.6 U	5.3 U	5.3 U
Hexachloro-1,3-butadiene	5.6 U	5.1 U	5.6 U	5.3 U	5.3 U
Hexachlorobenzene	5.6 U	5.1 U	5.6 U	5.3 U	5.3 U
Hexachlorocyclopentadiene	5.6 U	5.1 U	5.6 U	5.3 U	5.3 U
Hexachloroethane	5.6 U	5.1 U	5.6 U	5.3 U	5.3 U
Hexachloropropene	5.6 UJ	5.1 UJ	5.6 U	5.3 U	5.3 U
Indeno(1,2,3-cd)pyrene	5.6 UJ	5.1 UJ	5.6 UJ	5.3 UJ	5.3 UJ
Isophorone	5.6 U	5.1 U	5.6 U	5.3 U	5.3 U
Isosafrole	5.6 U	5.1 U	5.6 U	5.3 U	5.3 U
Methapyrilene	5.6 R	5.1 R	5.6 R	5.3 R	5.3 R
Methyl Methane Sulfonate	5.6 U	5.1 U	5.6 U	5.3 U	5.3 U
Nitrobenzene	5.6 UJ	5.1 UJ	5.6 UJ	5.3 U	5.3 UJ

APPENDIX C

SUMMARY OF ANALYTICAL RESULTS, GROUNDWATER
SWMU 67 – FORMER GAS STATION
PHASE I RFI REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Site ID	67SB05	67SB06	67SB07	67SB08	67SB08
Sample ID	67GW05	67GW06	67GW07	67GW08	67GW08D
Sample Date	3/27/2010	3/27/2010	3/26/2010	3/26/2010	3/26/2010
Semivolatiles (µg/L) (Cont)					
n-Nitrosodiethylamine	5.6 UJ	5.1 UJ	5.6 UJ	5.3 UJ	5.3 UJ
n-Nitrosodimethylamine (NDMA)	5.6 U	5.1 U	5.6 U	5.3 U	5.3 U
n-Nitroso-di-n-butylamine	5.6 UJ	5.1 UJ	5.6 U	5.3 UJ	5.3 U
n-Nitrosodi-n-propylamine	5.6 U	5.1 U	5.6 U	5.3 U	5.3 U
n-Nitrosodiphenylamine	5.6 UJ	5.1 UJ	5.6 UJ	5.3 R	5.3 R
n-Nitrosomethylethylamine	5.6 UJ	5.1 UJ	5.6 UJ	5.3 UJ	5.3 UJ
n-Nitrosomorpholine	5.6 UJ	5.1 UJ	5.6 UJ	5.3 UJ	5.3 UJ
n-Nitrosopiperidine	5.6 UJ	5.1 UJ	5.6 UJ	5.3 UJ	5.3 UJ
n-Nitrosopyrrolidine	5.6 UJ	5.1 UJ	5.6 UJ	5.3 UJ	5.3 UJ
o-Toluidine	5.6 UJ	5.1 UJ	5.6 UJ	5.3 R	5.3 R
Pentachlorobenzene	5.6 U	5.1 U	5.6 U	5.3 U	5.3 U
Pentachloronitrobenzene	5.6 U	5.1 U	5.6 UJ	5.3 U	5.3 UJ
Pentachlorophenol	11 U	10 U	11 UJ	10 U	10 UJ
Phenacetin	5.6 U	5.1 U	5.6 U	5.3 U	5.3 U
Phenol	11 U	10 U	11 U	10 U	10 U
Pronamide	11 U	10 U	11 U	10 R	10 R
Pyridine	1.6 J	5.1 U	5.6 U	5.3 U	5.3 U
Safrole	5.6 U	5.1 U	5.6 U	5.3 U	5.3 U
PAHs (µg/L) - Low Molecular Weight					
2-Methylnaphthalene	0.22 U	0.21 U	0.22 U	0.21 U	0.21 U
Acenaphthene	0.22 U	0.21 U	0.22 U	0.21 U	0.21 U
Acenaphthylene	0.22 U	0.21 U	0.22 U	0.21 UJ	0.21 UJ
Anthracene	0.22 U	0.21 U	0.22 U	0.21 R	0.21 R
Fluoranthene	0.017 J	0.015 J	0.22 U	0.21 U	0.035 J
Fluorene	0.22 U	0.06 J	0.22 U	0.21 U	0.21 U
Naphthalene	0.22 U	0.21 U	1	0.21 U	0.21 U
Phenanthrene	0.22 U	0.042 J	0.22 U	0.21 U	0.21 U
PAHs (µg/L) - High Molecular Weight					
Benzo(a)anthracene	0.22 U	0.21 U	0.22 U	0.21 UJ	0.022 J
Benzo(a)pyrene (BaP)	0.22 U	0.21 U	0.22 U	0.21 R	0.21 R
Benzo(b)fluoranthene	0.22 U	0.21 U	0.22 U	0.21 U	0.014 J
Benzo(g,h,i)perylene	0.22 U	0.21 U	0.22 U	0.21 U	0.21 U
Benzo(k)fluoranthene	0.22 U	0.21 U	0.22 U	0.21 U	0.02 J
Chrysene	0.22 U	0.21 U	0.22 U	0.21 U	0.027 J
Dibenz(a,h)anthracene	0.22 U	0.21 U	0.22 U	0.21 U	0.21 U
Indeno(1,2,3-cd)pyrene	0.22 U	0.21 U	0.22 U	0.21 U	0.21 U
Pyrene	0.22 U	0.21 U	0.22 U	0.21 U	0.033 J
PAH totals (µg/L)					
Low molecular weight PAHs	1.557	1.167	2.54	1.47	1.295
High molecular weight PAHs	1.98	1.89	1.98	1.68	0.746
TPH (mg/L)					
Diesel Range Organics (DRO)	0.5 U	0.54 U	0.5 U	0.5 U	0.56 U
Gasoline Range Organics (GRO)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Total TPH	1 U	1.04 U	1 U	1 U	1.06 U

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PHASE I RFI REPORT
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Site ID	67SB05	67SB06	67SB07	67SB08	67SB08
Sample ID	67GW05	67GW06	67GW07	67GW08	67GW08D
Sample Date	3/27/2010	3/27/2010	3/26/2010	3/26/2010	3/26/2010
Dissolved Inorganics (µg/L)					
Antimony	0.84 J	0.52 J	2 U	2 U	2 U
Arsenic	4.6	3	1.2	1.3	1.1
Barium	52.7	39.5	9.6 J	4.8 J	4.8 J
Beryllium	1 U	1 U	1 U	1 U	1 U
Cadmium	0.76 J	0.061 J	1 U	0.062 J	0.059 J
Chromium	0.77 J	0.73 J	0.45 J	0.34 J	0.49 J
Cobalt	35.7	2.3	0.64 J	2.4	2.5
Copper	31.3	29.3	11.3	5	9.5
Lead	1 U	1 U	1 U	1 U	1 U
Mercury	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Nickel	45.8	3.3	1 U	1.3	1.5
Selenium	17.3	10.1	6.3	8.1	7.9
Silver	1 U	1 U	1 U	1 U	1 U
Thallium	0.61 J	0.27 J	1 U	1 U	1 U
Tin	20 U	20 U	20 U	20 U	20 U
Vanadium	8.3 J	12.6 J	45.5 J	52.8 J	53.2 J
Zinc	181	8.4	2.3	2.5	2.1
Total Inorganics (µg/L)					
Antimony	2 U	2 U	2 U	0.23 J	2 U
Arsenic	3.4	3	1.1	1.2	1.3
Barium	60.5	41.2	9 J	4.6 J	5.1 J
Beryllium	1 U	1 U	1 U	1 U	1 U
Cadmium	0.097 J	0.12 J	1 U	0.055 J	0.051 J
Chromium	3.6	1 J	0.45 J	0.44 J	0.46 J
Cobalt	6.2	2.7	0.66 J	2.6	2.7
Copper	16	15.5	5.8	5.6	5.1
Lead	1 U	1 U	1 U	1 U	1 U
Mercury	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Nickel	5.7	3.8	1 U	1.4	1.4
Selenium	12.8	9.6	5.8	7.6	7.8
Silver	1 U	1 U	1 U	1 U	1 U
Thallium	0.16 J	0.29 J	1 U	0.051 J	1 U
Tin	20 U	20 U	20 U	20 U	20 U
Vanadium	10.2	13.4	41.4	49.5	52.7
Zinc	14.3	9.3	3.3	2.4	2.2

Notes:
µg/L - micrograms per liter
mg/L - milligrams per liter
U - Not detected
UJ - Reported quantitation limit is estimated
J - Analyte present - value is estimated
R - Result is rejected and unusable
PAH - Polyaromatic Hydrocarbons
TPH - Total Petroleum Hydrocarbons

SURFACE WATER

APPENDIX C

SUMMARY OF ANALYTICAL RESULTS, SURFACE WATER
SWMU 67 – FORMER GAS STATION
PHASE I RFI REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Site ID	67SW03	
Sample ID	67SW03	
Sample Date	3/22/2010	
Volatiles (µg/L)		
1,1,1,2-Tetrachloroethane	0.5	UJ
1,1,1-Trichloroethane	0.5	U
1,1,2,2-Tetrachloroethane	0.5	UJ
1,1,2-Trichloroethane	0.5	U
1,1-Dichloroethane	0.5	U
1,1-Dichloroethene	0.5	U
1,2,3-Trichloropropane	0.5	U
1,2-Dibromo-3-chloropropane (DBCP	0.5	UJ
1,2-Dibromoethane (EDB)	0.5	U
1,2-Dichloroethane	0.5	U
1,2-Dichloroethene (trans)	0.5	U
1,2-Dichloropropane	0.5	U
1,3-Dichloropropene (cis)	0.5	U
1,3-Dichloropropene (trans)	0.5	U
1,4-Dichloro-2-butene (trans)	2	U
1,4-Dioxane (p-)	25	R
2-Butanone (MEK)	2.5	R
2-Chloro-1,3-butadiene (Chloroprene)	0.5	U
2-Hexanone (MBK)	2.5	U
3-Chloropropene (Allyl Chloride)	0.5	UJ
4-Methyl-2-pentanone (MIBK)	2.5	U
Acetone	2.5	R
Acetonitrile	0.5	UJ
Acrolein	5	R
Acrylonitrile	5	R
Benzene	0.5	U
Bromodichloromethane	0.5	U
Bromoform	0.5	U
Bromomethane	0.5	UJ
Carbon Disulfide	0.5	U
Carbon Tetrachloride	0.5	U
Chlorobenzene	0.5	U
Chloroethane	0.5	UJ
Chloroform	0.5	U
Chloromethane	0.5	U
Dibromochloromethane	0.5	UJ
Dibromomethane	0.5	U
Dichlorodifluoromethane (Freon-12)	0.5	UJ
Ethyl Methacrylate	5	U
Ethylbenzene	0.5	U
Isobutyl Alcohol	25	R
Methyl Acrylonitrile	5	U
Methyl Iodide	0.5	UJ
Methyl Methacrylate	5	U
Methylene Chloride	0.5	U

APPENDIX C

SUMMARY OF ANALYTICAL RESULTS, SURFACE WATER
SWMU 67 – FORMER GAS STATION
PHASE I RFI REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Site ID	67SW03	
Sample ID	67SW03	
Sample Date	3/22/2010	
Volatiles (µg/L) (Cont)		
Pentachloroethane	0.5	U
Propionitrile (Ethyl Cyanide)	25	R
Styrene (Ethenylbenzene)	0.5	U
Tetrachloroethene (PCE)	0.5	U
Toluene	0.5	U
Trichloroethene (TCE)	0.5	U
Trichlorofluoromethane (Freon 11)	0.5	U
Vinyl Acetate	1	U
Vinyl Chloride	0.5	U
Xylene, m/p-	1	U
Xylene, o-	0.5	U
Xylenes, total	0.5	U
Semivolatiles (µg/L)		
1,2,4,5-Tetrachlorobenzene	5	U
1,2,4-Trichlorobenzene	5	U
1,2-Dichlorobenzene (o-)	5	U
1,3,5-Trinitrobenzene (TNB)	5	U
1,3-Dichlorobenzene (m-)	5	U
1,3-Dinitrobenzene (m-)	5	U
1,4-Dichlorobenzene (p-)	5	U
1,4-Naphthoquinone	5	U
1,4-Phenylenediamine	51	R
1-Naphthylamine	5	UJ
2,2'-Oxybis[1-chloropropane]	5	U
2,3,4,6-Tetrachlorophenol	10	U
2,4,5-Trichlorophenol	10	U
2,4,6-Trichlorophenol	10	U
2,4-Dichlorophenol	10	U
2,4-Dimethylphenol	10	U
2,4-Dinitrophenol	10	U
2,4-Dinitrotoluene (DNT)	5	U
2,6-Dichlorophenol	10	U
2,6-Dinitrotoluene (DNT)	5	U
2-Acetylaminofluorene	5	UJ
2-Chloronaphthalene	5	U
2-Chlorophenol	10	U
2-Methyl-5-nitroaniline	5	UJ
2-Methylphenol (o-Cresol)	10	U
2-Naphthylamine	5	UJ
2-Nitroaniline	5	U
2-Nitrophenol	10	U
2-Picoline	5	UJ
3,3'-Dichlorobenzidine	5	U
3,3'-Dimethylbenzidine	5	UJ

APPENDIX C

SUMMARY OF ANALYTICAL RESULTS, SURFACE WATER
SWMU 67 – FORMER GAS STATION
PHASE I RFI REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Site ID	67SW03
Sample ID	67SW03
Sample Date	3/22/2010
Semivolatiles (µg/L) (Cont)	
3-Methylcholanthrene	5 U
3-Methylphenol (m-Cresol)	8 U
3-Nitroaniline	5 U
4,6-Dinitro-2-methylphenol	10 U
4-Aminobiphenyl	5 UJ
4-Bromophenyl-phenylether	5 U
4-Chloro-3-methylphenol	10 U
4-Chloroaniline	5 U
4-Chlorophenyl-phenylether	5 U
4-Dimethylaminoazobenzene (p-)	5 UJ
4-Methylphenol (p-Cresol)	8 U
4-Nitroaniline	5 U
4-Nitrophenol	10 U
4-Nitroquinoline-1-oxide	5 UJ
7,12-Dimethylbenz(a)anthracene	5 U
Acetophenone	5 U
Aniline	5 U
Aramite	5 U
Benzyl Alcohol	5 U
Bis(2-chloroethoxy)methane	5 U
Bis(2-chloroethyl)ether	5 U
Bis(2-ethylhexyl) Phthalate (BEHP)	5 U
Butyl Benzyl Phthalate	5 U
Diallate (cis)	5 UJ
Diallate (total)	5 UJ
Diallate (trans)	5 UJ
Dibenzofuran	5 U
Diethyl Phthalate (DEP)	5 U
Dimethyl Phthalate	5 U
Di-n-butyl Phthalate (DBP)	5 U
Di-n-octyl Phthalate	5 U
Dinoseb	5 U
Ethyl Methane Sulfonate (EMS)	5 U
Hexachloro-1,3-butadiene	5 U
Hexachlorobenzene	5 U
Hexachlorocyclopentadiene	5 U
Hexachloroethane	5 U
Hexachloropropene	5 UJ
Indeno(1,2,3-cd)pyrene	5 UJ
Isophorone	5 U
Isosafrole	5 U
Methapyrilene	5 UJ
Methyl Methane Sulfonate	5 U
Nitrobenzene	5 U

APPENDIX C

SUMMARY OF ANALYTICAL RESULTS, SURFACE WATER
SWMU 67 – FORMER GAS STATION
PHASE I RFI REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Site ID	67SW03	
Sample ID	67SW03	
Sample Date	3/22/2010	
Semivolatiles (µg/L) (Cont)		
n-Nitrosodiethylamine	5	UJ
n-Nitrosodimethylamine (NDMA)	5	U
n-Nitroso-di-n-butylamine	5	UJ
n-Nitrosodi-n-propylamine	5	U
n-Nitrosodiphenylamine	5	UJ
n-Nitrosomethylethylamine	5	UJ
n-Nitrosomorpholine	5	UJ
n-Nitrosopiperidine	5	UJ
n-Nitrosopyrrolidine	5	UJ
o-Toluidine	5	UJ
Pentachlorobenzene	5	U
Pentachloronitrobenzene	5	U
Pentachlorophenol	10	U
Phenacetin	5	U
Phenol	10	U
Pronamide	10	U
Pyridine	5	U
Safrole	5	U
PAHs (µg/L) - Low Molecular Weight		
2-Methylnaphthalene	0.2	U
Acenaphthene	0.2	U
Acenaphthylene	0.2	U
Anthracene	0.2	U
Fluoranthene	0.2	U
Fluorene	0.2	U
Naphthalene	0.072	J
Phenanthrene	0.2	U
PAHs (µg/L) - High Molecular Weight		
Benzo(a)anthracene	0.2	U
Benzo(a)pyrene (BaP)	0.2	U
Benzo(b)fluoranthene	0.2	U
Benzo(g,h,i)perylene	0.2	U
Benzo(k)fluoranthene	0.2	U
Chrysene	0.2	U
Dibenz(a,h)anthracene	0.2	U
Indeno(1,2,3-cd)pyrene	0.2	U
Pyrene	0.2	U
PAH totals (µg/L)		
Low molecular weight PAHs	1.472	
High molecular weight PAHs	1.8	
TPH (mg/L)		
Diesel Range Organics (DRO)	0.54	U
Gasoline Range Organics (GRO)	0.5	U
Total TPH	1.04	U

APPENDIX C

SUMMARY OF ANALYTICAL RESULTS, SURFACE WATER
SWMU 67 – FORMER GAS STATION
PHASE I RFI REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Site ID	67SW03	
Sample ID	67SW03	
Sample Date	3/22/2010	
Dissolved Inorganics (µg/L)		
Antimony	0.45	J
Arsenic	1	U
Barium	38	
Beryllium	1	U
Cadmium	1	U
Chromium	0.33	J
Cobalt	0.13	J
Copper	6	
Lead	0.091	J
Mercury	0.2	U
Nickel	0.89	J
Selenium	4.2	J
Silver	1	U
Thallium	1	U
Tin	20	U
Vanadium	8.2	J
Zinc	3	
Total Inorganics (µg/L)		
Antimony	0.4	J
Arsenic	0.74	J
Barium	38	
Beryllium	1	U
Cadmium	1	U
Chromium	0.44	J
Cobalt	0.27	J
Copper	5.8	
Lead	0.23	J
Mercury	0.2	U
Nickel	0.78	J
Selenium	3.8	J
Silver	1	U
Thallium	1	U
Tin	20	U
Vanadium	8.8	
Zinc	5.6	J

Notes:

µg/L - micrograms per liter
mg/L - milligrams per liter
PAH - Polyaromatic Hydrocarbons
TPH - Total Petroleum Hydrocarbons
U - Not detected
UJ - Reported quantitation limit is qualified as estimated
J - Analyte present - Reported value is estimated
R - Result is rejected and unusable

SEDIMENT

Estuarine Sediment

APPENDIX C

SUMMARY OF ANALYTICAL RESULTS, ESTUARINE SEDIMENT
SWMU 67 – FORMER GAS STATION
PHASE I RFI REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Site ID	67SD01	67SD01D	67SD02	67SD04	67SD05
Sample ID	67SD01	67SD01D	67SD02	67SD04	67SD05
Sample Date	3/22/2010	3/22/2010	3/22/2010	3/22/2010	3/22/2010
Sample Depth (ft bgs)	0.0 - 0.25	0.0 - 0.25	0.0 - 0.25	0.0 - 0.25	0.0 - 0.25
Volatiles (µg/kg)					
1,1,1,2-Tetrachloroethane	6.6 U	6 U	7 U	8.2 U	8.3 UJ
1,1,1-Trichloroethane	6.6 U	6 U	7 U	8.2 U	8.3 UJ
1,1,2,2-Tetrachloroethane	6.6 U	6 U	7 U	8.2 U	8.3 UJ
1,1,2-Trichloroethane	6.6 U	6 U	7 U	8.2 U	8.3 UJ
1,1-Dichloroethane	6.6 U	6 U	7 U	8.2 U	8.3 UJ
1,1-Dichloroethene	6.6 U	6 U	7 U	8.2 U	8.3 UJ
1,2,3-Trichloropropane	6.6 U	6 U	7 U	8.2 U	8.3 UJ
1,2-Dibromo-3-chloropropane (DBCP)	6.6 U	6 U	7 U	8.2 U	8.3 UJ
1,2-Dibromoethane (EDB)	6.6 U	6 U	7 U	8.2 U	8.3 UJ
1,2-Dichloroethane	6.6 U	6 U	7 U	8.2 U	8.3 UJ
1,2-Dichloroethene (trans)	6.6 U	6 U	7 U	8.2 U	8.3 UJ
1,2-Dichloropropane	6.6 UJ	6 UJ	7 UJ	8.2 UJ	8.3 UJ
1,3-Dichloropropene (cis)	6.6 U	6 U	7 U	8.2 U	8.3 UJ
1,3-Dichloropropene (trans)	6.6 U	6 U	7 U	8.2 U	8.3 UJ
1,4-Dichloro-2-butene (trans)	26 U	24 U	28 U	33 U	33 UJ
1,4-Dioxane (p-)	330 R	300 R	350 R	410 R	410 R
2-Butanone (MEK)	11 J	20	9.4 J	15 J	15 J
2-Chloro-1,3-butadiene (Chloroprene)	6.6 U	6 U	7 U	8.2 U	8.3 UJ
2-Hexanone (MBK)	16 U	15 U	17 U	21 U	21 UJ
3-Chloropropene (Allyl Chloride)	6.6 U	6 U	7 U	8.2 U	8.3 UJ
4-Methyl-2-pentanone (MIBK)	16 U	15 U	17 U	21 U	21 UJ
Acetone	95	170	120 J	190	210 J
Acetonitrile	6.6 U	6 U	7 U	8.2 U	8.3 UJ
Acrolein	66 R	60 R	70 R	82 R	83 R
Acrylonitrile	66 R	60 R	70 R	82 R	83 R
Benzene	6.6 U	6 U	7 U	8.2 U	8.3 UJ
Bromodichloromethane	6.6 U	6 U	7 U	8.2 U	8.3 UJ
Bromoform	6.6 U	6 U	7 U	8.2 U	8.3 UJ
Bromomethane	6.6 U	6 U	7 U	8.2 U	8.3 UJ
Carbon Disulfide	5.1 J	36 J	0.86 J	15	1.7 J
Carbon Tetrachloride	6.6 U	6 U	7 U	8.2 U	8.3 UJ
Chlorobenzene	6.6 U	6 U	7 U	8.2 U	8.3 UJ
Chloroethane	6.6 U	6 U	7 U	8.2 U	8.3 UJ
Chloroform	6.6 U	6 U	7 U	8.2 U	8.3 UJ
Chloromethane	6.6 U	6 U	0.76 J	8.2 U	0.82 J
Dibromochloromethane	6.6 U	6 U	7 U	8.2 U	8.3 UJ
Dibromomethane	6.6 U	6 U	7 U	8.2 U	8.3 UJ
Dichlorodifluoromethane (Freon-12)	6.6 U	6 U	7 U	8.2 U	8.3 UJ
Ethyl Methacrylate	66 U	60 U	70 U	82 U	83 UJ
Ethylbenzene	6.6 U	6 U	7 U	8.2 U	8.3 UJ
Isobutyl Alcohol	330 R	300 R	350 R	410 R	410 R
Methyl Acrylonitrile	66 U	60 U	70 U	82 U	83 UJ
Methyl Iodide	1.2 J	0.77 J	2.5 J	2.3 J	2.5 J

APPENDIX C

SUMMARY OF ANALYTICAL RESULTS, ESTUARINE SEDIMENT
SWMU 67 – FORMER GAS STATION
PHASE I RFI REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Site ID	67SD01	67SD01D	67SD02	67SD04	67SD05
Sample ID	67SD01	67SD01D	67SD02	67SD04	67SD05
Sample Date	3/22/2010	3/22/2010	3/22/2010	3/22/2010	3/22/2010
Sample Depth (ft bgs)	0.0 - 0.25	0.0 - 0.25	0.0 - 0.25	0.0 - 0.25	0.0 - 0.25
Volatiles (µg/kg) (Cont)					
Methyl Methacrylate	66 R	60 R	70 R	82 R	83 R
Methylene Chloride	6.6 U	6 U	7 U	8.2 U	8.3 UJ
Pentachloroethane	6.6 U	6 U	7 U	8.2 U	8.3 UJ
Propionitrile (Ethyl Cyanide)	330 R	300 R	350 R	410 R	410 R
Styrene (Ethenylbenzene)	6.6 U	6 U	7 U	8.2 U	8.3 UJ
Tetrachloroethene (PCE)	6.6 U	6 U	7 U	8.2 U	8.3 UJ
Toluene	6.6 U	6 U	7 U	8.2 U	8.3 UJ
Trichloroethene (TCE)	6.6 U	6 U	7 U	8.2 U	8.3 UJ
Trichlorofluoromethane (Freon 11)	6.6 U	6 U	7 U	8.2 U	8.3 UJ
Vinyl Acetate	6.6 U	6 U	7 U	8.2 U	8.3 UJ
Vinyl Chloride	6.6 U	6 U	7 U	8.2 U	8.3 UJ
Xylene, m/p-	13 U	0.24 J	0.42 J	0.38 J	17 UJ
Xylene, o-	6.6 U	6 U	7 U	8.2 U	8.3 UJ
Xylenes, total	6.6 U	6 U	7 U	8.2 U	8.3 UJ
Semivolatiles (µg/kg)					
1,2,4,5-Tetrachlorobenzene	260 U	250 U	280 U	290 U	360 UJ
1,2,4-Trichlorobenzene	260 U	250 U	280 U	290 U	360 UJ
1,2-Dichlorobenzene (o-)	260 U	250 U	280 U	290 U	360 UJ
1,3,5-Trinitrobenzene (TNB)	260 U	250 U	280 U	290 U	360 UJ
1,3-Dichlorobenzene (m-)	260 U	250 U	280 U	290 U	360 UJ
1,3-Dinitrobenzene (m-)	260 U	250 U	280 U	290 U	360 UJ
1,4-Dichlorobenzene (p-)	260 U	250 U	280 U	290 U	360 UJ
1,4-Naphthoquinone	260 UJ	250 U	280 U	290 U	360 UJ
1,4-Phenylenediamine	2600 R	2500 R	2800 R	2900 R	3600 R
1-Naphthylamine	260 R	250 UJ	280 UJ	290 UJ	360 UJ
2,2'-Oxybis[1-chloropropane]	260 U	250 U	280 U	290 U	360 UJ
2,3,4,6-Tetrachlorophenol	500 U	480 U	540 U	570 U	700 UJ
2,4,5-Trichlorophenol	500 U	480 U	540 U	570 U	700 UJ
2,4,6-Trichlorophenol	500 U	480 U	540 U	570 U	700 UJ
2,4-Dichlorophenol	500 U	480 U	540 U	570 U	700 UJ
2,4-Dimethylphenol	500 U	480 U	540 U	570 U	700 UJ
2,4-Dinitrophenol	500 U	480 U	540 U	570 U	700 UJ
2,4-Dinitrotoluene (DNT)	260 U	250 U	280 U	290 U	360 UJ
2,6-Dichlorophenol	500 U	480 U	540 U	570 U	700 UJ
2,6-Dinitrotoluene (DNT)	260 U	250 U	280 U	290 U	360 UJ
2-Acetylaminofluorene	260 UJ	250 UJ	280 UJ	290 UJ	360 UJ
2-Chloronaphthalene	260 U	250 U	280 U	290 U	360 UJ
2-Chlorophenol	500 U	480 U	540 U	570 U	700 UJ
2-Methyl-5-nitroaniline	260 UJ	250 UJ	280 UJ	290 UJ	360 UJ
2-Methylphenol (o-Cresol)	500 U	480 U	540 U	570 U	700 UJ
2-Naphthylamine	260 UJ	250 UJ	280 UJ	290 UJ	360 UJ
2-Nitroaniline	260 U	250 U	280 U	290 U	360 UJ
2-Nitrophenol	500 U	480 U	540 U	570 U	700 UJ
2-Picoline	260 UJ	250 UJ	280 UJ	290 UJ	360 UJ

APPENDIX C

SUMMARY OF ANALYTICAL RESULTS, ESTUARINE SEDIMENT
SWMU 67 – FORMER GAS STATION
PHASE I RFI REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Site ID	67SD01	67SD01D	67SD02	67SD04	67SD05
Sample ID	67SD01	67SD01D	67SD02	67SD04	67SD05
Sample Date	3/22/2010	3/22/2010	3/22/2010	3/22/2010	3/22/2010
Sample Depth (ft bgs)	0.0 - 0.25	0.0 - 0.25	0.0 - 0.25	0.0 - 0.25	0.0 - 0.25
Semivolatiles (µg/kg) (Cont)					
3,3'-Dichlorobenzidine	260 U	250 U	280 U	290 U	360 UJ
3,3'-Dimethylbenzidine	260 R	250 UJ	280 UJ	290 UJ	360 UJ
3-Methylcholanthrene	260 U	250 U	280 U	290 U	360 UJ
3-Methylphenol (m-Cresol)	380 U	360 U	410 U	430 U	530 UJ
3-Nitroaniline	260 U	250 U	280 U	290 U	360 UJ
4,6-Dinitro-2-methylphenol	500 U	480 U	540 U	570 U	700 UJ
4-Aminobiphenyl	260 UJ	250 UJ	280 UJ	290 UJ	360 UJ
4-Bromophenyl-phenylether	260 U	250 U	280 U	290 U	360 UJ
4-Chloro-3-methylphenol	500 U	480 U	540 U	570 U	700 UJ
4-Chloroaniline	260 U	250 U	280 U	290 U	360 UJ
4-Chlorophenyl-phenylether	260 U	250 U	280 U	290 U	360 UJ
4-Dimethylaminoazobenzene (p-)	260 UJ	250 UJ	280 UJ	290 UJ	360 UJ
4-Methylphenol (p-Cresol)	380 U	360 U	410 U	430 U	530 UJ
4-Nitroaniline	260 U	250 U	280 U	290 U	360 UJ
4-Nitrophenol	500 UJ	480 U	540 U	570 U	700 UJ
4-Nitroquinoline-1-oxide	260 UJ	250 UJ	280 UJ	290 UJ	360 UJ
7,12-Dimethylbenz(a)anthracene	260 U	250 UJ	280 UJ	290 UJ	360 UJ
Acetophenone	260 U	250 U	280 U	290 U	360 UJ
Aniline	260 U	250 U	280 U	290 U	360 UJ
Aramite	260 U	250 U	280 U	290 U	360 UJ
Benzyl Alcohol	260 UJ	250 U	280 U	290 U	360 UJ
Bis(2-chloroethoxy)methane	260 UJ	250 U	280 U	290 U	360 UJ
Bis(2-chloroethyl)ether	260 U	250 U	280 U	290 U	360 UJ
Bis(2-ethylhexyl) Phthalate (BEHP)	350 U	440 U	280 U	290 U	360 UJ
Butyl Benzyl Phthalate	260 U	250 U	280 U	290 U	360 UJ
Diallate (cis)	260 U	250 U	280 U	290 U	360 UJ
Diallate (total)	260 UJ	250 UJ	280 UJ	290 UJ	360 UJ
Diallate (trans)	260 UJ	250 UJ	280 UJ	290 UJ	360 UJ
Dibenzofuran	260 U	250 U	280 U	290 U	360 UJ
Diethyl Phthalate (DEP)	260 U	250 U	280 U	290 U	360 UJ
Dimethyl Phthalate	260 U	250 U	280 U	290 U	360 UJ
Di-n-butyl Phthalate (DBP)	260 U	250 U	280 U	290 U	360 UJ
Di-n-octyl Phthalate	260 U	250 U	280 U	290 U	360 UJ
Dinoseb	260 UJ	250 U	280 U	290 U	360 UJ
Ethyl Methane Sulfonate (EMS)	260 U	250 U	280 U	290 U	360 UJ
Hexachloro-1,3-butadiene	260 U	250 U	280 U	290 U	360 UJ
Hexachlorobenzene	260 U	250 U	280 U	290 U	360 UJ
Hexachlorocyclopentadiene	260 U	250 U	280 U	290 U	360 UJ
Hexachloroethane	260 U	250 U	280 U	290 U	360 UJ
Hexachloropropene	260 UJ	250 UJ	280 UJ	290 UJ	360 UJ
Indeno(1,2,3-cd)pyrene	260 UJ	250 UJ	280 UJ	290 UJ	360 UJ
Isophorone	260 U	250 U	280 U	290 U	360 UJ
Isosafrole	260 U	250 U	280 U	290 U	360 UJ

APPENDIX C

SUMMARY OF ANALYTICAL RESULTS, ESTUARINE SEDIMENT
SWMU 67 – FORMER GAS STATION
PHASE I RFI REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Site ID	67SD01	67SD01D	67SD02	67SD04	67SD05
Sample ID	67SD01	67SD01D	67SD02	67SD04	67SD05
Sample Date	3/22/2010	3/22/2010	3/22/2010	3/22/2010	3/22/2010
Sample Depth (ft bgs)	0.0 - 0.25	0.0 - 0.25	0.0 - 0.25	0.0 - 0.25	0.0 - 0.25
Semivolatiles (µg/kg) (Cont)					
Methapyrilene	260 UJ	250 UJ	280 UJ	290 UJ	360 UJ
Methyl Methane Sulfonate	260 U	250 U	280 U	290 U	360 UJ
Nitrobenzene	260 UJ	250 UJ	280 UJ	290 UJ	360 UJ
n-Nitrosodiethylamine	260 UJ	250 UJ	280 UJ	290 UJ	360 UJ
n-Nitrosodimethylamine (NDMA)	260 U	250 U	280 U	290 U	360 UJ
n-Nitroso-di-n-butylamine	260 UJ	250 UJ	280 UJ	290 UJ	360 UJ
n-Nitrosodi-n-propylamine	260 U	250 U	280 U	290 U	360 UJ
n-Nitrosodiphenylamine	260 UJ	250 UJ	280 UJ	290 UJ	360 UJ
n-Nitrosomethylethylamine	260 UJ	250 UJ	280 UJ	290 UJ	360 UJ
n-Nitrosomorpholine	260 UJ	250 UJ	280 UJ	290 UJ	360 UJ
n-Nitrosopiperidine	260 UJ	250 UJ	280 UJ	290 UJ	360 UJ
n-Nitrosopyrrolidine	260 UJ	250 UJ	280 UJ	290 UJ	360 UJ
o-Toluidine	260 UJ	250 UJ	280 UJ	290 UJ	360 UJ
Pentachlorobenzene	260 U	250 U	280 U	290 U	360 UJ
Pentachloronitrobenzene	260 UJ	250 U	280 U	290 U	360 UJ
Pentachlorophenol	500 U	480 U	540 U	570 U	700 UJ
Phenacetin	260 U	250 U	280 U	290 U	360 UJ
Phenol	500 U	480 U	540 U	570 U	700 UJ
Pronamide	500 U	480 U	540 U	570 U	700 UJ
Pyridine	260 U	250 U	280 U	290 U	360 UJ
Safrole	260 U	250 U	280 U	290 U	360 UJ
PAHs (µg/kg) - Low Molecular Weight					
2-Methylnaphthalene	13 U	12 U	14 U	14 U	18 UJ
Acenaphthene	13 U	12 U	14 U	14 U	18 UJ
Acenaphthylene	13 U	12 U	14 U	14 U	18 UJ
Anthracene	13 U	12 U	14 U	14 U	18 UJ
Fluoranthene	13 UJ	43 J	14 U	14 U	95 J
Fluorene	13 U	12 U	14 U	14 U	18 UJ
Naphthalene	13 U	12 U	14 U	14 U	18 UJ
Phenanthrene	13 U	12 U	14 U	14 U	18 UJ
PAHs (µg/kg) - High Molecular Weight					
Benzo(a)anthracene	13 UJ	28 J	14 U	14 U	52 J
Benzo(a)pyrene (BaP)	13 U	12 U	14 U	14 U	70 J
Benzo(b)fluoranthene	13 U	12 U	14 U	14 U	110 J
Benzo(g,h,i)perylene	13 U	12 U	14 U	14 U	73 J
Benzo(k)fluoranthene	13 U	12 U	14 U	14 U	74 J
Chrysene	13 UJ	24 J	14 U	14 U	77 J
Dibenz(a,h)anthracene	13 U	12 U	14 U	14 U	28 J
Indeno(1,2,3-cd)pyrene	13 U	12 U	14 U	14 U	100 J
Pyrene	13 UJ	51 J	14 U	14 U	90 J
PAH totals (µg/kg)					
Low molecular weight PAHs	104	127	112	112	221
High molecular weight PAHs	117	175	126	126	674

APPENDIX C

SUMMARY OF ANALYTICAL RESULTS, ESTUARINE SEDIMENT
SWMU 67 – FORMER GAS STATION
PHASE I RFI REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Site ID	67SD01	67SD01D	67SD02	67SD04	67SD05
Sample ID	67SD01	67SD01D	67SD02	67SD04	67SD05
Sample Date	3/22/2010	3/22/2010	3/22/2010	3/22/2010	3/22/2010
Sample Depth (ft bgs)	0.0 - 0.25	0.0 - 0.25	0.0 - 0.25	0.0 - 0.25	0.0 - 0.25
TPH (mg/kg)					
Diesel Range Organics (DRO)	31 J	20 J	27 J	34 J	41 J
Gasoline Range Organics (GRO)	0.76 U	0.72 U	0.82 U	0.86 U	1.1 UJ
Total TPH	31.76 J	20.72 J	27.82 J	34.86 J	42.1 J
Inorganics (mg/kg)					
Antimony	1.2 J	1.4 UJ	1.5 UJ	1.7 UJ	2 UJ
Arsenic	1.2	0.99	0.93	1.6	1.3 J
Barium	62	53.3	44.8	61.8	113 J
Beryllium	0.27 J	0.24 J	0.28 J	0.31 J	0.31 J
Cadmium	0.79	0.7	0.51 J	0.35 J	0.79 J
Chromium	28.2	21	27.5	36	37.2 J
Cobalt	44.5 J	35.9 J	45.6 J	41.8 J	25.7 J
Copper	77.1 J	58.3 J	63.4 J	65.4 J	133 J
Lead	134 J	119 J	35.6 J	21.2 J	31.3 J
Mercury	0.028 J	0.04 J	0.033 J	0.041 J	0.084 J
Nickel	12.8	10.1	11.7	12.3	12.3 J
Selenium	1.4 J	1.2 J	1.4 J	1.5 J	1.6 J
Silver	0.15 J	0.69 U	0.77 U	0.85 U	0.99 UJ
Thallium	0.069 J	0.048 J	0.048 J	0.051 J	0.18 J
Tin	7.6 U	6.9 U	8 U	8.5 U	9.9 UJ
Vanadium	232 J	190 J	371 J	282 J	214 J
Zinc	86.8	75	68.7	65.1	98.1 J
Conventionals (mg/kg)					
Total Organic Carbon (TOC)	NA	NA	25440	25600	47770

Notes:

ft bgs - feet below ground surface
µg/kg - micrograms per kilogram
mg/kg - milligrams per kilogram
PAH - Polyaromatic Hydrocarbons
TPH - Total Petroleum Hydrocarbons
U - Not detected
UJ - Reported quantitation limit isestimated
J - Analyte present - value is estimated
R - Result is rejected and unusable

Freshwater Sediment

APPENDIX C

SUMMARY OF ANALYTICAL RESULTS, FRESHWATER SEDIMENT
SWMU 67 – FORMER GAS STATION
PHASE I RFI REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Site ID	67SD03	
Sample ID	67SD03	
Sample Date	3/22/2010	
Sample Depth (ft bgs)	0.0 - 0.25	
Volatiles (µg/kg)		
1,1,1,2-Tetrachloroethane	6.8	UJ
1,1,1-Trichloroethane	6.8	UJ
1,1,2,2-Tetrachloroethane	6.8	UJ
1,1,2-Trichloroethane	6.8	UJ
1,1-Dichloroethane	6.8	UJ
1,1-Dichloroethene	6.8	UJ
1,2,3-Trichloropropane	6.8	UJ
1,2-Dibromo-3-chloropropane (DBCP)	6.8	UJ
1,2-Dibromoethane (EDB)	6.8	UJ
1,2-Dichloroethane	6.8	UJ
1,2-Dichloroethene (trans)	6.8	UJ
1,2-Dichloropropane	6.8	UJ
1,3-Dichloropropene (cis)	6.8	UJ
1,3-Dichloropropene (trans)	6.8	UJ
1,4-Dichloro-2-butene (trans)	27	UJ
1,4-Dioxane (p-)	340	R
2-Butanone (MEK)	13	J
2-Chloro-1,3-butadiene (Chloroprene)	6.8	UJ
2-Hexanone (MBK)	17	UJ
3-Chloropropene (Allyl Chloride)	6.8	UJ
4-Methyl-2-pentanone (MIBK)	17	UJ
Acetone	200	J
Acetonitrile	6.8	UJ
Acrolein	68	R
Acrylonitrile	68	R
Benzene	6.8	UJ
Bromodichloromethane	6.8	UJ
Bromoform	6.8	UJ
Bromomethane	6.8	UJ
Carbon Disulfide	2.7	J
Carbon Tetrachloride	6.8	UJ
Chlorobenzene	6.8	UJ
Chloroethane	6.8	UJ
Chloroform	6.8	UJ
Chloromethane	6.8	UJ
Dibromochloromethane	6.8	UJ
Dibromomethane	6.8	UJ
Dichlorodifluoromethane (Freon-12)	6.8	UJ
Ethyl Methacrylate	68	UJ
Ethylbenzene	6.8	UJ
Isobutyl Alcohol	340	R
Methyl Acrylonitrile	68	UJ
Methyl Iodide	2.9	J

APPENDIX C

SUMMARY OF ANALYTICAL RESULTS, FRESHWATER SEDIMENT
SWMU 67 – FORMER GAS STATION
PHASE I RFI REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Site ID	67SD03	
Sample ID	67SD03	
Sample Date	3/22/2010	
Sample Depth (ft bgs)	0.0 - 0.25	
Volatiles (µg/kg) (Cont)		
Methyl Methacrylate	68	R
Methylene Chloride	6.8	UJ
Pentachloroethane	6.8	UJ
Propionitrile (Ethyl Cyanide)	340	R
Styrene (Ethenylbenzene)	6.8	UJ
Tetrachloroethene (PCE)	6.8	UJ
Toluene	6.8	UJ
Trichloroethene (TCE)	6.8	UJ
Trichlorofluoromethane (Freon 11)	6.8	UJ
Vinyl Acetate	6.8	UJ
Vinyl Chloride	6.8	UJ
Xylene, m/p-	0.34	J
Xylene, o-	6.8	UJ
Xylenes, total	6.8	UJ
Semivolatiles (µg/kg)		
1,2,4,5-Tetrachlorobenzene	270	U
1,2,4-Trichlorobenzene	270	U
1,2-Dichlorobenzene (o-)	270	U
1,3,5-Trinitrobenzene (TNB)	270	U
1,3-Dichlorobenzene (m-)	270	U
1,3-Dinitrobenzene (m-)	270	U
1,4-Dichlorobenzene (p-)	270	U
1,4-Naphthoquinone	270	U
1,4-Phenylenediamine	2700	R
1-Naphthylamine	270	UJ
2,2'-Oxybis[1-chloropropane]	270	U
2,3,4,6-Tetrachlorophenol	520	U
2,4,5-Trichlorophenol	520	U
2,4,6-Trichlorophenol	520	U
2,4-Dichlorophenol	520	U
2,4-Dimethylphenol	520	U
2,4-Dinitrophenol	520	U
2,4-Dinitrotoluene (DNT)	270	U
2,6-Dichlorophenol	520	U
2,6-Dinitrotoluene (DNT)	270	U
2-Acetylaminofluorene	270	UJ
2-Chloronaphthalene	270	U
2-Chlorophenol	520	U
2-Methyl-5-nitroaniline	270	UJ
2-Methylphenol (o-Cresol)	520	U
2-Naphthylamine	270	UJ
2-Nitroaniline	270	U
2-Nitrophenol	520	U
2-Picoline	270	UJ

APPENDIX C

SUMMARY OF ANALYTICAL RESULTS, FRESHWATER SEDIMENT
SWMU 67 – FORMER GAS STATION
PHASE I RFI REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Site ID	67SD03	
Sample ID	67SD03	
Sample Date	3/22/2010	
Sample Depth (ft bgs)	0.0 - 0.25	
Semivolatiles (µg/kg) (Cont)		
3,3'-Dichlorobenzidine	270	U
3,3'-Dimethylbenzidine	270	UJ
3-Methylcholanthrene	270	U
3-Methylphenol (m-Cresol)	400	U
3-Nitroaniline	270	U
4,6-Dinitro-2-methylphenol	520	U
4-Aminobiphenyl	270	UJ
4-Bromophenyl-phenylether	270	U
4-Chloro-3-methylphenol	520	U
4-Chloroaniline	270	U
4-Chlorophenyl-phenylether	270	U
4-Dimethylaminoazobenzene (p-)	270	UJ
4-Methylphenol (p-Cresol)	400	U
4-Nitroaniline	270	U
4-Nitrophenol	520	U
4-Nitroquinoline-1-oxide	270	UJ
7,12-Dimethylbenz(a)anthracene	270	UJ
Acetophenone	270	U
Aniline	270	U
Aramite	270	U
Benzyl Alcohol	270	U
Bis(2-chloroethoxy)methane	270	U
Bis(2-chloroethyl)ether	270	U
Bis(2-ethylhexyl) Phthalate (BEHP)	270	U
Butyl Benzyl Phthalate	270	U
Diallate (cis)	270	U
Diallate (total)	270	UJ
Diallate (trans)	270	UJ
Dibenzofuran	270	U
Diethyl Phthalate (DEP)	270	U
Dimethyl Phthalate	270	U
Di-n-butyl Phthalate (DBP)	270	U
Di-n-octyl Phthalate	270	U
Dinoseb	270	U
Ethyl Methane Sulfonate (EMS)	270	U
Hexachloro-1,3-butadiene	270	U
Hexachlorobenzene	270	U
Hexachlorocyclopentadiene	270	U
Hexachloroethane	270	U
Hexachloropropene	270	UJ
Indeno(1,2,3-cd)pyrene	270	UJ
Isophorone	270	U
Isosafrole	270	U

APPENDIX C

SUMMARY OF ANALYTICAL RESULTS, FRESHWATER SEDIMENT
SWMU 67 – FORMER GAS STATION
PHASE I RFI REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Site ID	67SD03	
Sample ID	67SD03	
Sample Date	3/22/2010	
Sample Depth (ft bgs)	0.0 - 0.25	
Semivolatiles (µg/kg) (Cont)		
Methapyrilene	270	UJ
Methyl Methane Sulfonate	270	U
Nitrobenzene	270	UJ
n-Nitrosodiethylamine	270	UJ
n-Nitrosodimethylamine (NDMA)	270	U
n-Nitroso-di-n-butylamine	270	UJ
n-Nitrosodi-n-propylamine	270	U
n-Nitrosodiphenylamine	270	UJ
n-Nitrosomethylethylamine	270	UJ
n-Nitrosomorpholine	270	UJ
n-Nitrosopiperidine	270	UJ
n-Nitrosopyrrolidine	270	UJ
o-Toluidine	270	UJ
Pentachlorobenzene	270	U
Pentachloronitrobenzene	270	U
Pentachlorophenol	520	U
Phenacetin	270	U
Phenol	520	U
Pronamide	520	U
Pyridine	270	U
Safrole	270	U
PAHs (µg/kg) - Low Molecular Weight		
2-Methylnaphthalene	13	U
Acenaphthene	13	U
Acenaphthylene	13	U
Anthracene	13	U
Fluoranthene	13	U
Fluorene	13	U
Naphthalene	13	U
Phenanthrene	13	U
PAHs (µg/kg) - High Molecular Weight		
Benzo(a)anthracene	13	U
Benzo(a)pyrene (BaP)	13	U
Benzo(b)fluoranthene	13	U
Benzo(g,h,i)perylene	23	
Benzo(k)fluoranthene	13	U
Chrysene	13	U
Dibenz(a,h)anthracene	13	U
Indeno(1,2,3-cd)pyrene	13	U
Pyrene	13	U
PAH totals (µg/kg)		
Low molecular weight PAHs	104	
High molecular weight PAHs	127	

APPENDIX C

SUMMARY OF ANALYTICAL RESULTS, FRESHWATER SEDIMENT
SWMU 67 – FORMER GAS STATION
PHASE I RFI REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Site ID	67SD03	
Sample ID	67SD03	
Sample Date	3/22/2010	
Sample Depth (ft bgs)	0.0 - 0.25	
TPH (mg/kg)		
Diesel Range Organics (DRO)	28	J
Gasoline Range Organics (GRO)	0.79	U
Total TPH	28.79	J
Inorganics (mg/kg)		
Antimony	1.5	UJ
Arsenic	0.89	
Barium	68.3	
Beryllium	0.25	J
Cadmium	0.32	J
Chromium	23.8	
Cobalt	32.8	J
Copper	64	J
Lead	11	J
Mercury	0.023	J
Nickel	9.8	
Selenium	1.5	J
Silver	0.76	U
Thallium	0.047	J
Tin	7.6	U
Vanadium	170	J
Zinc	81.4	
Conventionals (mg/kg)		
Total Organic Carbon (TOC)	14030	

Notes:

ft bgs - feet below ground surface
µg/kg - micrograms per kilogram
mg/kg - milligrams per kilogram
PAH - Polyaromatic Hydrocarbons
TPH - Total Petroleum Hydrocarbons
U - Not detected
UJ - Reported quantitation limit isestimated
J - Analyte present - value is estimated
R - Result is rejected and unusable

QUALITY ASSURANCE/QUALITY CONTROL

APPENDIX C

SUMMARY OF ANALYTICAL RESULTS, QUALITY ASSURANCE / QUALITY CONTROL
SWMU 67 – FORMER GAS STATION
PHASE I RFI REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

	Equipment Rinsates				
Sample ID	67ER01	67ER02	67ER03	67ER04	67ER05
Sample Date	3/22/2010	3/23/2010	3/24/2010	3/25/2010	3/26/2010
Volatiles (µg/L)					
1,1,1,2-Tetrachloroethane	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ
1,1,1-Trichloroethane	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1,2,2-Tetrachloroethane	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ
1,1,2-Trichloroethane	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1-Dichloroethane	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1-Dichloroethene	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2,3-Trichloropropane	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dibromo-3-chloropropane (DBCP)	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ
1,2-Dibromoethane (EDB)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dichloroethane	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dichloroethene (trans)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dichloropropane	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,3-Dichloropropene (cis)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,3-Dichloropropene (trans)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,4-Dichloro-2-butene (trans)	2 U	2 U	2 U	2 U	2 U
1,4-Dioxane (p-)	25 R	25 R	25 R	25 R	25 R
2-Butanone (MEK)	2.5 R	2.5 R	2 J	2.5 J	2.5 R
2-Chloro-1,3-butadiene (Chloroprene)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
2-Hexanone (MBK)	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
3-Chloropropene (Allyl Chloride)	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ
4-Methyl-2-pentanone (MIBK)	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
Acetone	3.5 J	3.2 J	2.7 J	3.9 J	5.1 J
Acetonitrile	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ
Acrolein	5 R	5 R	5 R	5 R	5 R
Acrylonitrile	5 R	5 R	5 R	5 R	5 R
Benzene	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Bromodichloromethane	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Bromoform	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Bromomethane	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ
Carbon Disulfide	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Carbon Tetrachloride	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Chlorobenzene	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Chloroethane	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 U
Chloroform	1.4	1.3	0.97	1	0.5 U
Chloromethane	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Dibromochloromethane	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ
Dibromomethane	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Dichlorodifluoromethane (Freon-12)	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ
Ethyl Methacrylate	5 U	5 U	5 U	5 U	5 U
Ethylbenzene	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Isobutyl Alcohol	25 R	25 R	25 R	25 R	25 R
Methyl Acrylonitrile	5 U	5 U	5 U	5 U	5 UJ
Methyl Iodide	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ

APPENDIX C

SUMMARY OF ANALYTICAL RESULTS, QUALITY ASSURANCE / QUALITY CONTROL
SWMU 67 – FORMER GAS STATION
PHASE I RFI REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

	Equipment Rinsates				
Sample ID	67ER01	67ER02	67ER03	67ER04	67ER05
Sample Date	3/22/2010	3/23/2010	3/24/2010	3/25/2010	3/26/2010
Volatiles (µg/L)					
Methyl Methacrylate	5 U	5 U	5 U	5 U	5 U
Methylene Chloride	1.5	1.3	1.1	1.1	0.18 J
Pentachloroethane	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ
Propionitrile (Ethyl Cyanide)	25 R	25 R	25 R	25 R	25 R
Styrene (Ethenylbenzene)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Tetrachloroethene (PCE)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Toluene	0.95	0.81	0.5	0.53	0.082 J
Trichloroethene (TCE)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Trichlorofluoromethane (Freon 11)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Vinyl Acetate	1 U	1 U	1 U	1 U	1 U
Vinyl Chloride	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Xylene, m/p-	1 U	1 U	1 U	1 U	1 U
Xylene, o-	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Xylenes, total	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Semivolatiles (µg/L)					
1,2,4,5-Tetrachlorobenzene	5.1 U	5.3 U	5.6 U	5.6 U	5 U
1,2,4-Trichlorobenzene	5.1 U	5.3 U	5.6 U	5.6 U	5 U
1,2-Dichlorobenzene (o-)	5.1 U	5.3 U	5.6 U	5.6 U	5 U
1,3,5-Trinitrobenzene (TNB)	5.1 U	5.3 U	5.6 U	5.6 U	5 U
1,3-Dichlorobenzene (m-)	5.1 U	5.3 U	5.6 U	5.6 U	5 U
1,3-Dinitrobenzene (m-)	5.1 U	5.3 U	5.6 U	5.6 U	5 U
1,4-Dichlorobenzene (p-)	5.1 U	5.3 U	5.6 U	5.6 U	5 U
1,4-Naphthoquinone	5.1 U	5.3 U	5.6 U	5.6 U	5 U
1,4-Phenylenediamine	52 R	54 R	57 R	57 R	51 R
1-Naphthylamine	5.1 UJ	5.3 UJ	5.6 UJ	5.6 UJ	5 UJ
2,2'-Oxybis[1-chloropropane]	5.1 U	5.3 U	5.6 U	5.6 U	5 U
2,3,4,6-Tetrachlorophenol	10 U	10 U	11 U	11 U	10 U
2,4,5-Trichlorophenol	10 U	10 U	11 U	11 U	10 U
2,4,6-Trichlorophenol	10 U	10 U	11 U	11 U	10 U
2,4-Dichlorophenol	10 U	10 U	11 U	11 U	10 U
2,4-Dimethylphenol	10 U	10 U	11 U	11 U	10 U
2,4-Dinitrophenol	10 U	10 U	11 U	11 U	10 U
2,4-Dinitrotoluene (DNT)	5.1 U	5.3 U	5.6 U	5.6 U	5 U
2,6-Dichlorophenol	10 U	10 U	11 U	11 U	10 U
2,6-Dinitrotoluene (DNT)	5.1 U	5.3 U	5.6 U	5.6 U	5 U
2-Acetylaminofluorene	5.1 UJ	5.3 UJ	5.6 UJ	5.6 UJ	5 UJ
2-Chloronaphthalene	5.1 U	5.3 U	5.6 UJ	5.6 UJ	5 U
2-Chlorophenol	10 U	10 U	11 U	11 U	10 U
2-Methyl-5-nitroaniline	5.1 UJ	5.3 UJ	5.6 UJ	5.6 UJ	5 UJ
2-Methylphenol (o-Cresol)	10 U	10 U	11 U	11 U	10 U
2-Naphthylamine	5.1 UJ	5.3 UJ	5.6 UJ	5.6 UJ	5 UJ
2-Nitroaniline	5.1 U	5.3 U	5.6 U	5.6 U	5 U
2-Nitrophenol	10 U	10 U	11 U	11 U	10 U
2-Picoline	5.1 UJ	5.3 UJ	5.6 UJ	5.6 UJ	5 UJ

APPENDIX C

SUMMARY OF ANALYTICAL RESULTS, QUALITY ASSURANCE / QUALITY CONTROL
SWMU 67 – FORMER GAS STATION
PHASE I RFI REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

	Equipment Rinsates				
Sample ID	67ER01	67ER02	67ER03	67ER04	67ER05
Sample Date	3/22/2010	3/23/2010	3/24/2010	3/25/2010	3/26/2010
Semivolatiles (µg/L)					
3,3'-Dichlorobenzidine	5.1 U	5.3 U	5.6 U	5.6 U	5 U
3,3'-Dimethylbenzidine	5.1 UJ	5.3 UJ	5.6 UJ	5.6 UJ	5 UJ
3-Methylcholanthrene	5.1 U	5.3 U	5.6 U	5.6 U	5 U
3-Methylphenol (m-Cresol)	8.2 U	8.4 U	8.9 U	8.9 U	8 U
3-Nitroaniline	5.1 U	5.3 U	5.6 U	5.6 U	5 U
4,6-Dinitro-2-methylphenol	10 U	10 U	11 U	11 U	10 UJ
4-Aminobiphenyl	5.1 UJ	5.3 UJ	5.6 UJ	5.6 UJ	5 UJ
4-Bromophenyl-phenylether	5.1 U	5.3 U	5.6 U	5.6 U	5 U
4-Chloro-3-methylphenol	10 U	10 U	11 U	11 U	10 U
4-Chloroaniline	5.1 U	5.3 U	5.6 U	5.6 U	5 U
4-Chlorophenyl-phenylether	5.1 U	5.3 U	5.6 U	5.6 U	5 U
4-Dimethylaminoazobenzene (p-)	5.1 UJ	5.3 UJ	5.6 UJ	5.6 UJ	5 UJ
4-Methylphenol (p-Cresol)	8.2 U	8.4 U	8.9 U	8.9 U	8 U
4-Nitroaniline	5.1 U	5.3 U	5.6 U	5.6 U	5 U
4-Nitrophenol	10 U	10 U	11 U	11 U	10 U
4-Nitroquinoline-1-oxide	5.1 UJ	5.3 UJ	5.6 UJ	5.6 UJ	5 UJ
7,12-Dimethylbenz(a)anthracene	5.1 U	5.3 U	5.6 U	5.6 U	5 U
Acetophenone	5.1 U	5.3 U	5.6 U	5.6 U	5 U
Aniline	5.1 U	5.3 U	5.6 U	5.6 U	5 U
Aramite	5.1 U	5.3 U	5.6 U	5.6 U	5 U
Benzyl Alcohol	5.1 U	5.3 U	5.6 U	5.6 U	5 U
Bis(2-chloroethoxy)methane	5.1 U	5.3 U	5.6 U	5.6 U	5 U
Bis(2-chloroethyl)ether	5.1 U	5.3 U	5.6 U	5.6 U	5 U
Bis(2-ethylhexyl) Phthalate (BEHP)	5.1 U	5.3 U	5.6 U	5.6 U	5 U
Butyl Benzyl Phthalate	5.1 U	5.3 U	5.6 U	5.6 U	5 U
Diallate (cis)	5.1 UJ	5.3 UJ	5.6 U	5.6 U	5 U
Diallate (total)	5.1 UJ	5.3 UJ	5.6 UJ	5.6 UJ	5 UJ
Diallate (trans)	5.1 UJ	5.3 UJ	5.6 UJ	5.6 UJ	5 UJ
Dibenzofuran	5.1 U	5.3 U	5.6 U	5.6 U	5 U
Diethyl Phthalate (DEP)	5.1 U	5.3 U	5.6 U	5.6 U	5 U
Dimethyl Phthalate	5.1 U	5.3 U	5.6 U	5.6 U	5 U
Di-n-butyl Phthalate (DBP)	5.1 U	5.3 U	5.6 U	5.6 U	5 U
Di-n-octyl Phthalate	5.1 U	5.3 U	5.6 U	5.6 U	5 U
Dinoseb	5.1 U	5.3 U	5.6 U	5.6 U	5 U
Ethyl Methane Sulfonate (EMS)	5.1 U	5.3 U	5.6 U	5.6 U	5 U
Hexachloro-1,3-butadiene	5.1 U	5.3 U	5.6 U	5.6 U	5 U
Hexachlorobenzene	5.1 U	5.3 U	5.6 U	5.6 U	5 U
Hexachlorocyclopentadiene	5.1 U	5.3 U	5.6 U	5.6 U	5 U
Hexachloroethane	5.1 U	5.3 U	5.6 U	5.6 U	5 U
Hexachloropropene	5.1 UJ	5.3 UJ	5.6 U	5.6 U	5 U
Indeno(1,2,3-cd)pyrene	5.1 UJ	5.3 UJ	5.6 UJ	5.6 UJ	5 UJ
Isophorone	5.1 U	5.3 U	5.6 U	5.6 U	5 U
Isosafrole	5.1 U	5.3 U	5.6 U	5.6 U	5 U

APPENDIX C

SUMMARY OF ANALYTICAL RESULTS, QUALITY ASSURANCE / QUALITY CONTROL
SWMU 67 – FORMER GAS STATION
PHASE I RFI REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

	Equipment Rinsates				
Sample ID	67ER01	67ER02	67ER03	67ER04	67ER05
Sample Date	3/22/2010	3/23/2010	3/24/2010	3/25/2010	3/26/2010
Semivolatiles (µg/L)					
Methapyrilene	5.1 UJ	5.3 UJ	5.6 UJ	5.6 UJ	5 R
Methyl Methane Sulfonate	5.1 U	5.3 U	5.6 U	5.6 U	5 U
Nitrobenzene	5.1 U	5.3 U	5.6 U	5.6 U	5 UJ
n-Nitrosodiethylamine	5.1 UJ	5.3 UJ	5.6 UJ	5.6 UJ	5 UJ
n-Nitrosodimethylamine (NDMA)	5.1 U	5.3 U	5.6 U	5.6 U	5 U
n-Nitroso-di-n-butylamine	5.1 UJ	5.3 UJ	5.6 UJ	5.6 UJ	5 U
n-Nitrosodi-n-propylamine	5.1 U	5.3 U	5.6 U	5.6 U	5 U
n-Nitrosodiphenylamine	5.1 UJ	5.3 UJ	5.6 UJ	5.6 UJ	5 UJ
n-Nitrosomethylethylamine	5.1 UJ	5.3 UJ	5.6 UJ	5.6 UJ	5 UJ
n-Nitrosomorpholine	5.1 UJ	5.3 UJ	5.6 UJ	5.6 UJ	5 UJ
n-Nitrosopiperidine	5.1 UJ	5.3 UJ	5.6 UJ	5.6 UJ	5 UJ
n-Nitrosopyrrolidine	5.1 UJ	5.3 UJ	5.6 UJ	5.6 UJ	5 UJ
o-Toluidine	5.1 UJ	5.3 UJ	5.6 UJ	5.6 UJ	5 UJ
Pentachlorobenzene	5.1 U	5.3 U	5.6 U	5.6 U	5 U
Pentachloronitrobenzene	5.1 U	5.3 U	5.6 U	5.6 U	5 UJ
Pentachlorophenol	10 U	10 U	11 U	11 U	10 UJ
Phenacetin	5.1 U	5.3 U	5.6 U	5.6 U	5 U
Phenol	10 U	10 U	11 U	11 U	10 U
Pronamide	10 U	10 U	11 U	11 U	10 U
Pyridine	5.1 U	5.3 U	5.6 U	5.6 U	5 U
Safrole	5.1 U	5.3 U	5.6 U	5.6 U	5 U
PAHs (µg/L) - Low Molecular Weight					
2-Methylnaphthalene	0.21 U	0.21 U	0.22 U	0.22 U	0.2 U
Acenaphthene	0.21 U	0.21 U	0.22 U	0.22 U	0.2 U
Acenaphthylene	0.21 U	0.21 U	0.22 U	0.22 U	0.2 U
Anthracene	0.21 U	0.21 U	0.22 U	0.22 U	0.2 U
Fluoranthene	0.21 U	0.21 U	0.22 U	0.22 U	0.2 U
Fluorene	0.21 U	0.21 U	0.22 U	0.22 U	0.2 U
Naphthalene	0.097 J	0.093 J	0.079 J	0.061 J	0.2 U
Phenanthrene	0.21 U	0.21 U	0.22 U	0.22 U	0.2 U
PAHs (µg/L) - High Molecular Weight					
Benzo(a)anthracene	0.21 U	0.21 U	0.22 U	0.22 U	0.2 U
Benzo(a)pyrene (BaP)	0.21 U	0.21 U	0.22 U	0.22 U	0.2 U
Benzo(b)fluoranthene	0.21 U	0.21 U	0.22 U	0.22 U	0.2 U
Benzo(g,h,i)perylene	0.21 U	0.21 U	0.22 U	0.22 U	0.2 U
Benzo(k)fluoranthene	0.21 U	0.21 U	0.22 U	0.22 U	0.011 J
Chrysene	0.21 U	0.21 U	0.22 U	0.22 U	0.2 U
Dibenz(a,h)anthracene	0.21 U	0.21 U	0.22 U	0.22 U	0.2 U
Indeno(1,2,3-cd)pyrene	0.21 U	0.21 U	0.22 U	0.22 U	0.2 U
Pyrene	0.21 U	0.21 U	0.22 U	0.22 U	0.2 U
PAH totals (µg/L)					
Low molecular weight PAHs	1.567	1.563	1.619	1.601	1.6
High molecular weight PAHs	1.89	1.89	1.98	1.98	1.611

APPENDIX C

SUMMARY OF ANALYTICAL RESULTS, QUALITY ASSURANCE / QUALITY CONTROL
SWMU 67 – FORMER GAS STATION
PHASE I RFI REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

	Equipment Rinsates				
Sample ID	67ER01	67ER02	67ER03	67ER04	67ER05
Sample Date	3/22/2010	3/23/2010	3/24/2010	3/25/2010	3/26/2010
TPH (mg/L)					
Diesel Range Organics (DRO)	0.5 U	0.5 U	0.5 U	0.53 U	0.51 U
Gasoline Range Organics (GRO)	0.03 J	0.03 J	0.029 J	0.03 J	0.037 J
Total TPH	0.53 J	0.53 J	0.529 J	0.56 J	0.547 J
Total Inorganics (µg/L)					
Antimony	2 U	2 U	2 U	2 U	2 U
Arsenic	1 U	1 U	1 U	1 U	1 U
Barium	10 U	10 U	10 U	10 U	10 U
Beryllium	1 U	1 U	1 U	1 U	1 U
Cadmium	1 U	1 U	1 U	1 U	1 U
Chromium	2 U	2 U	2 U	2 U	2 U
Cobalt	1 U	1 U	1 U	1 U	1 U
Copper	0.53 J	0.3 J	2 U	2 U	2 U
Lead	1 U	1 U	1 U	1 U	1 U
Mercury	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Nickel	1 U	1 U	1 U	1 U	1 U
Selenium	5 U	5 U	5 U	5 U	5 U
Silver	1 U	1 U	1 U	1 U	1 U
Thallium	1 U	1 U	1 U	1 U	1 U
Tin	20 U	20 U	20 U	20 U	20 U
Vanadium	5 U	5 U	5 U	5 U	5 U
Zinc	0.61 J	0.83 J	1 J	0.99 J	0.98 J

Notes:

µg/L - micrograms per liter
mg/L - milligrams per liter
PAH - Polyaromatic Hydrocarbons
TPH - Total Petroleum Hydrocarbons
U - Not detected
UJ - Reported quantitation limit is estimated
J - Analyte present - value is estimated
R - Result is rejected and unusable

APPENDIX C

SUMMARY OF ANALYTICAL RESULTS, QUALITY ASSURANCE / QUALITY CONTROL
SWMU 67 – FORMER GAS STATION
PHASE I RFI REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

	Equipment Rinsates		
Sample ID	67ER06	67ER07	67ER08
Sample Date	3/27/2010	3/28/2010	3/30/2010
Volatiles (µg/L)			
1,1,1,2-Tetrachloroethane	0.5 UJ	0.5 UJ	0.5 U
1,1,1-Trichloroethane	0.5 U	0.5 U	0.5 U
1,1,2,2-Tetrachloroethane	0.5 UJ	0.5 UJ	0.5 U
1,1,2-Trichloroethane	0.5 U	0.5 U	0.5 U
1,1-Dichloroethane	0.5 U	0.5 U	0.5 U
1,1-Dichloroethene	0.5 U	0.5 U	0.5 U
1,2,3-Trichloropropane	0.5 U	0.5 U	0.5 U
1,2-Dibromo-3-chloropropane (DBCP)	0.5 UJ	0.5 UJ	0.5 U
1,2-Dibromoethane (EDB)	0.5 U	0.5 U	0.5 U
1,2-Dichloroethane	0.5 U	0.5 U	0.5 U
1,2-Dichloroethene (trans)	0.5 U	0.5 U	0.5 U
1,2-Dichloropropane	0.5 U	0.5 U	0.5 U
1,3-Dichloropropene (cis)	0.5 U	0.5 U	0.5 U
1,3-Dichloropropene (trans)	0.5 U	0.5 U	0.5 U
1,4-Dichloro-2-butene (trans)	2 U	2 U	2 U
1,4-Dioxane (p-)	25 R	25 R	25 R
2-Butanone (MEK)	2.1 J	2.4 J	1.5 J
2-Chloro-1,3-butadiene (Chloroprene)	0.5 U	0.5 U	0.5 U
2-Hexanone (MBK)	2.5 U	2.5 U	2.5 U
3-Chloropropene (Allyl Chloride)	0.5 UJ	0.5 UJ	0.5 U
4-Methyl-2-pentanone (MIBK)	2.5 U	2.5 U	2.5 U
Acetone	3.1 J	4.9 J	4 J
Acetonitrile	0.5 UJ	0.5 UJ	0.5 U
Acrolein	5 R	5 R	5 R
Acrylonitrile	5 R	5 R	5 R
Benzene	0.5 U	0.5 U	0.034 J
Bromodichloromethane	0.092 J	0.5 U	0.5 U
Bromoform	0.5 U	0.5 U	0.5 U
Bromomethane	0.5 UJ	0.5 UJ	0.5 U
Carbon Disulfide	0.5 U	0.5 U	0.5 U
Carbon Tetrachloride	0.5 U	0.5 U	0.5 U
Chlorobenzene	0.5 U	0.5 U	0.5 U
Chloroethane	0.5 U	0.5 U	0.5 U
Chloroform	1.2	0.46 J	0.2 J
Chloromethane	0.5 U	0.5 U	0.5 U
Dibromochloromethane	0.5 UJ	0.5 UJ	0.5 U
Dibromomethane	0.5 U	0.5 U	0.5 U
Dichlorodifluoromethane (Freon-12)	0.5 UJ	0.5 UJ	0.5 U
Ethyl Methacrylate	5 U	5 U	5 U
Ethylbenzene	0.5 U	0.5 U	0.5 U
Isobutyl Alcohol	25 R	25 R	25 R
Methyl Acrylonitrile	5 UJ	5 UJ	5 U
Methyl Iodide	0.5 UJ	0.5 UJ	0.5 U

APPENDIX C

SUMMARY OF ANALYTICAL RESULTS, QUALITY ASSURANCE / QUALITY CONTROL
SWMU 67 – FORMER GAS STATION
PHASE I RFI REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

	Equipment Rinsates		
Sample ID	67ER06	67ER07	67ER08
Sample Date	3/27/2010	3/28/2010	3/30/2010
Volatiles (µg/L)			
Methyl Methacrylate	5 U	5 U	5 U
Methylene Chloride	0.9	0.52	3.8
Pentachloroethane	0.5 UJ	0.5 UJ	0.5 U
Propionitrile (Ethyl Cyanide)	25 R	25 R	25 R
Styrene (Ethenylbenzene)	0.5 U	0.5 U	0.5 U
Tetrachloroethene (PCE)	0.5 U	0.5 U	0.5 U
Toluene	0.22 J	0.14 J	1
Trichloroethene (TCE)	0.5 U	0.5 U	0.5 U
Trichlorofluoromethane (Freon 11)	0.5 U	0.5 U	0.5 U
Vinyl Acetate	1 U	1 U	1 U
Vinyl Chloride	0.5 U	0.5 U	0.5 U
Xylene, m/p-	1 U	1 U	0.12 J
Xylene, o-	0.5 U	0.5 U	0.076 J
Xylenes, total	0.5 U	0.5 U	0.13 J
Semivolatiles (µg/L)			
1,2,4,5-Tetrachlorobenzene	5.1 U	5.1 U	5 U
1,2,4-Trichlorobenzene	5.1 U	5.1 U	5 U
1,2-Dichlorobenzene (o-)	5.1 U	5.1 U	5 U
1,3,5-Trinitrobenzene (TNB)	5.1 U	5.1 U	5 U
1,3-Dichlorobenzene (m-)	5.1 U	5.1 U	5 U
1,3-Dinitrobenzene (m-)	5.1 U	5.1 U	5 U
1,4-Dichlorobenzene (p-)	5.1 U	5.1 U	5 U
1,4-Naphthoquinone	5.1 U	5.1 U	5 U
1,4-Phenylenediamine	52 R	52 R	51 R
1-Naphthylamine	5.1 UJ	5.1 UJ	5 UJ
2,2'-Oxybis[1-chloropropane]	5.1 U	5.1 U	5 U
2,3,4,6-Tetrachlorophenol	10 U	10 U	10 U
2,4,5-Trichlorophenol	10 U	10 U	10 U
2,4,6-Trichlorophenol	10 U	10 U	10 U
2,4-Dichlorophenol	10 U	10 U	10 U
2,4-Dimethylphenol	10 U	10 U	10 U
2,4-Dinitrophenol	10 U	10 U	10 U
2,4-Dinitrotoluene (DNT)	5.1 U	5.1 U	5 U
2,6-Dichlorophenol	10 U	10 U	10 U
2,6-Dinitrotoluene (DNT)	5.1 U	5.1 U	5 U
2-Acetylaminofluorene	5.1 UJ	5.1 UJ	5 UJ
2-Chloronaphthalene	5.1 U	5.1 U	5 U
2-Chlorophenol	10 U	10 U	10 U
2-Methyl-5-nitroaniline	5.1 UJ	5.1 UJ	5 UJ
2-Methylphenol (o-Cresol)	10 U	10 U	10 U
2-Naphthylamine	5.1 UJ	5.1 UJ	5 UJ
2-Nitroaniline	5.1 U	5.1 U	5 U
2-Nitrophenol	10 U	10 U	10 U
2-Picoline	5.1 UJ	5.1 UJ	5 UJ

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SUMMARY OF ANALYTICAL RESULTS, QUALITY ASSURANCE / QUALITY CONTROL
SWMU 67 – FORMER GAS STATION
PHASE I RFI REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

	Equipment Rinsates		
Sample ID	67ER06	67ER07	67ER08
Sample Date	3/27/2010	3/28/2010	3/30/2010
Semivolatiles (µg/L)			
3,3'-Dichlorobenzidine	5.1 U	5.1 U	5 U
3,3'-Dimethylbenzidine	5.1 UJ	5.1 UJ	5 UJ
3-Methylcholanthrene	5.1 U	5.1 U	5 U
3-Methylphenol (m-Cresol)	8.2 U	8.2 U	8 U
3-Nitroaniline	5.1 U	5.1 U	5 U
4,6-Dinitro-2-methylphenol	10 UJ	10 UJ	10 UJ
4-Aminobiphenyl	5.1 UJ	5.1 UJ	5 UJ
4-Bromophenyl-phenylether	5.1 U	5.1 U	5 U
4-Chloro-3-methylphenol	10 U	10 U	10 U
4-Chloroaniline	5.1 U	5.1 U	5 U
4-Chlorophenyl-phenylether	5.1 U	5.1 U	5 U
4-Dimethylaminoazobenzene (p-)	5.1 UJ	5.1 UJ	5 UJ
4-Methylphenol (p-Cresol)	8.2 U	8.2 U	8 U
4-Nitroaniline	5.1 U	5.1 U	5 U
4-Nitrophenol	10 U	10 U	10 U
4-Nitroquinoline-1-oxide	5.1 UJ	5.1 UJ	5 UJ
7,12-Dimethylbenz(a)anthracene	5.1 U	5.1 U	5 U
Acetophenone	5.1 U	5.1 U	5 U
Aniline	5.1 U	5.1 U	5 U
Aramite	5.1 U	5.1 U	5 U
Benzyl Alcohol	5.1 U	5.1 U	5 U
Bis(2-chloroethoxy)methane	5.1 U	5.1 U	5 U
Bis(2-chloroethyl)ether	5.1 U	5.1 U	5 U
Bis(2-ethylhexyl) Phthalate (BEHP)	5.1 U	5.1 U	5 U
Butyl Benzyl Phthalate	5.1 U	5.1 U	5 U
Diallate (cis)	5.1 U	5.1 U	5 U
Diallate (total)	5.1 UJ	5.1 UJ	5 UJ
Diallate (trans)	5.1 UJ	5.1 UJ	5 UJ
Dibenzofuran	5.1 U	5.1 U	5 U
Diethyl Phthalate (DEP)	5.1 U	5.1 U	5 U
Dimethyl Phthalate	5.1 U	5.1 U	5 U
Di-n-butyl Phthalate (DBP)	5.1 U	5.1 U	5 U
Di-n-octyl Phthalate	5.1 U	5.1 U	5 U
Dinoseb	5.1 U	5.1 U	5 U
Ethyl Methane Sulfonate (EMS)	5.1 U	5.1 U	5 U
Hexachloro-1,3-butadiene	5.1 U	5.1 U	5 U
Hexachlorobenzene	5.1 U	5.1 U	5 U
Hexachlorocyclopentadiene	5.1 U	5.1 U	5 U
Hexachloroethane	5.1 U	5.1 U	5 U
Hexachloropropene	5.1 U	5.1 U	5 U
Indeno(1,2,3-cd)pyrene	5.1 UJ	5.1 UJ	5 UJ
Isophorone	5.1 U	5.1 U	5 U
Isosafrole	5.1 U	5.1 U	5 U

APPENDIX C

SUMMARY OF ANALYTICAL RESULTS, QUALITY ASSURANCE / QUALITY CONTROL
SWMU 67 – FORMER GAS STATION
PHASE I RFI REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

	Equipment Rinsates		
Sample ID	67ER06	67ER07	67ER08
Sample Date	3/27/2010	3/28/2010	3/30/2010
Semivolatiles (µg/L)			
Methapyrilene	5.1 R	5.1 R	5 R
Methyl Methane Sulfonate	5.1 U	5.1 U	5 U
Nitrobenzene	5.1 UJ	5.1 UJ	5 UJ
n-Nitrosodiethylamine	5.1 UJ	5.1 UJ	5 UJ
n-Nitrosodimethylamine (NDMA)	5.1 U	5.1 U	5 U
n-Nitroso-di-n-butylamine	5.1 U	5.1 U	5 U
n-Nitrosodi-n-propylamine	5.1 U	5.1 U	5 U
n-Nitrosodiphenylamine	5.1 UJ	5.1 UJ	5 UJ
n-Nitrosomethylethylamine	5.1 UJ	5.1 UJ	5 UJ
n-Nitrosomorpholine	5.1 UJ	5.1 UJ	5 UJ
n-Nitrosopiperidine	5.1 UJ	5.1 UJ	5 UJ
n-Nitrosopyrrolidine	5.1 UJ	5.1 UJ	5 UJ
o-Toluidine	5.1 UJ	5.1 UJ	5 UJ
Pentachlorobenzene	5.1 U	5.1 U	5 U
Pentachloronitrobenzene	5.1 UJ	5.1 UJ	5 UJ
Pentachlorophenol	10 UJ	10 UJ	10 UJ
Phenacetin	5.1 U	5.1 U	5 U
Phenol	10 U	10 U	10 U
Pronamide	10 U	10 U	10 U
Pyridine	5.1 U	5.1 U	5 U
Safrole	5.1 U	5.1 U	5 U
PAHs (µg/L) - Low Molecular Weight			
2-Methylnaphthalene	0.016 J	0.21 U	0.02 J
Acenaphthene	0.21 U	0.21 U	0.2 U
Acenaphthylene	0.21 U	0.21 U	0.2 U
Anthracene	0.21 U	0.21 U	0.2 U
Fluoranthene	0.21 U	0.21 U	0.2 U
Fluorene	0.21 U	0.21 U	0.2 U
Naphthalene	0.074 J	0.04 J	0.11 J
Phenanthrene	0.21 U	0.21 U	0.2 U
PAHs (µg/L) - High Molecular Weight			
Benzo(a)anthracene	0.21 U	0.21 U	0.2 U
Benzo(a)pyrene (BaP)	0.21 U	0.21 U	0.2 U
Benzo(b)fluoranthene	0.21 U	0.21 U	0.2 U
Benzo(g,h,i)perylene	0.21 U	0.21 U	0.2 U
Benzo(k)fluoranthene	0.21 U	0.21 U	0.2 U
Chrysene	0.21 U	0.21 U	0.2 U
Dibenz(a,h)anthracene	0.21 U	0.21 U	0.2 U
Indeno(1,2,3-cd)pyrene	0.21 U	0.21 U	0.2 U
Pyrene	0.21 U	0.21 U	0.2 U
PAH totals (µg/L)			
Low molecular weight PAHs	1.35	1.51	1.33
High molecular weight PAHs	1.89	1.89	1.8

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SUMMARY OF ANALYTICAL RESULTS, QUALITY ASSURANCE / QUALITY CONTROL
SWMU 67 – FORMER GAS STATION
PHASE I RFI REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

	Equipment Rinsates		
Sample ID	67ER06	67ER07	67ER08
Sample Date	3/27/2010	3/28/2010	3/30/2010
TPH (mg/L)			
Diesel Range Organics (DRO)	0.54 U	0.5 U	0.5 U
Gasoline Range Organics (GRO)	0.03 J	0.035 J	0.033 J
Total TPH	0.57 J	0.535 J	0.533 J
Total Inorganics (µg/L)			
Antimony	2 U	2 U	2 U
Arsenic	1 U	1 U	1 U
Barium	10 U	10 U	10 U
Beryllium	1 U	1 U	1 U
Cadmium	1 U	1 U	1 U
Chromium	2 U	2 U	2 U
Cobalt	1 U	1 U	1 U
Copper	2 U	1.3 J	0.45 J
Lead	1 U	1 U	1 U
Mercury	0.2 U	0.2 U	0.2 U
Nickel	1 U	0.22 J	1 U
Selenium	5 U	5 U	5 U
Silver	1 U	1 U	1 U
Thallium	1 U	1 U	1 U
Tin	20 U	20 U	20 U
Vanadium	5 U	5 U	5 U
Zinc	2 U	1.8 J	2 U

Notes:

µg/L - micrograms per liter
mg/L - milligrams per liter
PAH - Polyaromatic Hydrocarbons
TPH - Total Petroleum Hydrocarbons
U - Not detected
UJ - Reported quantitation limit is estimated
J - Analyte present - value is estimated
R - Result is rejected and unusable

APPENDIX C

SUMMARY OF ANALYTICAL RESULTS, QUALITY ASSURANCE / QUALITY CONTROL
SWMU 67 – FORMER GAS STATION
PHASE I RFI REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

	Field Blanks		Trip Blanks
Sample ID	67FB01	67FB02	67TB01
Sample Date	3/23/2010	3/25/2010	3/22/2010
Volatiles (µg/L)			
1,1,1,2-Tetrachloroethane	0.5 UJ	0.5 UJ	0.5 UJ
1,1,1-Trichloroethane	0.5 U	0.5 U	0.5 U
1,1,2,2-Tetrachloroethane	0.5 UJ	0.5 UJ	0.5 UJ
1,1,2-Trichloroethane	0.5 U	0.5 U	0.5 U
1,1-Dichloroethane	0.5 U	0.5 U	0.5 U
1,1-Dichloroethene	0.5 U	0.5 U	0.5 U
1,2,3-Trichloropropane	0.5 U	0.5 U	0.5 U
1,2-Dibromo-3-chloropropane (DBCP)	0.5 UJ	0.5 UJ	0.5 UJ
1,2-Dibromoethane (EDB)	0.5 U	0.5 U	0.5 U
1,2-Dichloroethane	0.5 U	0.5 U	0.5 U
1,2-Dichloroethene (trans)	0.5 U	0.5 U	0.5 U
1,2-Dichloropropane	0.5 U	0.5 U	0.5 U
1,3-Dichloropropene (cis)	0.5 U	0.5 U	0.5 U
1,3-Dichloropropene (trans)	0.5 U	0.5 U	0.5 U
1,4-Dichloro-2-butene (trans)	2 U	2 U	2 U
1,4-Dioxane (p-)	25 R	25 R	25 R
2-Butanone (MEK)	2.5 R	2.5 R	2.5 R
2-Chloro-1,3-butadiene (Chloroprene)	0.5 U	0.5 U	0.5 U
2-Hexanone (MBK)	2.5 U	2.5 U	2.5 U
3-Chloropropene (Allyl Chloride)	0.5 UJ	0.5 UJ	0.5 UJ
4-Methyl-2-pentanone (MIBK)	2.5 U	2.5 U	2.5 U
Acetone	3.7 J	5.1 J	2.5 R
Acetonitrile	0.5 UJ	0.5 UJ	0.5 UJ
Acrolein	5 R	5 R	5 R
Acrylonitrile	5 R	5 R	5 R
Benzene	0.5 U	0.5 U	0.5 U
Bromodichloromethane	0.5 U	0.5 U	0.5 U
Bromoform	0.5 U	0.5 U	0.5 U
Bromomethane	0.5 UJ	0.5 UJ	0.5 UJ
Carbon Disulfide	0.5 U	0.5 U	0.5 U
Carbon Tetrachloride	0.5 U	0.5 U	0.5 U
Chlorobenzene	0.5 U	0.5 U	0.5 U
Chloroethane	0.5 UJ	0.5 UJ	0.5 UJ
Chloroform	1.4	0.5 U	0.5 U
Chloromethane	0.5 U	0.5 U	0.5 U
Dibromochloromethane	0.5 UJ	0.5 UJ	0.5 UJ
Dibromomethane	0.5 U	0.5 U	0.5 U
Dichlorodifluoromethane (Freon-12)	0.5 UJ	0.5 UJ	0.5 UJ
Ethyl Methacrylate	5 U	5 U	5 U
Ethylbenzene	0.5 U	0.5 U	0.5 U
Isobutyl Alcohol	25 R	25 R	25 R
Methyl Acrylonitrile	5 U	5 U	5 U
Methyl Iodide	0.5 UJ	0.5 UJ	0.5 UJ

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SUMMARY OF ANALYTICAL RESULTS, QUALITY ASSURANCE / QUALITY CONTROL
SWMU 67 – FORMER GAS STATION
PHASE I RFI REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

	Field Blanks		Trip Blanks
Sample ID	67FB01	67FB02	67TB01
Sample Date	3/23/2010	3/25/2010	3/22/2010
Volatiles (µg/L)			
Methyl Methacrylate	5 U	5 U	5 U
Methylene Chloride	1.6	0.5 U	0.5 U
Pentachloroethane	0.5 U	0.5 U	0.5 U
Propionitrile (Ethyl Cyanide)	25 R	25 R	25 R
Styrene (Ethenylbenzene)	0.5 U	0.5 U	0.5 U
Tetrachloroethene (PCE)	0.5 U	0.5 U	0.5 U
Toluene	0.97	0.054 J	0.5 U
Trichloroethene (TCE)	0.5 U	0.5 U	0.5 U
Trichlorofluoromethane (Freon 11)	0.5 U	0.5 U	0.5 U
Vinyl Acetate	1 U	1 U	1 U
Vinyl Chloride	0.5 U	0.5 U	0.5 U
Xylene, m/p-	1 U	1 U	1 U
Xylene, o-	0.5 U	0.5 U	0.5 U
Xylenes, total	0.5 U	0.5 U	0.5 U
Semivolatiles (µg/L)			
1,2,4,5-Tetrachlorobenzene	5.1 U	5.4 U	NA
1,2,4-Trichlorobenzene	5.1 U	5.4 U	NA
1,2-Dichlorobenzene (o-)	5.1 U	5.4 U	NA
1,3,5-Trinitrobenzene (TNB)	5.1 U	5.4 U	NA
1,3-Dichlorobenzene (m-)	5.1 U	5.4 U	NA
1,3-Dinitrobenzene (m-)	5.1 U	5.4 U	NA
1,4-Dichlorobenzene (p-)	5.1 U	5.4 U	NA
1,4-Naphthoquinone	5.1 U	5.4 U	NA
1,4-Phenylenediamine	52 R	55 R	NA
1-Naphthylamine	5.1 UJ	5.4 UJ	NA
2,2'-Oxybis[1-chloropropane]	5.1 U	5.4 U	NA
2,3,4,6-Tetrachlorophenol	10 U	11 U	NA
2,4,5-Trichlorophenol	10 U	11 U	NA
2,4,6-Trichlorophenol	10 U	11 U	NA
2,4-Dichlorophenol	10 U	11 U	NA
2,4-Dimethylphenol	10 U	11 U	NA
2,4-Dinitrophenol	10 U	11 U	NA
2,4-Dinitrotoluene (DNT)	5.1 U	5.4 U	NA
2,6-Dichlorophenol	10 U	11 U	NA
2,6-Dinitrotoluene (DNT)	5.1 U	5.4 U	NA
2-Acetylaminofluorene	5.1 UJ	5.4 UJ	NA
2-Chloronaphthalene	5.1 U	5.4 UJ	NA
2-Chlorophenol	10 U	11 U	NA
2-Methyl-5-nitroaniline	5.1 UJ	5.4 UJ	NA
2-Methylphenol (o-Cresol)	10 U	11 U	NA
2-Naphthylamine	5.1 UJ	5.4 UJ	NA
2-Nitroaniline	5.1 U	5.4 U	NA
2-Nitrophenol	10 U	11 U	NA
2-Picoline	5.1 UJ	5.4 UJ	NA

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SUMMARY OF ANALYTICAL RESULTS, QUALITY ASSURANCE / QUALITY CONTROL
SWMU 67 – FORMER GAS STATION
PHASE I RFI REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

	Field Blanks		Trip Blanks
Sample ID	67FB01	67FB02	67TB01
Sample Date	3/23/2010	3/25/2010	3/22/2010
Semivolatiles (µg/L)			
3,3'-Dichlorobenzidine	5.1 U	5.4 U	NA
3,3'-Dimethylbenzidine	5.1 UJ	5.4 UJ	NA
3-Methylcholanthrene	5.1 U	5.4 U	NA
3-Methylphenol (m-Cresol)	8.2 U	8.6 U	NA
3-Nitroaniline	5.1 U	5.4 U	NA
4,6-Dinitro-2-methylphenol	10 U	11 U	NA
4-Aminobiphenyl	5.1 UJ	5.4 UJ	NA
4-Bromophenyl-phenylether	5.1 U	5.4 U	NA
4-Chloro-3-methylphenol	10 U	11 U	NA
4-Chloroaniline	5.1 U	5.4 U	NA
4-Chlorophenyl-phenylether	5.1 U	5.4 U	NA
4-Dimethylaminoazobenzene (p-)	5.1 UJ	5.4 UJ	NA
4-Methylphenol (p-Cresol)	8.2 U	8.6 U	NA
4-Nitroaniline	5.1 U	5.4 U	NA
4-Nitrophenol	10 U	11 U	NA
4-Nitroquinoline-1-oxide	5.1 UJ	5.4 UJ	NA
7,12-Dimethylbenz(a)anthracene	5.1 U	5.4 U	NA
Acetophenone	5.1 U	5.4 U	NA
Aniline	5.1 U	5.4 U	NA
Aramite	5.1 U	5.4 U	NA
Benzyl Alcohol	5.1 U	5.4 U	NA
Bis(2-chloroethoxy)methane	5.1 U	5.4 U	NA
Bis(2-chloroethyl)ether	5.1 U	5.4 U	NA
Bis(2-ethylhexyl) Phthalate (BEHP)	5.1 U	5.4 U	NA
Butyl Benzyl Phthalate	5.1 U	5.4 U	NA
Diallate (cis)	5.1 UJ	5.4 U	NA
Diallate (total)	5.1 UJ	5.4 UJ	NA
Diallate (trans)	5.1 UJ	5.4 UJ	NA
Dibenzofuran	5.1 U	5.4 U	NA
Diethyl Phthalate (DEP)	5.1 U	5.4 U	NA
Dimethyl Phthalate	5.1 U	5.4 U	NA
Di-n-butyl Phthalate (DBP)	5.1 U	5.4 U	NA
Di-n-octyl Phthalate	5.1 U	5.4 U	NA
Dinoseb	5.1 U	5.4 U	NA
Ethyl Methane Sulfonate (EMS)	5.1 U	5.4 U	NA
Hexachloro-1,3-butadiene	5.1 U	5.4 U	NA
Hexachlorobenzene	5.1 U	5.4 U	NA
Hexachlorocyclopentadiene	5.1 U	5.4 U	NA
Hexachloroethane	5.1 U	5.4 U	NA
Hexachloropropene	5.1 UJ	5.4 U	NA
Indeno(1,2,3-cd)pyrene	5.1 UJ	5.4 UJ	NA
Isophorone	5.1 U	5.4 U	NA
Isosafrole	5.1 U	5.4 U	NA

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SUMMARY OF ANALYTICAL RESULTS, QUALITY ASSURANCE / QUALITY CONTROL
SWMU 67 – FORMER GAS STATION
PHASE I RFI REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

	Field Blanks		Trip Blanks
Sample ID	67FB01	67FB02	67TB01
Sample Date	3/23/2010	3/25/2010	3/22/2010
Semivolatiles (µg/L)			
Methapyrilene	5.1 UJ	5.4 UJ	NA
Methyl Methane Sulfonate	5.1 U	5.4 U	NA
Nitrobenzene	5.1 U	5.4 U	NA
n-Nitrosodiethylamine	5.1 UJ	5.4 UJ	NA
n-Nitrosodimethylamine (NDMA)	5.1 U	5.4 U	NA
n-Nitroso-di-n-butylamine	5.1 UJ	5.4 UJ	NA
n-Nitrosodi-n-propylamine	5.1 U	5.4 U	NA
n-Nitrosodiphenylamine	5.1 UJ	5.4 UJ	NA
n-Nitrosomethylethylamine	5.1 UJ	5.4 UJ	NA
n-Nitrosomorpholine	5.1 UJ	5.4 UJ	NA
n-Nitrosopiperidine	5.1 UJ	5.4 UJ	NA
n-Nitrosopyrrolidine	5.1 UJ	5.4 UJ	NA
o-Toluidine	5.1 UJ	5.4 UJ	NA
Pentachlorobenzene	5.1 U	5.4 U	NA
Pentachloronitrobenzene	5.1 U	5.4 U	NA
Pentachlorophenol	10 U	11 U	NA
Phenacetin	5.1 U	5.4 U	NA
Phenol	10 U	11 U	NA
Pronamide	10 U	11 U	NA
Pyridine	5.1 U	5.4 U	NA
Safrole	5.1 U	5.4 U	NA
PAHs (µg/L) - Low Molecular Weight			
2-Methylnaphthalene	0.021 J	0.22 U	NA
Acenaphthene	0.21 U	0.22 U	NA
Acenaphthylene	0.21 U	0.22 U	NA
Anthracene	0.21 U	0.22 U	NA
Fluoranthene	0.21 U	0.22 U	NA
Fluorene	0.21 U	0.22 U	NA
Naphthalene	0.098 J	0.22 U	NA
Phenanthrene	0.21 U	0.22 U	NA
PAHs (µg/L) - High Molecular Weight			
Benzo(a)anthracene	0.21 U	0.22 U	NA
Benzo(a)pyrene (BaP)	0.21 U	0.22 U	NA
Benzo(b)fluoranthene	0.21 U	0.22 U	NA
Benzo(g,h,i)perylene	0.21 U	0.22 U	NA
Benzo(k)fluoranthene	0.21 U	0.22 U	NA
Chrysene	0.21 U	0.22 U	NA
Dibenz(a,h)anthracene	0.21 U	0.22 U	NA
Indeno(1,2,3-cd)pyrene	0.21 U	0.22 U	NA
Pyrene	0.21 U	0.22 U	NA
PAH totals (µg/L)			
Low molecular weight PAHs	1.379	1.76	NA
High molecular weight PAHs	1.89	1.98	NA

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SUMMARY OF ANALYTICAL RESULTS, QUALITY ASSURANCE / QUALITY CONTROL
SWMU 67 – FORMER GAS STATION
PHASE I RFI REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

	Field Blanks		Trip Blanks
Sample ID	67FB01	67FB02	67TB01
Sample Date	3/23/2010	3/25/2010	3/22/2010
TPH (mg/L)			
Diesel Range Organics (DRO)	0.5 U	0.5 U	NA
Gasoline Range Organics (GRO)	0.032 J	0.032 J	0.033 J
Total TPH	0.532 J	0.532 J	0.033 J
Total Inorganics (µg/L)			
Antimony	2 U	2 U	NA
Arsenic	1 U	1 U	NA
Barium	10 U	10 U	NA
Beryllium	1 U	1 U	NA
Cadmium	1 U	1 U	NA
Chromium	2 U	2 U	NA
Cobalt	1 U	1 U	NA
Copper	2 U	0.27 J	NA
Lead	1 U	0.074 J	NA
Mercury	0.2 U	0.2 U	NA
Nickel	1 U	0.11 J	NA
Selenium	5 U	5 U	NA
Silver	1 U	1 U	NA
Thallium	1 U	1 U	NA
Tin	20 U	20 U	NA
Vanadium	5 U	5 U	NA
Zinc	2.3	1.2 J	NA

Notes:
µg/L - micrograms per liter
mg/L - milligrams per liter
PAH - Polyaromatic Hydrocarbons
TPH - Total Petroleum Hydrocarbons
U - Not detected
UJ - Reported quantitation limit is estimated
J - Analyte present - value is estimated
R - Result is rejected and unusable

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SUMMARY OF ANALYTICAL RESULTS, QUALITY ASSURANCE / QUALITY CONTROL
SWMU 67 – FORMER GAS STATION
PHASE I RFI REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

	Trip Blanks			
Sample ID	67TB02	67TB03	67TB04	67TB05
Sample Date	3/24/2010	3/26/2010	3/26/2010	3/30/2010
Volatiles (µg/L)				
1,1,1,2-Tetrachloroethane	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ
1,1,1-Trichloroethane	0.5 U	0.5 U	0.5 U	0.5 U
1,1,2,2-Tetrachloroethane	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ
1,1,2-Trichloroethane	0.5 U	0.5 U	0.5 U	0.5 U
1,1-Dichloroethane	0.5 U	0.5 U	0.5 U	0.5 U
1,1-Dichloroethene	0.5 U	0.5 U	0.5 U	0.5 U
1,2,3-Trichloropropane	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dibromo-3-chloropropane (DBCP)	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ
1,2-Dibromoethane (EDB)	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dichloroethane	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dichloroethene (trans)	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dichloropropane	0.5 U	0.5 U	0.5 U	0.5 U
1,3-Dichloropropene (cis)	0.5 U	0.5 U	0.5 U	0.5 U
1,3-Dichloropropene (trans)	0.5 U	0.5 U	0.5 U	0.5 U
1,4-Dichloro-2-butene (trans)	2 U	2 U	2 U	2 U
1,4-Dioxane (p-)	25 R	25 R	25 R	25 R
2-Butanone (MEK)	2.5 R	2.5 R	2.5 R	2.5 R
2-Chloro-1,3-butadiene (Chloroprene)	0.5 U	0.5 U	0.5 U	0.5 U
2-Hexanone (MBK)	2.5 U	2.5 U	2.5 U	2.5 U
3-Chloropropene (Allyl Chloride)	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ
4-Methyl-2-pentanone (MIBK)	2.5 U	2.5 U	2.5 U	2.5 U
Acetone	2.5 R	2.5 R	2.5 R	2.5 R
Acetonitrile	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ
Acrolein	5 R	5 R	5 R	5 R
Acrylonitrile	5 R	5 R	5 R	5 R
Benzene	0.5 U	0.5 U	0.5 U	0.5 U
Bromodichloromethane	0.5 U	0.5 U	0.5 U	0.5 U
Bromoform	0.5 U	0.5 U	0.5 U	0.5 U
Bromomethane	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ
Carbon Disulfide	0.5 U	0.5 U	0.5 U	0.5 U
Carbon Tetrachloride	0.5 U	0.5 U	0.5 U	0.5 U
Chlorobenzene	0.5 U	0.5 U	0.5 U	0.5 U
Chloroethane	0.5 UJ	0.5 U	0.5 U	0.5 U
Chloroform	0.5 U	0.5 U	0.5 U	0.5 U
Chloromethane	0.5 U	0.5 U	0.5 U	0.5 U
Dibromochloromethane	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ
Dibromomethane	0.5 U	0.5 U	0.5 U	0.5 U
Dichlorodifluoromethane (Freon-12)	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ
Ethyl Methacrylate	5 U	5 U	5 U	5 U
Ethylbenzene	0.5 U	0.5 U	0.5 U	0.5 U
Isobutyl Alcohol	25 R	25 R	25 R	25 R
Methyl Acrylonitrile	5 U	5 UJ	5 UJ	5 UJ
Methyl Iodide	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ

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SUMMARY OF ANALYTICAL RESULTS, QUALITY ASSURANCE / QUALITY CONTROL
SWMU 67 – FORMER GAS STATION
PHASE I RFI REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

	Trip Blanks			
Sample ID	67TB02	67TB03	67TB04	67TB05
Sample Date	3/24/2010	3/26/2010	3/26/2010	3/30/2010
Volatiles (µg/L)				
Methyl Methacrylate	5 U	5 U	5 U	5 U
Methylene Chloride	0.5 U	0.5 U	0.5 U	0.5 U
Pentachloroethane	0.5 U	0.5 UJ	0.5 UJ	0.5 UJ
Propionitrile (Ethyl Cyanide)	25 R	25 R	25 R	25 R
Styrene (Ethenylbenzene)	0.5 U	0.5 U	0.5 U	0.5 U
Tetrachloroethene (PCE)	0.5 U	0.5 U	0.5 U	0.5 U
Toluene	0.5 U	0.5 U	0.037 J	0.037 J
Trichloroethene (TCE)	0.5 U	0.5 U	0.5 U	0.5 U
Trichlorofluoromethane (Freon 11)	0.5 U	0.5 U	0.5 U	0.5 U
Vinyl Acetate	1 U	1 U	1 U	1 U
Vinyl Chloride	0.5 U	0.5 U	0.5 U	0.5 U
Xylene, m/p-	1 U	1 U	1 U	1 U
Xylene, o-	0.5 U	0.5 U	0.5 U	0.5 U
Xylenes, total	0.5 U	0.5 U	0.5 U	0.5 U
Semivolatiles (µg/L)				
1,2,4,5-Tetrachlorobenzene	NA	NA	NA	NA
1,2,4-Trichlorobenzene	NA	NA	NA	NA
1,2-Dichlorobenzene (o-)	NA	NA	NA	NA
1,3,5-Trinitrobenzene (TNB)	NA	NA	NA	NA
1,3-Dichlorobenzene (m-)	NA	NA	NA	NA
1,3-Dinitrobenzene (m-)	NA	NA	NA	NA
1,4-Dichlorobenzene (p-)	NA	NA	NA	NA
1,4-Naphthoquinone	NA	NA	NA	NA
1,4-Phenylenediamine	NA	NA	NA	NA
1-Naphthylamine	NA	NA	NA	NA
2,2'-Oxybis[1-chloropropane]	NA	NA	NA	NA
2,3,4,6-Tetrachlorophenol	NA	NA	NA	NA
2,4,5-Trichlorophenol	NA	NA	NA	NA
2,4,6-Trichlorophenol	NA	NA	NA	NA
2,4-Dichlorophenol	NA	NA	NA	NA
2,4-Dimethylphenol	NA	NA	NA	NA
2,4-Dinitrophenol	NA	NA	NA	NA
2,4-Dinitrotoluene (DNT)	NA	NA	NA	NA
2,6-Dichlorophenol	NA	NA	NA	NA
2,6-Dinitrotoluene (DNT)	NA	NA	NA	NA
2-Acetylaminofluorene	NA	NA	NA	NA
2-Chloronaphthalene	NA	NA	NA	NA
2-Chlorophenol	NA	NA	NA	NA
2-Methyl-5-nitroaniline	NA	NA	NA	NA
2-Methylphenol (o-Cresol)	NA	NA	NA	NA
2-Naphthylamine	NA	NA	NA	NA
2-Nitroaniline	NA	NA	NA	NA
2-Nitrophenol	NA	NA	NA	NA
2-Picoline	NA	NA	NA	NA

APPENDIX C

SUMMARY OF ANALYTICAL RESULTS, QUALITY ASSURANCE / QUALITY CONTROL
SWMU 67 – FORMER GAS STATION
PHASE I RFI REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

	Trip Blanks			
Sample ID	67TB02	67TB03	67TB04	67TB05
Sample Date	3/24/2010	3/26/2010	3/26/2010	3/30/2010
Semivolatiles (µg/L)				
3,3'-Dichlorobenzidine	NA	NA	NA	NA
3,3'-Dimethylbenzidine	NA	NA	NA	NA
3-Methylcholanthrene	NA	NA	NA	NA
3-Methylphenol (m-Cresol)	NA	NA	NA	NA
3-Nitroaniline	NA	NA	NA	NA
4,6-Dinitro-2-methylphenol	NA	NA	NA	NA
4-Aminobiphenyl	NA	NA	NA	NA
4-Bromophenyl-phenylether	NA	NA	NA	NA
4-Chloro-3-methylphenol	NA	NA	NA	NA
4-Chloroaniline	NA	NA	NA	NA
4-Chlorophenyl-phenylether	NA	NA	NA	NA
4-Dimethylaminoazobenzene (p-)	NA	NA	NA	NA
4-Methylphenol (p-Cresol)	NA	NA	NA	NA
4-Nitroaniline	NA	NA	NA	NA
4-Nitrophenol	NA	NA	NA	NA
4-Nitroquinoline-1-oxide	NA	NA	NA	NA
7,12-Dimethylbenz(a)anthracene	NA	NA	NA	NA
Acetophenone	NA	NA	NA	NA
Aniline	NA	NA	NA	NA
Aramite	NA	NA	NA	NA
Benzyl Alcohol	NA	NA	NA	NA
Bis(2-chloroethoxy)methane	NA	NA	NA	NA
Bis(2-chloroethyl)ether	NA	NA	NA	NA
Bis(2-ethylhexyl) Phthalate (BEHP)	NA	NA	NA	NA
Butyl Benzyl Phthalate	NA	NA	NA	NA
Diallate (cis)	NA	NA	NA	NA
Diallate (total)	NA	NA	NA	NA
Diallate (trans)	NA	NA	NA	NA
Dibenzofuran	NA	NA	NA	NA
Diethyl Phthalate (DEP)	NA	NA	NA	NA
Dimethyl Phthalate	NA	NA	NA	NA
Di-n-butyl Phthalate (DBP)	NA	NA	NA	NA
Di-n-octyl Phthalate	NA	NA	NA	NA
Dinoseb	NA	NA	NA	NA
Ethyl Methane Sulfonate (EMS)	NA	NA	NA	NA
Hexachloro-1,3-butadiene	NA	NA	NA	NA
Hexachlorobenzene	NA	NA	NA	NA
Hexachlorocyclopentadiene	NA	NA	NA	NA
Hexachloroethane	NA	NA	NA	NA
Hexachloropropene	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	NA	NA	NA	NA
Isophorone	NA	NA	NA	NA
Isosafrole	NA	NA	NA	NA

APPENDIX C

SUMMARY OF ANALYTICAL RESULTS, QUALITY ASSURANCE / QUALITY CONTROL
SWMU 67 – FORMER GAS STATION
PHASE I RFI REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

	Trip Blanks			
Sample ID	67TB02	67TB03	67TB04	67TB05
Sample Date	3/24/2010	3/26/2010	3/26/2010	3/30/2010
Semivolatiles (µg/L)				
Methapyrilene	NA	NA	NA	NA
Methyl Methane Sulfonate	NA	NA	NA	NA
Nitrobenzene	NA	NA	NA	NA
n-Nitrosodiethylamine	NA	NA	NA	NA
n-Nitrosodimethylamine (NDMA)	NA	NA	NA	NA
n-Nitroso-di-n-butylamine	NA	NA	NA	NA
n-Nitrosodi-n-propylamine	NA	NA	NA	NA
n-Nitrosodiphenylamine	NA	NA	NA	NA
n-Nitrosomethylethylamine	NA	NA	NA	NA
n-Nitrosomorpholine	NA	NA	NA	NA
n-Nitrosopiperidine	NA	NA	NA	NA
n-Nitrosopyrrolidine	NA	NA	NA	NA
o-Toluidine	NA	NA	NA	NA
Pentachlorobenzene	NA	NA	NA	NA
Pentachloronitrobenzene	NA	NA	NA	NA
Pentachlorophenol	NA	NA	NA	NA
Phenacetin	NA	NA	NA	NA
Phenol	NA	NA	NA	NA
Pronamide	NA	NA	NA	NA
Pyridine	NA	NA	NA	NA
Safrole	NA	NA	NA	NA
PAHs (µg/L) - Low Molecular Weight				
2-Methylnaphthalene	NA	NA	NA	NA
Acenaphthene	NA	NA	NA	NA
Acenaphthylene	NA	NA	NA	NA
Anthracene	NA	NA	NA	NA
Fluoranthene	NA	NA	NA	NA
Fluorene	NA	NA	NA	NA
Naphthalene	NA	NA	NA	NA
Phenanthrene	NA	NA	NA	NA
PAHs (µg/L) - High Molecular Weight				
Benzo(a)anthracene	NA	NA	NA	NA
Benzo(a)pyrene (BaP)	NA	NA	NA	NA
Benzo(b)fluoranthene	NA	NA	NA	NA
Benzo(g,h,i)perylene	NA	NA	NA	NA
Benzo(k)fluoranthene	NA	NA	NA	NA
Chrysene	NA	NA	NA	NA
Dibenz(a,h)anthracene	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	NA	NA	NA	NA
Pyrene	NA	NA	NA	NA
PAH totals (µg/L)				
Low molecular weight PAHs	NA	NA	NA	NA
High molecular weight PAHs	NA	NA	NA	NA

APPENDIX C

SUMMARY OF ANALYTICAL RESULTS, QUALITY ASSURANCE / QUALITY CONTROL
SWMU 67 – FORMER GAS STATION
PHASE I RFI REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

	Trip Blanks			
Sample ID	67TB02	67TB03	67TB04	67TB05
Sample Date	3/24/2010	3/26/2010	3/26/2010	3/30/2010
TPH (mg/L)				
Diesel Range Organics (DRO)	NA	NA	NA	NA
Gasoline Range Organics (GRO)	0.032 J	0.03 J	0.036 J	0.032 J
Total TPH	0.032 J	0.03 J	0.036 J	0.032 J
Total Inorganics (µg/L)				
Antimony	NA	NA	NA	NA
Arsenic	NA	NA	NA	NA
Barium	NA	NA	NA	NA
Beryllium	NA	NA	NA	NA
Cadmium	NA	NA	NA	NA
Chromium	NA	NA	NA	NA
Cobalt	NA	NA	NA	NA
Copper	NA	NA	NA	NA
Lead	NA	NA	NA	NA
Mercury	NA	NA	NA	NA
Nickel	NA	NA	NA	NA
Selenium	NA	NA	NA	NA
Silver	NA	NA	NA	NA
Thallium	NA	NA	NA	NA
Tin	NA	NA	NA	NA
Vanadium	NA	NA	NA	NA
Zinc	NA	NA	NA	NA

Notes:

µg/L - micrograms per liter
mg/L - milligrams per liter
PAH - Polyaromatic Hydrocarbons
TPH - Total Petroleum Hydrocarbons
U - Not detected
UJ - Reported quantitation limit is estimated
J - Analyte present - value is estimated
R - Result is rejected and unusable

SW846 - METALS

-1-

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

67IDW01

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 1003249

Matrix (soil/water): LEACHATE Lab Sample ID: 1003249-01

Level (low/med): LOW Date Received: 3/31/2010

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7440-38-2	Arsenic	14.8	B		P
7440-39-3	Barium	318	B		P
7440-43-9	Cadmium	2.3	B		P
7440-47-3	Chromium	0.75	U		P
7439-92-1	Lead	3.8	B		P
7439-97-6	Mercury	0.09	U		CV
7782-49-2	Selenium	18.2	B		P
7440-22-4	Silver	0.64	U		P

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

FORM 1
VOLATILE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

67IDW01

Lab Name: COMPUCHEM Method: 8260B-1311S

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 1003249

Matrix: (soil/water) LEACHATE Lab Sample ID: 1003249-01

Sample wt/vol: 5 (g/ml) ML Lab File ID: 1003249-0159

Level: (low/med) LOW Date Received: 03/31/10

% Moisture: not dec. _____ Date Analyzed: 04/15/10

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 5.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
75-01-4	Vinyl Chloride	25	U
75-35-4	1,1-Dichloroethene	25	U
78-93-3	2-butanone	63	U
67-66-3	Chloroform	25	U
56-23-5	Carbon Tetrachloride	25	U
71-43-2	Benzene	25	U
107-06-2	1,2-Dichloroethane	25	U
79-01-6	Trichloroethene	1.7	J
127-18-4	Tetrachloroethene	25	U
108-90-7	Chlorobenzene	25	U

FORM I VOA

CompuChem
A Division Of
Liberty Analytical Corp.

BAKER ENVIRONMENTAL, INC. AIRSIDE BUSINESS PARK 100 AIRSIDE DRIVE MOON TOWNSHIP PA, 15108	Project: NAPR SWMU67/DO#119197.6.8 ON ISLAND Project Number: NAPR SWMU67/DO#119197.6.8 ON ISLAND Project Manager: MARK KIMES	Reported: 04/19/2010 15:34

67IDW01
1003249-02 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
			COMPUCHEM					
***** DEFAULT GENERAL METHOD *****								
% Solids	**85**	0	% by Weight	1	0040607	04/06/2010 10:55	04/06/2010 11:00	% Calculation
WET CHEMISTRY PARAMETERS								
Corrosivity-pH	7.83		pH Units	1	0040536	04/05/2010 15:42	04/06/2010 15:26	EPA 9040B
Ignitability by Flashpoint	>140		degree F	1	0040537	04/05/2010 15:42	04/06/2010 15:29	EPA 1010
Reactive Cyanide	ND	250	mg/L	1	0040530	04/05/2010 15:33	04/06/2010 15:31	EPA 9014
Reactive Sulfide	ND	250	mg/L	1	0040535	04/05/2010 15:41	04/06/2010 15:33	EPA 9034

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Preeti Khare For Cathy Dover, Project Manager

SW846 - METALS

-1-

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

67IDW02

Lab Name: COMPUCHEM Contract: _____

Lab Code: LIBRTY Case No.: _____ SAS No.: _____ SDG No.: 1003250

Matrix (soil/water): LEACHATE Lab Sample ID: 1003250-01

Level (low/med): LOW Date Received: 3/31/2010

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7440-38-2	Arsenic	2.5	U		P
7440-39-3	Barium	24.1	B		P
7440-43-9	Cadmium	0.64	U		P
7440-47-3	Chromium	3.9	B		P
7439-92-1	Lead	6.6	B		P
7439-97-6	Mercury	0.09	U		CV
7782-49-2	Selenium	2.1	U		P
7440-22-4	Silver	0.64	U		P

Color Before: BROWN Clarity Before: CLEAR Texture: _____

Color After: COLORLESS Clarity After: CLEAR Artifacts: _____

Comments: _____

FORM 1
VOLATILE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

67IDW02

Lab Name: COMPUCHEM Method: 8260B-1311W

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 1003250

Matrix: (soil/water) LEACHATE Lab Sample ID: 1003250-01

Sample wt/vol: 5 (g/ml) ML Lab File ID: 1003250-01R59

Level: (low/med) LOW Date Received: 03/31/10

% Moisture: not dec. _____ Date Analyzed: 04/16/10

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
75-01-4	Vinyl Chloride	5.0	U
75-35-4	1,1-Dichloroethene	5.0	U
78-93-3	2-butanone	13	U
67-66-3	Chloroform	0.95	J
56-23-5	Carbon Tetrachloride	5.0	U
71-43-2	Benzene	5.0	U
107-06-2	1,2-Dichloroethane	5.0	U
79-01-6	Trichloroethene	5.0	U
127-18-4	Tetrachloroethene	5.0	U
108-90-7	Chlorobenzene	5.0	U

FORM I VOA

CompuChem
A Division Of
Liberty Analytical Corp.

BAKER ENVIRONMENTAL, INC.	Project: NAPR SWMU67/DO#119197.6.8 ON ISLAND	
AIRSIDE BUSINESS PARK 100 AIRSIDE DRIVE	Project Number: NAPR SWMU67/DO#119197.6.8 ON ISLAND	Reported:
MOON TOWNSHIP PA, 15108	Project Manager: MARK KIMES	04/22/2010 16:51

67IDW02
1003250-02 (Water)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
COMPUCHEM								
WET CHEMISTRY PARAMETERS								
Corrosivity-pH	**7.38**		pH Units	1	0040532	04/05/2010 15:36	04/06/2010 16:44	EPA 9040B
Ignitability by Flashpoint	>140		degree F	1	0040533	04/05/2010 15:36	04/06/2010 16:45	EPA 1010
Reactive Cyanide	ND	250	mg/L	1	0040534	04/05/2010 15:40	04/06/2010 16:46	EPA 9014
Reactive Sulfide	ND	250	mg/L	1	0040531	04/05/2010 15:35	04/06/2010 16:48	EPA 9034

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Preeti Khare For Cathy Dover, Project Manager

APPENDIX D
PHASE I RFI DATA VALIDATION SUMMARIES

DataQual

Environmental Services, LLC

Michael Baker, Jr., Inc.
Airside Business Park
100 Airside Drive
Moon Township, PA 15108

July 11, 2010

SDG# 1003194, CompuChem
NAPR SWMU 67; Ceiba, Puerto Rico

Dear Mr. Kimes,

The following Data Validation report is provided as requested for the parameters noted in the table below for SDG # 1003194. The data validation was performed in accordance with the SW-846 methods utilized by the laboratory, the Region II Standard Operating Procedures for the Validation of Organic Data Acquired Using SW-846 Methods (8260B-Rev 2, January 2006- SOP #HW-24, 8270D-Rev 3, October 2006-SOP #HW-22) and professional judgment. Region II has not developed a validation checklist SOP for the methods used to assess the organic methods for hydrocarbons and inorganic methods in this SDG (SW-846 methods 8015_DRO, 8015_GRO, 6020, 6010B and 7471A). Therefore, alternative worksheets were provided. Region II flagging conventions were used. All areas of concern are discussed in the body of the report and a summary of data qualification is provided.

Sample ID	Lab ID	Matrix	VOA App IX	SVOA App IX w/ LL PAH	GRO	DRO	Metals	Tin
67SB01-00	1003194-17	soil	X	X	X	X	X	X
67SB01-01	1003194-18	soil	X	X	X	X	X	X
67SB01-01D	1003194-19	soil	X	X	X	X	X	X
67SB01-03	1003194-20	soil	X	X	X	X	X	X
67SB05-00	1003194-14	soil	X	X	X	X	X	X
67SB05-01	1003194-15	soil	X	X	X	X	X	X
67SB05-05	1003194-16	soil	X	X	X	X	X	X
67SB07-00	1003194-11	soil	X	X	X	X	X	X
67SB07-01	1003194-12	soil	X	X	X	X	X	X
67SB07-05	1003194-13	soil	X	X	X	X	X	X
67SB08-00	1003194-07	soil	X	X	X	X	X	X
67SB08-00D	1003194-08	soil	X	X	X	X	X	X
67SB08-01	1003194-09	soil	X	X	X	X	X	X
67SB08-05	1003194-10	soil	X	X	X	X	X	X
67SD01	1003194-01	soil	X	X	X	X	X	X
67SD01D	1003194-04	soil	X	X	X	X	X	X
67SD02	1003194-02	soil	X	X	X	X	X	X
67SD03	1003194-03	soil	X	X	X	X	X	X
67SD04	1003194-05	soil	X	X	X	X	X	X
67SD05	1003194-06	soil	X	X	X	X	X	X
67SD01 MS	1003194-01MS	soil	X	X	X	X	X	X
67SD01 MSD	1003194-01MSD	soil	X	X	X	X	X	X

5830 Amberway Drive • St. Louis, MO 63128 • 314-330-1327 • Fax 314-849-6264

The following quality control samples were provided with this SDG: sample 67SB01-01D -field duplicate of sample 67SB01-01; sample 67SB08-00D-field duplicate of sample 67SB08-00; and sample 67SD01D-field duplicate of sample 67SD01.

The samples were evaluated based on the following criteria:

• Data Completeness	*
• Sample Condition	
• Technical Holding Times	*
• GC/MS Tuning	*
• GC Performance	*
• Initial/Continuing Calibrations	
• ICSA/ICSAB Standards	*
• CRDL Standards	*
• Blanks	
• Internal Standards	
• Surrogate Recoveries	
• Laboratory Control Samples	
• Matrix Spike Recoveries	
• Matrix Duplicate RPDs	*
• Serial Dilutions	
• Field Duplicates	
• Identification/Quantitation	*
• Reporting Limits	*
• Tentatively Identified Compounds	NA

* - indicates that qualifications were not required based on this criteria

Overall Evaluation of Data/Potential Usability Issues

A summary of qualifications applied to the sample results are noted below for the fractions validated. Specific details regarding qualification of the data are addressed in the Specific Evaluation section of this narrative. If an issue is not addressed there were no actions required based on unmet quality criteria. When more than one qualifier is associated with a compound/analyte the validator has chosen the qualifier that best indicates possible bias in the results and flagged the data accordingly. However, information regarding all quality control issues is provided in the body of the report and on the qualification summary page.

VOA

One sample contained 50-90% water that resulted in qualifying the data results as estimated.

The initial and continuing calibrations exhibited some compounds with low RRF values, which resulted in qualifying non-detected values as rejected for these compounds. Due to high %RSDs values, in the initial calibration, some compounds were qualified as estimated.

Blank contamination was noted in the method and/or QC blanks associated with samples in this batch. Qualifications were added to the data.

Several samples exhibited non-compliant surrogate recoveries that resulted in qualifications to the data. The samples were re-analyzed with similar results.

Due to non-comparable results in one of the field duplicate pairs, qualifications were added to the data.

SVOA

One sample contained 50-90% water that resulted in qualifying the data results as estimated.

Due to high %RSDs and %D values, in the initial and continuing calibrations, some compounds were qualified as estimated.

Blank contamination was noted in the method and/or QC blanks associated with samples in this batch. Qualifications were added to the data.

Two samples exhibited non-compliant internal standard area recoveries that resulted in qualifications to the data. The samples were re-analyzed with less non-compliant recoveries; therefore the re-analysis was used instead of the initial analysis.

Due to below 10% recoveries for LCS samples, the associated sample non-detect results were qualified as rejected for one or more compounds.

The matrix spike and matrix spike duplicate exhibited below 10% recoveries that resulted in qualifying three compound results as rejected in the associated sample. Three compounds were also qualified as estimated due to high or low recoveries.

One of the field duplicate pairs did not exhibit comparable results that resulted in qualifications to the data.

GRO

One sample contained 50-90% water that resulted in qualifying the data results as estimated.

Blank contamination was noted in the method blank associated with samples in this batch. Qualifications were added to the data.

DRO

One sample contained 50-90% water that resulted in the qualification of the data results as estimated.

Blank contamination was noted in the method and instrument blanks associated with samples in this batch. Qualifications were added to the data.

The associated MS/MSD pair of sample 67SD01 exhibited low recoveries for DRO in the MS and MSD. All sediment samples were flagged as estimated J/UJ.

Metals by 6020 & 7471

One sample contained 50-90% water that resulted in the qualification of the data results as estimated.

Blank contamination was noted and qualification was required in the samples in this SDG.

The matrix spikes pair submitted in this SDG exhibited non-compliant recoveries in both the MS and the MSD for one analyte for which qualifications were required.

The serial dilution submitted in this SDG exhibited non-compliant %Ds for four analytes. All results for these analytes were qualified as estimated J/UJ in the metals samples.

The field duplicate pair of sample 67SB01-01/67SB01-01D exhibited one analyte with a non-compliant RPD greater than 120%. This analyte was rejected based on Region II guidance in the field duplicate pair only.

The field duplicate pair of sample 67SB08-00/67SB08-00D exhibited several analytes with non-compliant RPDs or absolute value results. These analytes were flagged based on Region II guidance in the field duplicate pair only.

All results reported at concentrations between the method detection limit and the reporting limits (B flagged by the laboratory) were qualified as estimated J.

Tin by 6010B

One sample contained 50-90% water that resulted in the qualification of the data results as estimated.

Blank contamination was noted and qualification was required in the samples in this SDG.

Specific Evaluation of Data

Data Completeness

The SDG was received complete and intact. Resubmissions were required for the SVOA fraction as the reporting limit listed on the Form I for several samples was not reported correctly. The laboratory was contacted and the corrected forms were supplied and used for this report. The laboratory was contacted for clarification of the ICP-MS calculation.

Sample Condition

All Fractions

Sediment sample 67SD05 contained >50% moisture (53%). This required the qualification of all reported results as estimated (J/UJ).

Technical Holding Times

According to chain of custody records, sampling was performed on 3/22-24/10 and samples were received at the laboratory 3/24-26/10. All sample preparation and analysis was performed within Region II and/or method holding time requirements.

Initial/Continuing Calibration

VOA

Calibration standards exhibited %RSDs and RRF values that were non-compliant. A summary of these non-compliances and affected samples are noted in the following table. Sample results are qualified as indicated.

Standard ID	Compound(s)	RRF, %RSD, %D	Samples	Q Flag
IC 3/30/10	acrolein	0.028	all samples	J/R
	acrylonitrile	0.046		
	propionitrile	0.018		
	isobutyl alcohol	0.006		
	1,4-dioxane	0.002		
	methylmethacrylate	0.049		
	1,2-dichloropropane	16.913		J/UJ

SVOA

Calibration standards exhibited %RSDs and %D values that were non-compliant. A summary of these non-compliances and affected samples are noted in the following table. Sample results are qualified as indicated.

Standard ID	Compound(s)	RRF, %RSD, %D	Samples	Q Flag
IC full scan 3/17/10	2-picoline	22.651	67SD01, 67SD02, 67SD03, 67SD04, 67SD05, 67SD01D	J/UJ
	nitrosomethylethylamine	22.006		
	n-nitrosodiethylamine	21.768		
	n-nitrosopyrrolidine	24.941		
	n-nitrosomorpholine	22.939		
	o-toluidine	22.524		
	n-nitrosopiperidine	24.199		
	p-phenylenediamine	28.824		
	1-naphthylamine	27.268		
	2-naphthylamine	30.303		
	5-nitro-o-toluidine	27.604		
	n-nitrosodiphenylamine	16.397		
	diallate (trans isomer)	23.234		
	4-aminobiphenyl	24.870		
	4-nitroquinoline-1-oxide	19.692		
	methapyrilene	29.063		
	p-dimethylaminoazobenzene	25.398		
	3,3'-dimethylbenzidine	29.792		
	2-acetylaminofluorene	24.074		
	indeno(1,2,3-cd)pyrene	19.789		
	diallate (total)	19.303		
CC full scan 4/13/10	benzyl alcohol	24.38	67SD01	J/UJ
	nitrobenzene	80.51		
	bis(2-chloroethoxy)methane	25.07		
	hexachloropropene	24.50		
	n-nitroso-di-n-butylamine	-29.67		
	1,4-napthaquinone	21.84		
	4-nitrophenol	-36.27		
	pentachloronitrobenzene	26.66		
	dinoseb	20.76		
CC full scan 4/14/10	nitrobenzene	72.11	67SD02, 67SD03, 67SD04, 67SD05, 67SD01D	J/UJ
	hexachloropropene	20.34		
	n-nitroso-di-n-butylamine	-46.64		
	7,12-dimethylbenz(a)anthracene	-21.45		
	dibenzo(a,h)anthracene	25.02		
	benzo(g,h,i)perylene	32.78		
IC full scan 4/16/10	2,6-dichlorophenol	19.314	67SB08-00, 67SB08-00D, 67SB08-01, 67SB08-05, 67SB07-00, 67SB07-01, 67SB07-05, 67SB05-00, 67SB05-01, 67SB05-05, 67SB01-00, 67SB01-01, 67SB01-01D, 67SB01-03	J/UJ
	hexachloropropene	21.849		
	1,4-napthoquinone	20.128		
	diallate (trans isomer)	19.278		
	4-nitroquinoline-1-oxide	23.521		
	7,12-dimethylbenz(a)anthracene	16.318		
	benzo(k)fluoranthene	29.966		

Standard ID	Compound(s)	RRF, %RSD, %D	Samples	Q Flag
CC-full scan 4/23/10	pyridine methyl methanesulfonate aniline 2-chlorophenol benzyl alcohol n-nitroso-di-n-propylamine methapyrilene benzo(b)fluoranthene diallate total	-20.35 -38.56 -26.77 -36.75 24.63 -40.14 -34.18 24.72 -22.56	67SB08-00, 67SB08-00D, 67SB08-01, 67SB08-05, 67SB07-00, 67SB07-01, 67SB07-05, 67SB05-00, 67SB05-01	J/UJ
CC-full scan 4/23/10	3-methylphenol p-phenylenediamine methapyrilene benzo(g,h,i)perylene	-21.09 -39.97 -33.99 -25.02	67SB05-05, 67SB01-00, 67SB01-01, 67SB01-01D, 67SB01-03	J/UJ
CC-SIM 4/28/10	fluorene benzo(b)fluoranthene	-21.84 -40.40	PAH SIM: 67SB05-00, 67SB05-01, 67SB05-05, 67SB01-00RE, 67SB01-01, 67SB01-01DRE, 67SB01-03	J/UJ
CC-SIM 4/28/10	2-methylnaphthalene benzo(b)fluoranthene indeno(1,2,3-cd)pyrene	-20.18 -35.93 25.96	PAH SIM: 67SB08-00, 67SB08-00D, 67SB08-01, 67SB08-05, 67SB07-00, 67SB07-01, 67SB07-05	J/UJ

Blanks

VOA

The associated method and/or QC blanks exhibited contamination as noted in the following table. Compounds for which there was no action required, are not included in the following table, see worksheets for full list of compounds.

Blank ID	Compound	Concentration	Reporting Limit
VBLKIJ	methylene chloride	1J ug/Kg	5 ug/Kg
	toluene	0.7J	5
67ER01	acetone	3.5 ug/L	2.5 ug/L
	methylene chloride	1.5	0.5
67ER02	acetone	3.2	2.5
	methylene chloride	1.3	0.5
67ER03	acetone	2.7	2.5
	methylene chloride	1.1	0.5
	2-butanone	2J	2.5
67FB01	acetone	3.7	2.5
	methylene chloride	1.6	0.5
67FB01	acetone	5.1	2.5

Associated samples and required qualifications are noted in the following table.

Sample ID	Compound	Q Flag
67SB05-05, 67SB08-05	acetone	U at RL
67SB07-05	acetone	U
67SB07-00, 67SD01, 67SB07-05, 67SB01-01D	methylene chloride	U at RL
67SB01-01, 67SB01-01D, 67SB05-00, 67SB05-01	2-butanone	U at RL
67SB07-01, 67SB07-05, 67SB01-01D	toluene	U at RL

SVOA

The associated method and/or QC blanks exhibited contamination as noted in the following table. Compounds for which there was no action required, are not included in the following table, see worksheets for full list of compounds.

Blank ID	Compound	Concentration	Reporting Limit
SBLKPN	bis(2-ethylhexyl)phthalate	58J ug/Kg	170 ug/Kg
SBLKPN-SIM	naphthalene	1.0J ug/Kg	8.3 ug/Kg
	2-methylnaphthalene	1.0J	8.3
	acenaphthylene	0.86J	8.3
	acenaphthene	0.85J	8.3
	fluorene	0.94J	8.3
	phenanthrene	2.2J	8.3
	anthracene	1.2J	8.3
	fluoranthene	1.7J	8.3
	pyrene	1.6J	8.3
	benzo(a)anthracene	1.3J	8.3
	chrysene	0.97J	8.3
	benzo(b)fluoranthene	0.59J	8.3
	benzo(k)fluoranthene	1.1J	8.3
	benzo(a)pyrene	0.91J	8.3
	indeno(1,2,3-cd)pyrene	1J	8.3
	benzo(g,h,i)perylene	0.78J	8.3
67ER01	naphthalene	0.097J ug/L	0.21 ug/L
67ER02	naphthalene	0.093J	0.21
67ER03	naphthalene	0.079J	0.22
67FB01	naphthalene	0.098J	0.21
	2-methylnaphthalene	0.021J	0.21

Associated samples and required qualifications are noted in the following table.

Sample ID	Compound	Q Flag
67SB07-01, 67SD02, 67SD03, 67SD05	bis(2-ethylhexyl)phthalate	U at RL
67SD01, 67SD01D	bis(2-ethylhexyl)phthalate	U
PAH SIM: 67SD01D, 67SD03	naphthalene	U at RL
PAH SIM: 67SD01D, 67SD03, 67SD04, 67SD05	2-methylnaphthalene	U at RL
PAH SIM: 67SD01, 67SD01D, 67SD02, 67SD03, 67SD04, 67SD05	acenaphthylene	U at RL
PAH SIM: 67SD01D, 67SD05	fluorene	U at RL
PAH SIM: 67SB08-01, 67SD01, 67SD01D, 67SD02, 67SD05	phenanthrene	U at RL

Sample ID	Compound	Q Flag
PAH SIM: 67SD01, 67SD01D, 67SD02, 67SD03, 67SD04, 67SD05	anthracene	U at RL
PAH SIM: 67SB08-01, 67SD01, 67SD02, 67SD03, 67SD04	fluoranthene	U at RL
PAH SIM: 67SB07-00, 67SB07-01, 67SB08-01, 67SD01, 67SD02, 67SD03, 67SD04	pyrene	U at RL
PAH SIM: 67SB08-01, 67SD01, 67SD02, 67SD03, 67SD04	benzo(a)anthracene	U at RL
PAH SIM: 67SB08-01, 67SD01, 67SD02, 67SD03, 67SD04	chrysene	U at RL
PAH SIM: 67SB08-01, 67SD02, 67SD03	benzo(b)fluoranthene	U at RL
PAH SIM: 67SB08-01, 67SD02, 67SD03	benzo(k)fluoranthene	U at RL
PAH SIM: 67SB07-00, 67SB08-01, 67SD02, 67SD03	benzo(a)pyrene	U at RL
PAH SIM: 67SB07-00, 67SB08-01, 67SD01	indeno(1,2,3-cd)pyrene	U at RL
PAH SIM: 67SB08-00D, 67SB08-01	benzo(g,h,i)perylene	U at RL

GRO

The associated method and/or QC blanks exhibited contamination as noted in the following table. Compounds for which there was no action required, are not included in the following table.

Blank ID	Compound	Concentration	RL	Action Level
VBLKCX	GRO	0.041J mg/Kg	0.5 mg/Kg	RL
VBLKDA	GRO	0.04J	0.5	RL

Associated samples and required qualifications are noted in the following table.

Sample ID	Compound	Q Flag
all samples except 67SB08-01	GRO	U at RL

DRO

The associated method and/or QC blanks exhibited contamination as noted in the following table. Compounds for which there was no action required, are not included in the following table.

Blank ID	Compound	Concentration	Action Level	Q Flag
PBLKPY	DRO	3.5J mg/Kg	RL	U at RL
PIBLKXF	DRO	0.022J mg/L	RL	U at RL
PIBLKXG	DRO	0.19J mg/L	RL	U at RL
PIBLKXQ	DRO	0.14J mg/L	RL	U at RL
PIBLKXR	DRO	0.30J mg/L	RL	U at RL

Associated samples and required qualifications are noted in the following table.

Sample ID	Compound	Q Flag
67SB01-00, 67SB01-01, 67SD01-01D, 67SB-01-03, 67SB05-05, 67SB07-00	DRO	U at RL

Metals by 6020 & 7471

Associated blanks exhibited contamination as noted in the following table. Please see the Glossary of Qualification Flags and Abbreviations for details.

Blank ID	Analyte	Concentration	Action Level	Q Flag
PBS	lead	0.016B mg/Kg	RL	U at RL
ICB 4/17	antimony	0.252B ug/L	RL	U at RL
	silver	0.052B ug/L	RL	U at RL
CCB, 4/17 17:09	arsenic	0.090B ug/L	RL	U at RL

Associated samples and required qualifications are noted in the following table.

Sample ID	Analyte	Q Flag
all samples >MDL up to RL except 67SD01	antimony	U at RL
	silver	U at RL
67SB08-05	lead	U at RL
67SB07-05, 67SB01-03	arsenic	U at RL

Tin by 6010B

Associated blanks exhibited contamination as noted in the following table. Please see the Glossary of Qualification Flags and Abbreviations for details.

Blank ID	Analyte	Concentration	Action Level	Q Flag
PBS	tin	0.559B mg/Kg	RL	U at RL

Associated samples and required qualifications are noted in the following table.

Sample ID	Analyte	Q Flag
all samples >MDL up to RL	tin	U at RL

Internal Standard Area Recoveries

SVOA

Sample 67SB01-00 exhibited non-compliant area recoveries for 5 of 6 internal standards; therefore the sample was re-analyzed. The re-analysis exhibited less non-compliance with low recovery for standard perylene-d12; therefore re-analyzed sample was used and all compound results associated with this standard were qualified as estimated (J/UJ).

Sample 67SB01-01D exhibited non-compliant area recoveries for 4 of 6 internal standards; therefore the sample was re-analyzed. The re-analysis exhibited less non-compliance with low recovery for standard perylene-d12; therefore re-analyzed sample was used and all compound results associated with this standard were qualified as estimated (J/UJ).

Surrogate Recoveries

VOA

The following samples exhibited non-compliant surrogate recoveries and were qualified as stated in the table below. All samples with low recoveries were re-analyzed with non-compliant recoveries were exhibited; therefore the initial analysis for all samples was used.

Sample ID	Non-Compliant Surrogate	% Rec	QC limit	Qualifier
67SD02	bromofluorobenzene	124	85-120	J
67SD03	toluene-d8	83	85-115	J/UJ
67SB08-01	bromofluorobenzene	84	85-120	J/UJ
67SB08-05	1,2-dichloroethane-d4	140	70-139	J
67SB07-00	toluene-d8 bromofluorobenzene	83 76	85-115 85-120	J/UJ

Laboratory Control Sample

SVOA

All submitted LCS exhibited zero percent recovery for p-phenylenediamine; therefore all non-detected results for this compound were qualified as rejected (R) in all samples.

Matrix Spike

SVOA

The submitted matrix spike and matrix spike duplicate exhibited non-compliant recoveries requiring qualification or rejection in the associated sample. A summary of these non-compliances and affected samples are noted in the following table.

MS/MSD Associated Sample ID	Compounds	MS %Rec	MSD % Rec	QC Limit	Q Flag
67SD01	p-phenylenediamine 1-naphthylamine 3,3'-dimethylbenzidine	0 6 5	0 4 3	20-150 20-150 20-150	J/R
	2-naphthylamine	16	15	20-150	J/UJ
67SD01 (SIM)	anthracene indeno(1,2,3-cd)pyrene	112 189	108 150	55-105 50-110	J

DRO

The matrix spike pair analysis submitted in this SDG exhibited non-compliant %Rs for DRO, requiring qualification in the sediment field samples. A summary of these non-compliances and affected samples are noted in the following table.

MS/MSD	Compound	Samples	%R	Q Flag
67SD01	DRO	all sediment samples	42/36	J/UJ

Metals by 6020 & 7471

The matrix spike analysis submitted in this SDG exhibited non-compliant %Rs for three analytes. A summary of these non-compliances and affected samples and actions are noted in the following table.

MS/MSD	Analytes	Samples	%R	Q Flag
67SD01	antimony	all samples	9/12	J/UJ

Serial Dilutions

Metals by 6020 & 7471

The serial dilution analysis submitted in this SDG exhibited non-compliant %Ds for three analytes, requiring qualification in the field samples. A summary of these non-compliances and affected samples are noted in the following table.

SD	Analytes	Samples	%D	Q Flag
67SD01	cobalt copper lead vanadium	all samples	16 13 20 14	J/UJ

Field Duplicates

VOA

Sample 67SD01 and field duplicate 67SD01D exhibited non-compliant results for carbon disulfide at 150% RPD; therefore results were qualified as estimated (J/UJ).

SVOA

Sample 67SD01 (SIM) and field duplicate 67SD01D (SIM) exhibited non-compliant results for fluoranthene, pyrene, benzo (a) anthracene, and chrysene at 200% RPD; therefore results were qualified as estimated (J/UJ).

Metals by 6020 & 7471

The field duplicate pairs exhibited non-compliant field duplicate reproducibility for the following analytes. These field duplicate pairs and analytes were flagged as noted in the table below based on Region II guidelines.

Sample ID	Analyte	RPD or Absolute Difference	Q Flag
67SB01-01/67SB01-01D	lead	180	R
67SB08-00/67SB08-00D	barium nickel lead	67 57 70	J

Identification/Quantitation

VOA

Samples 67SD02RE, 67SD03RE, 67SD08-01RE, 67SB08-05RE and 67SB07-00RE were not used, in favor of the initial analysis, due to non-compliant surrogate recoveries.

SVOA

Samples 67SB01-00 and 67SB01-01D were not used, in favor of the re-analysis, due to non-compliant internal standard area recoveries.

Metals by 6020 & 7471

All results reported at concentrations between the method detection limit and the reporting limit (B flagged by the laboratory) were qualified as estimated J.

A summary of qualifications required is provided on the following page. Please do not hesitate to contact DataQual ES with any questions regarding this validation report.

Sincerely,

Laura Maschhoff
President

Jacqueline Cleveland
Vice-President

Summary of Data Qualifications

VOA

Sample ID	Compound	Results	Q flag
67SD05	all results	+/-	J/UJ
all samples	acrolein acrylonitrile propionitrile isobutyl alcohol 1,4-dioxane methylmethacrylate	+/-	J/R
all samples	1,2-dichloropropane	+/-	J/UJ
67SB05-05, 67SB08-05	acetone	+	U at RL
67SB07-05	acetone	+	U
67SB07-00, 67SD01, 67SB07-05, 67SB01-01D	methylene chloride	+	U at RL
67SB01-01, 67SB01-01D, 67SB05-00, 67SB05-01	2-butanone	+	U at RL
67SB07-01, 67SB07-05, 67SB01-01D	toluene	+	U at RL
67SD02, 67SB08-05	all results	+	J
67SD03, 67SB08-01, 67SB07-00	all results	+/-	J/UJ
67SD01, 67SD01D	carbon disulfide	+/-	J/UJ
67SD02RE, 67SD03RE, 67SD08-01RE, 67SB08-05RE and 67SB07-00RE	all results	+/-	R

SVOA

Sample ID	Compound	Results	Q flag
67SD05	all results	+/-	J/UJ
67SD01, 67SD02, 67SD03, 67SD04, 67SD05, 67SD01D	2-picoline nitrosomethylethylamine n-nitrosodiethylamine n-nitrosopyrrolidine n-nitrosomorpholine o-toluidine n-nitrosopiperidine p-phenylenediamine 1-naphthylamine 2-naphthylamine 5-nitro-o-toluidine n-nitrosodiphenylamine diallate (trans isomer) 4-aminobiphenyl 4-nitroquinoline-1-oxide methapyrilene p-dimethylaminoazobenzene 3,3'-dimethylbenzidine 2-acetylaminofluorene indeno(1,2,3-cd)pyrene diallate (total)	+/-	J/UJ

Summary of Data Qualifications

SVOA

Sample ID	Compound	Results	Q flag
67SD01	benzyl alcohol nitrobenzene bis(2-chloroethoxy)methane hexachloropropene n-nitroso-di-n-butylamine 1,4-napthaquinone 4-nitrophenol pentachloronitrobenzene dinoseb	+/-	J/UJ
67SD02, 67SD03, 67SD04, 67SD05, 67SD01D	nitrobenzene hexachloropropene n-nitroso-di-n-butylamine 7,12-dimethylbenz(a)anthracene dibenzo(a,h)anthracene benzo(g,h,i)perylene	+/-	J/UJ
67SB08-00, 67SB08-00D, 67SB08-01, 67SB08-05, 67SB07-00, 67SB07-01, 67SB07-05, 67SB05-00, 67SB05-01, 67SB05-05, 67SB01-00, 67SB01-01, 67SB01-01D, 67SB01-03	2,6-dichlorophenol hexachloropropene 1,4-napthoquinone diallate (trans isomer) 4-nitroquinoline-1-oxide 7,12-dimethylbenz(a)anthracene benzo(k)fluoranthene	+/-	J/UJ
67SB08-00, 67SB08-00D, 67SB08-01, 67SB08-05, 67SB07-00, 67SB07-01, 67SB07-05, 67SB05-00, 67SB05-01	pyridine methyl methanesulfonate aniline 2-chlorophenol benzyl alcohol n-nitroso-di-n-propylamine methapyrilene benzo(b)fluoranthene diallate total	+/-	J/UJ
67SB05-05, 67SB01-00, 67SB01-01, 67SB01-01D, 67SB01-03	3-methylphenol p-phenylenediamine methapyrilene benzo(g,h,i)perylene	+/-	J/UJ
PAH SIM: 67SB05-00, 67SB05-01, 67SB05-05, 67SB01-00RE, 67SB01-01, 67SB01-01DRE, 67SB01-03	fluorene benzo(b)fluoranthene	+/-	J/UJ
PAH SIM: 67SB08-00, 67SB08-00D, 67SB08-01, 67SB08-05, 67SB07-00, 67SB07-01, 67SB07-05	2-methylnaphthalene benzo(b)fluoranthene indeno(1,2,3-cd)pyrene	+/-	J/UJ
67SB07-01, 67SD02, 67SD03, 67SD05	bis(2-ethylhexyl)phthalate	+	U at RL
67SD01, 67SD01D	bis(2-ethylhexyl)phthalate	+	U
PAH SIM: 67SD01D, 67SD03	naphthalene	+	U at RL
PAH SIM: 67SD01D, 67SD03, 67SD04, 67SD05	2-methylnaphthalene	+	U at RL
PAH SIM: 67SD01, 67SD01D, 67SD02, 67SD03, 67SD04, 67SD05	acenaphthylene	+	U at RL
PAH SIM: 67SD01D, 67SD05	fluorene	+	U at RL
PAH SIM: 67SB08-01, 67SD01, 67SD01D, 67SD02, 67SD05	phenanthrene	+	U at RL

Summary of Data Qualifications

SVOA

Sample ID	Compound	Results	Q flag
PAH SIM: 67SD01, 67SD01D, 67SD02, 67SD03, 67SD04, 67SD05	anthracene	+	U at RL
PAH SIM: 67SB08-01, 67SD01, 67SD02, 67SD03, 67SD04	fluoranthene	+	U at RL
PAH SIM: 67SB07-00, 67SB07-01, 67SB08-01, 67SD01, 67SD02, 67SD03, 67SD04	pyrene	+	U at RL
PAH SIM: 67SB08-01, 67SD01, 67SD02, 67SD03, 67SD04	benzo(a)anthracene	+	U at RL
PAH SIM: 67SB08-01, 67SD01, 67SD02, 67SD03, 67SD04	chrysene	+	U at RL
PAH SIM: 67SB08-01, 67SD02, 67SD03	benzo(b)fluoranthene	+	U at RL
PAH SIM: 67SB08-01, 67SD02, 67SD03	benzo(k)fluoranthene	+	U at RL
PAH SIM: 67SB07-00, 67SB08-01, 67SD02, 67SD03	benzo(a)pyrene	+	U at RL
PAH SIM: 67SB07-00, 67SB08-01, 67SD01	indeno(1,2,3-cd)pyrene	+	U at RL
PAH SIM: 67SB08-00D, 67SB08-01	benzo(g,h,i)perylene	+	U at RL
PAH SIM: 67SB01-00RE, 67SB01-01DRE	all compounds associated with: perylene-d12	+/-	J/UJ
all samples	p-phenylenediamine	+/-	J/R
67SD01	p-phenylenediamine 1-naphthylamine 3,3'-dimethylbenzidine	+/-	J/R
67SD01	2-naphthylamine	+/-	J/UJ
67SD01 (SIM)	anthracene indeno(1,2,3-cd)pyrene	+	J
PAH SIM: 67SD01, 67SD01D	fluoranthene, pyrene, benzo(a)anthracene, chrysene	+/-	J/UJ
PAH SIM: 67SB01-00, 67SB01-01D	all results	+/-	R

GRO

Sample ID	Compound	Results	Q flag
67SD05	all results	+/-	J/UJ
all samples except 67SB08-01	GRO	+	U at RL

DRO

Sample ID	Compound	Results	Q flag
67SD05	DRO	+/-	J/UJ
67SB01-00, 67SB01-01, 67SD01-01D, 67SB-01-03, 67SB05-05, 67SB07-00	DRO	+J	U at RL
all sediment samples	DRO	+/-	J/UJ

Summary of Data Qualifications

Metals by 6020 & 7471

Sample ID	Analyte	Results	Q flag
67SD05	all results	+/-	J/UJ
all samples >MDL up to RL except 67SD01	antimony	+J	U at RL
	silver	+J	U at RL
67SB08-05	lead	+J	U at RL
67SB07-05, 67SB01-03	arsenic	+J	U at RL
all samples	antimony	+/-	J/UJ
all samples	cobalt copper led vanadium	+/-	J/UJ
67SB01-01/67SB01-01D	lead	+	R
67SB08-00/67SB08-00D	barium nickel lead	+	J
all samples	all analytes	+B	J

Tin by 6020

Sample ID	Analyte	Results	Q flag
67SD05	all results	+/-	J/UJ
all samples >MDL up to RL	tin	+J	U at RL

Glossary of Qualification Flags and Abbreviations

Qualification Flags (Q-Flags)

U	not detected above the reported sample quantitation limit
J	estimated value
UJ	reported quantitation limit is qualified as estimated
N	analyte has been tentatively identified
JN	analyte has been tentatively identified, estimated value
R	result is rejected; the presence or absence of the analyte cannot be verified

Method/Preparation/Field QC Blank Qualification Flags (Q-Flags)

Organic Methods

NA	The sample result for the blank contaminant is greater than the RL (2X sample RL for common laboratory contaminants) when the blank value is less than the RL. The sample result for the blank contaminant is not qualified with any blank qualifiers.
U*	The sample result for the blank contaminant is less than the RL (2X sample RL for common laboratory contaminants) but greater than the MDL when the blank value is less than the RL. The sample result for the blank contaminant is qualified as non-detect U at the reported concentration.
RL**	The sample result for the blank contaminant is less than the RL (2X sample RL for common laboratory contaminants) but greater than the MDL when the blank value is less than the RL. The sample result for the blank contaminant is changed to the RL and qualified as non-detect U.

* This guideline is used when the laboratory is reporting non-detects to the MDL. ** This guideline is used when the laboratory is reporting non-detects to the RL.

Inorganic Methods

ICB/CCB/PB Action:

No Action -	The sample result is greater than the RL and greater than ten times (10X) the blank value.
U -	The sample result is greater than or equal to the MDL but less than or equal to the RL, result is reported as non-detect at the reported concentration, when the ICB/CCB/PB result is less or greater than the RL.

Glossary of Qualification Flags and Abbreviations, continued

R -	Sample result is greater than the RL and less than the ICB/CCB/PB value when the ICB/CCB/PB value is greater than the RL.
J -	Sample result is greater than the ICB/CCB/PB value but less than 10X the ICB/CCB/PB value when ICB/CCB/PB value is greater than the RL.
J/UJ -	Sample result is less than 10X RL when blank result is below the negative RL.

Field QC Blank action:

Note – Use field blanks to qualify data only if field blank results are greater than prep blank results.

Do not use rinsate blank associated with soils to qualify water samples and vice versa.

No Action -	The sample result is greater than the RL and greater than ten times (10X) the blank value.
U -	The sample result is greater than or equal to the MDL but less than or equal to the RL, result is reported as non-detect at the reported concentration, when the FB result is less or greater than the RL.
R -	Sample result is greater than the RL and less than the FB value when the FB value is greater than the RL.
J -	Sample result is greater than the FB value but less than 10X the FB value when FB value is greater than the RL.

General Abbreviations

RL	reporting limit
IDL	instrument detection limit
MDL	method detection limit
CRDL	contract required detection limit
CRQL	contract required quantitation limit
+	positive result
-	non-detect result

DataQual

Environmental Services, LLC

Michael Baker, Jr., Inc.
Airside Business Park
100 Airside Drive
Moon Township, PA 15108

July 11, 2010

SDG# 1003197, CompuChem
NAPR SWMU 67; Ceiba, Puerto Rico

Dear Mr. Kimes,

The following Data Validation report is provided as requested for the parameters noted in the table below for SDG # 1003197. The data validation was performed in accordance with the SW-846 methods utilized by the laboratory, the Region II Standard Operating Procedures for the Validation of Organic Data Acquired Using SW-846 Methods (8260B-Rev 2, January 2006- SOP #HW-24, 8270D-Rev 3, October 2006-SOP #HW-22) and professional judgment. Region II has not developed a validation checklist SOP for the methods used to assess the organic methods for hydrocarbons and inorganic methods in this SDG (SW-846 methods 8015_DRO, 8015_GRO, 6020, 6010B and 7470A). Therefore, alternative worksheets were provided. Region II flagging conventions were used. All areas of concern are discussed in the body of the report and a summary of data qualification is provided.

Sample ID	Lab ID	Matrix	VOA App IX	SVOA App IX w/ LL PAH	GRO	DRO	Tin	Metals
67ER01	1003197-02	water	X	X	X	X	X	X
67ER02	1003197-03	water	X	X	X	X	X	X
67ER03	1003197-06	water	X	X	X	X	X	X
67ER04	1003197-07	water	X	X	X	X	X	X
67ER05	1003197-12	water	X	X	X	X	X	X
67ER06	1003197-18	water	X	X	X	X	X	X
67ER07	1003197-21	water	X	X	X	X	X	X
67ER08	1003197-23	water	X	X	X	X	X	X
67FB01	1003197-04	water	X	X	X	X	X	X
67FB02	1003197-08	water	X	X	X	X	X	X
67GW01	1003197-17	water	X	X	X	X	X	X
67GW02	1003197-19	water	X	X	X	X	X	X
67GW03	1003197-24	water	X	X	X	X	X	X
67GW04	1003197-20	water	X	X	X	X	X	X
67GW05	1003197-15	water	X	X	X	X	X	X
67GW06	1003197-16	water	X	X	X	X	X	X
67GW07	1003197-14	water	X	X	X	X	X	X
67GW08	1003197-10	water	X	X	X	X	X	X
67GW08D	1003197-11	water	X	X	X	X	X	X
67SW03	1003197-01	water	X	X	X	X	X	X
67TB01	1003197-05	water	X		X			
67TB02	1003197-09	water	X		X			
67TB03	1003197-13	water	X		X			
67TB04	1003197-22	water	X		X			

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Sample ID	Lab ID	Matrix	VOA App IX	SVOA App IX w/ LL PAH	GRO	DRO	Tin	Metals
67TB05	1003197-25	water	X		X			
67GW08 MS	1003197-10MS	water	X	X	X	X	X	X
67GW08 MSD	1003197-10MSD	water	X	X	X	X	X	X

The following quality control samples were provided with this SDG: sample 67GW08D - field duplicate of sample 67GW08; samples 67ER01, 67ER02, 67ER03, 67ER04, 67ER05, 67ER06, 67ER07 and 67ER08-equipment blanks; samples 67FB01 and 67FB02-field blanks; and samples 67TB01, 67TB02, 67TB03, 67TB04 and 67TB05-trip blanks.

The samples were evaluated based on the following criteria:

- Data Completeness *
- Sample Condition *
- Technical Holding Times *
- GC/MS Tuning *
- ICP-MS Tuning *
- GC Performance *
- Initial/Continuing Calibrations
- ICSA/ICSAB Standards *
- CRDL Standards *
- Blanks
- Internal Standards *
- Surrogate Recoveries *
- Laboratory Control Samples
- Matrix Spike Recoveries
- Matrix Duplicate RPDs *
- Serial Dilutions *
- Field Duplicates *
- Identification/Quantitation *
- Reporting Limits
- Tentatively Identified Compounds NA

* - indicates that qualifications were not required based on this criteria

Overall Evaluation of Data/Potential Usability Issues

A summary of qualifications applied to the sample results are noted below for the fractions validated. Specific details regarding qualification of the data are addressed in the Specific Evaluation section of this narrative. If an issue is not addressed there were no actions required based on unmet quality criteria. When more than one qualifier is associated with a compound/analyte the validator has chosen the qualifier that best indicates possible bias in the results and flagged the data accordingly. However,

information regarding all quality control issues is provided in the body of the report and on the qualification summary page.

VOA

The initial and continuing calibrations exhibited some compounds with low RRF values, which resulted in qualifying non-detected values as rejected for these compounds. Due to high %Ds values, in the continuing calibration, some compounds were qualified as estimated.

Blank contamination was noted in the method and/or QC blanks associated with samples in this batch. Qualifications were added to the data.

Due to low recoveries for LCS samples, the associated sample non-detect results were qualified as estimated for one or more compounds.

The matrix spike and matrix spike duplicate exhibited below 10% recoveries that resulted in qualifying one compound result as rejected in the associated sample.

SVOA

Due to high %RSDs and %D values, in the initial and continuing calibrations, some compounds were qualified as estimated.

Blank contamination was noted in the method and/or QC blanks associated with samples in this batch. Qualifications were added to the data.

Due to below 10% recoveries for LCS samples, the associated sample non-detect results were qualified as rejected for one or more compounds. Some compounds were also qualified as estimated for low recoveries.

The matrix spike and matrix spike duplicate exhibited below 10% recoveries that resulted in qualifying several compound results as rejected in the associated sample. Several compounds were also qualified as estimated due to low recoveries.

GRO

Blank contamination was noted in the method blank associated with samples in this batch. Qualifications were added to the data.

DRO

No qualifications to the data were required.

Metals by 6020 & 7471

Blank contamination was noted and qualification was required in the samples in this SDG.

All results reported at concentrations between the method detection limit and the reporting limits (B flagged by the laboratory) were qualified as estimated J.

Tin by 6010B

No qualifications to the data were required.

Specific Evaluation of Data

Data Completeness

The SDG was received complete and intact. Resubmissions were required for the SVOA fraction as one of the recoveries was not reported on the Form III for one of the LCS samples. The laboratory was contacted and the corrected forms were supplied and used for this report.

Technical Holding Times

According to chain of custody records, sampling was performed on 3/22-30/10 and samples were received at the laboratory 3/24-31/10. All sample preparation and analysis was performed within Region II and/or method holding time requirements.

Initial/Continuing Calibration

VOA

Calibration standards exhibited %Ds and RRF values that were non-compliant. A summary of these non-compliances and affected samples are noted in the following table. Sample results are qualified as indicated.

Standard ID	Compound(s)	RRF, %RSD, %D	Samples	Q Flag
IC 3/30/10	acrolein acetone acrylonitrile 2-butanone propionitrile isobutyl alcohol 1,4-dioxane	0.008 0.030 0.037 0.043 0.012 0.003 0.001	67SW03, 67ER01, 67ER02, 67ER03, 67ER04, 67FB01, 67FB02, 67TB01, 67TB02, 67GW08, 67GW08D, 67ER05, 67ER06, 67ER07, 67TB03, 67TB04, 67TB05, 67GW07, 67GW05, 67GW06, 67GW01, 67GW02, 67GW04	J/R

Standard ID	Compound(s)	RRF, %RSD, %D	Samples	Q Flag
CC 4/01/10	dichlorodifluoromethane bromomethane chloroethane iodomethane 3-chloropropene acetonitrile dibromochloromethane 1,1,1,2-tetrachloroethane 1,1,2,2-tetrachloroethane 1,2-dibromo-3-chloropropane	-44.64 -30.76 -27.14 55.79 28.16 30.77 -24.59 -20.44 -22.29 -33.45	67SW03, 67ER01, 67ER02, 67ER03, 67ER04, 67FB01, 67FB02, 67TB01, 67TB02, 67GW08, 67GW08D	J/UJ
CC 4/01/10	dichlorodifluoromethane bromomethane iodomethane 3-chloropropene acetonitrile methacrylonitrile pentachloroethane dibromochloromethane 1,1,1,2-tetrachloroethane 1,1,2,2-tetrachloroethane 1,2-dibromo-3-chloropropane	-40.60 -24.66 60.21 44.97 42.25 24.48 -20.25 -22.24 -31.68 -22.45 -34.32	67ER05, 67ER06, 67ER07, 67TB03, 67TB04, 67TB05, 67GW07, 67GW05, 67GW06, 67GW01, 67GW02, 67GW04	J/UJ
IC 4/6/10	acrolein acetone acrylonitrile 2-butanone propionitrile isobutyl alcohol 1,4-dioxane	0.0223 0.0298 0.0364 0.0456 0.0126 0.003 0.001	67ER08, 67GW03	J/R

SVOA

Calibration standards exhibited %RSDs and %D values that were non-compliant. A summary of these non-compliances and affected samples are noted in the following table. Sample results are qualified as indicated.

Standard ID	Compound(s)	RRF, %RSD, %D	Samples	Q Flag
IC full scan 3/17/10	2-picoline nitrosomethylethylamine n-nitrosodiethylamine n-nitrosopyrrolidine n-nitrosomorpholine o-toluidine n-nitrosopiperidine p-phenylenediamine 1-naphthylamine 2-naphthylamine 5-nitro-o-toluidine n-nitrosodiphenylamine diallate (trans isomer) 4-aminobiphenyl 4-nitroquinoline-1-oxide methapyrilene p-dimethylaminoazobenzene 3,3'-dimethylbenzidine 2-acetylaminofluorene indeno(1,2,3-cd)pyrene diallate (total)	22.651 22.006 21.768 24.941 22.939 22.524 24.199 28.824 27.268 30.303 27.604 16.397 23.234 24.870 19.692 29.063 25.398 29.792 24.074 19.789 19.303	all samples	J/UJ
CC 4/05/10	hexachloropropene n-nitroso-di-n-butylamine dibenzo(a,h)anthracene benzo(g,h,i)perylene	23.29 -42.46 27.64 30.61	67SW03, 67ER01, 67ER02, 67FB01	J/UJ
CC 4/06/10	n-nitroso-di-n-butylamine 2-chloronaphthalene dibenzo(a,h)anthracene benzo(g,h,i)perylene	-39.22 -37.60 24.08 28.35	67ER03, 67ER04, 67FB02, 67GW08	J/UJ
CC 4/07/10	nitrobenzene pentachlorophenol 4,6-dinitro-2-methylphenol pentachloronitrobenzene dibenzo(a,h)anthracene benzo(g,h,i)perylene	27.87 21.36 20.82 22.38 32.11 41.97	67ER05, 67GW07, 67GW01, 67ER06, 67GW02, 67GW04, 67ER07, 67ER08, 67GW03, 67GW08D	J/UJ
CC 4/07/10	nitrobenzene hexachloropropene n-nitroso-di-n-butylamine dibenzo(a,h)anthracene benzo(g,h,i)perylene	31.32 25.11 -33.11 24.81 23.08	67GW05, 67GW06	J/UJ

Blanks

VOA

The associated method and/or QC blanks exhibited contamination as noted in the following table. Compounds for which there was no action required, are not included in the following table, see worksheets for full list of compounds.

Blank ID	Compound	Concentration	Reporting Limit
VBLKIR	methylene chloride	0.029J ug/L	0.5 ug/L
VBLKSG	toluene	0.079J	0.5
VBLKSH	acetone	0.97J	2.5
	toluene	0.045J	0.5
67ER06	acetone	3.1 ug/L	2.5 ug/L
	2-butanone	2.1J	2.5
	chloroform	1.2	0.5
	toluene	0.22J	0.5
67ER07	acetone	4.9	2.5
	2-butanone	2.4J	2.5
	chloroform	0.46J	0.5
	toluene	0.14J	0.5
67FB01	acetone	3.7	2.5
	chloroform	1.4	0.5
	toluene	0.97	0.5
67FB01	acetone	5.1	2.5
	toluene	0.054J	0.5

Associated samples and required qualifications are noted in the following table.

Sample ID	Compound	Q Flag
67GW03	methylene chloride	U at RL
67GW03	acetone	U at RL
67GW07	acetone	U
67GW01, 67GW04	2-butanone	U at RL
67GW01, 67GW02, 67GW04, 67GW05, 67GW08, 67GW08D	chloroform	U at RL
67GW03, 67SW03, 67GW08, 67GW08D, 67GW07, 67GW05, 67GW06, 67GW01. 67GW02, 67GW04	toluene	U at RL

SVOA

The associated method and/or QC blanks exhibited contamination as noted in the following table. Compounds for which there was no action required, are not included in the following table, see worksheets for full list of compounds.

Blank ID	Compound	Concentration	Reporting Limit
SBLKPQ-SIM	pyrene	0.023J ug/L	0.20 ug/L
67ER06	naphthalene	0.074J ug/L	0.21 ug/L
	2-methylnaphthalene	0.016J	0.21
67ER07	naphthalene	0.040J	0.21
67FB01	naphthalene	0.098J	0.21
	2-methylnaphthalene	0.021J	0.21

Associated samples and required qualifications are noted in the following table.

Sample ID	Compound	Q Flag
PAH SIM: 67GW01, 67GW02, 67GW03, 67GW04, 67GW05, 67GW06, 67GW08, 67GW08D	naphthalene	U at RL
PAH SIM: 67GW05, 67GW06, 67GW08D	2-methylnaphthalene	U at RL
PAH SIM: 67SW03	pyrene	U at RL

GRO

The associated method and/or QC blanks exhibited contamination as noted in the following table.

Blank ID	Compound	Concentration	RL
VBLKCT	GRO	0.03J mg/L	0.5 mg/L
VBLKDF	GRO	0.035J	0.5
VBLKDI	GRO	0.035J	0.5

Associated samples and required qualifications are noted in the following table.

Sample ID	Compound	Q Flag
67GW01, 67GW02, 67GW03, 67GW04, 67GW05, 67GW06, 67GW07, 67GW08, 67GW08D, 67SW03	GRO	U at RL

Laboratory Control Sample

VOA

All submitted LCS exhibited low percent recovery for 1,1,1,2-tetrachloroethane at 78% and 78% (QC limit 80-120%); therefore all results for this compound were qualified as estimated (J/UJ) in the following sample: 67ER05, 67TB03, 67GW07, 67GW05, 67GW06, 67GW01, 67ER06, 67GW02, 67GW04, 67ER07, 67TB04 and 67TB05.

SVOA

All submitted LCS exhibited zero percent recovery for p-phenylenediamine; therefore all non-detected results for this compound were qualified as rejected (R) in all samples.

All submitted LCS exhibited low recoveries for diallate (trans isomer); therefore all results for this compound were qualified as estimated (J/UJ).

The submitted LC and LCSD samples exhibited low recoveries for diallate (cis isomer) at 18% and18%; therefore all results for this compound were qualified as estimated (J/UJ) in the associated samples, 67SW03, 67ER01, 67ER02 and 67FB01.

The LCS samples associated with samples 67GW08, 67GW08D, 67ER05, 67GW07, 67GW01, 67ER06, 67GW02, 67GW04, 67ER07, 67ER08, 67GW03, 67GW05 and 67GW06 exhibited zero percent recovery for methapyrilene; therefore the non-detected results in these samples were qualified as rejected (R).

Matrix Spike

VOA

All matrix spike and matrix spike duplicate associated with sample 67GW08 and duplicate sample 67GW08D exhibited low recoveries for styrene at 8% and 3% (QC limit 65-135%); therefore all non-detected results for this compound was qualified as rejected (R) in the associated sample.

SVOA

The submitted matrix spike and matrix spike duplicate exhibited non-compliant recoveries requiring qualification or rejection in the associated sample. A summary of these non-compliances and affected samples are noted in the following table.

MS/MSD Associated Sample ID	Compounds	MS %Rec	MSD % Rec	QC Limit	Q Flag
67GW08, 67GW08D	aniline	0	0	20-150	J/R
	o-toluidine	0	0	20-150	
	2,4-dimethylphenol	0	0	19-109	
	4-chloroaniline	0	0	25-115	
	p-phenylenediamine	0	0	20-150	
	1-naphthylamine	0	0	20-150	
	2-naphthylamine	0	0	20-150	
	n-nitrosodiphenylamine	0	0	52-117	
	4-aminobiphenyl	0	0	20-150	
	pronamide	0	0	20-150	
	p-dimethylaminoazobenzene	0	0	20-150	
	3,3'-dimethylbenzidine	0	0	20-150	
	3,3'-dichlorobenzidine	0	0	20-100	
	7,12-dimethylbenz(a)anthracene	4	4	20-150	
	3-methylcholanthrene	0	0	20-150	
	2-picoline	59	4	20-150	
	methapyrilene	17	0	20-150	
	diallate (trans isomer)	18	18	20-150	J/UJ
	diallate (cis isomer)	18	18	20-150	
	anthracene	44	46	55-127	
	benzo(a)pyrene	34	39	46-135	
67GW08 (SIM), 67GW08D (SIM)	anthracene	0	0	55-110	J/R
	benzo(a)pyrene	0	0	55-110	
	acenaphthylene	13	22	50-105	J/UJ
	benzo(a)anthracene	21	34	45-120	

Identification/Quantitation

Metals

All results reported at concentrations between the method detection limit and the reporting limit (B flagged by the laboratory) were qualified as estimated J.

A summary of qualifications required is provided on the following page. Please do not hesitate to contact DataQual ES with any questions regarding this validation report.

Sincerely,

Laura Maschhoff
President

Summary of Data Qualifications

VOA

Sample ID	Compound	Results	Q flag
67SW03, 67ER01, 67ER02, 67ER03, 67ER04, 67FB01, 67FB02, 67TB01, 67TB02, 67GW08, 67GW08D, 67ER05, 67ER06, 67ER07, 67TB03, 67TB04, 67TB05, 67GW07, 67GW05, 67GW06, 67GW01, 67GW02, 67GW04	acrolein acetone acrylonitrile 2-butanone propionitrile isobutyl alcohol 1,4-dioxane	+/-	J/R
67SW03, 67ER01, 67ER02, 67ER03, 67ER04, 67FB01, 67FB02, 67TB01, 67TB02, 67GW08, 67GW08D	dichlorodifluoromethane bromomethane chloroethane iodomethane 3-chloropropene acetonitrile dibromochloromethane 1,1,1,2-tetrachloroethane 1,1,2,2-tetrachloroethane 1,2-dibromo-3-chloropropane	+/-	J/UJ
67ER05, 67ER06, 67ER07, 67TB03, 67TB04, 67TB05, 67GW07, 67GW05, 67GW06, 67GW01, 67GW02, 67GW04	dichlorodifluoromethane bromomethane iodomethane 3-chloropropene acetonitrile methacrylonitrile pentachloroethane dibromochloromethane 1,1,1,2-tetrachloroethane 1,1,2,2-tetrachloroethane 1,2-dibromo-3-chloropropane	+/-	J/UJ
67ER08, 67GW03	acrolein acetone acrylonitrile 2-butanone propionitrile isobutyl alcohol 1,4-dioxane	+/-	J/R
67GW03	methylene chloride	+	U at RL
67GW03	acetone	+	U at RL
67GW07	acetone	+	U
67GW01, 67GW04	2-butanone	+	U at RL
67GW01, 67GW02, 67GW04, 67GW05, 67GW08, 67GW08D	chloroform	+	U at RL
67GW03, 67SW03, 67GW08, 67GW08D, 67GW07, 67GW05, 67GW06, 67GW01. 67GW02, 67GW04	toluene	+	U at RL
67ER05, 67TB03, 67GW07, 67GW05, 67GW06, 67GW01, 67ER06, 67GW02, 67GW04, 67ER07, 67TB04, 67TB05	1,1,1,2-tetrachloroethane	+/-	J/UJ
67GW08, 67GW08D	styrene	+/-	J/R

SVOA

Sample ID	Compound	Results	Q flag
all samples	2-picoline nitrosomethylethylamine n-nitrosodiethylamine n-nitrosopyrrolidine n-nitrosomorpholine o-toluidine n-nitrosopiperidine p-phenylenediamine 1-naphthylamine 2-naphthylamine 5-nitro-o-toluidine n-nitrosodiphenylamine diallate (trans isomer) 4-aminobiphenyl 4-nitroquinoline-1-oxide methapyrilene p-dimethylaminoazobenzene 3,3'-dimethylbenzidine 2-acetylaminofluorene indeno(1,2,3-cd)pyrene diallate (total)	+/-	J/UJ
67SW03, 67ER01, 67ER02, 67FB01	hexachloropropene n-nitroso-di-n-butylamine dibenzo(a,h)anthracene benzo(g,h,i)perylene	+/-	J/UJ
67ER03, 67ER04, 67FB02, 67GW08	n-nitroso-di-n-butylamine 2-chloronaphthalene dibenzo(a,h)anthracene benzo(g,h,i)perylene	+/-	J/UJ
67ER05, 67GW07, 67GW01, 67ER06, 67GW02, 67GW04, 67ER07, 67ER08, 67GW03, 67GW08D	nitrobenzene pentachlorophenol 4,6-dinitro-2-methylphenol pentachloronitrobenzene dibenzo(a,h)anthracene benzo(g,h,i)perylene	+/-	J/UJ
67GW05, 67GW06	nitrobenzene hexachloropropene n-nitroso-di-n-butylamine dibenzo(a,h)anthracene benzo(g,h,i)perylene	+/-	J/UJ
PAH SIM: 67GW01, 67GW02, 67GW03, 67GW04, 67GW05, 67GW06, 67GW08, 67GW08D	naphthalene	+	U at RL
PAH SIM: 67GW05, 67GW06, 67GW08D	2-methylnaphthalene	+	U at RL
PAH SIM: 67SW03	pyrene	+	U at RL
all samples	p-phenylenediamine	+/-	J/R
all samples	diallate (trans isomer)	+/-	J/UJ
67SW03, 67ER01, 67ER02, 67FB01	diallate (cis isomer)	+/-	J/UJ
67GW08, 67GW08D, 67ER05, 67GW07, 67GW01, 67ER06, 67GW02, 67GW04, 67ER07, 67ER08, 67GW03, 67GW05, 67GW06	methapyrilene	+/-	J/R

Sample ID	Compound	Results	Q flag
67GW08, 67GW08D	aniline o-toluidine 2,4-dimethylphenol 4-chloroaniline p-phenylenediamine 1-naphthylamine 2-naphthylamine n-nitrosodiphenylamine 4-aminobiphenyl pronamide p-dimethylaminoazobenzene 3,3'-dimethylbenzidine 3,3'-dichlorobenzidine 7,12-dimethylbenz(a)anthracene 3-methylcholanthrene 2-picoline methapyrilene	+/-	J/R
67GW08, 67GW08D	diallate (trans isomer) diallate (cis isomer) anthracene benzo(a)pyrene	+/-	J/UJ
67GW08 (SIM), 67GW08D (SIM)	anthracene benzo(a)pyrene	+/-	J/R
67GW08 (SIM), 67GW08D (SIM)	acenaphthylene benzo(a)anthracene	+/-	J/UJ

GRO

Sample ID	Compound	Results	Q flag
67GW01, 67GW02, 67GW03, 67GW04, 67GW05, 67GW06, 67GW07, 67GW08, 67GW08D, 67SW03	GRO	+	U at RL

DRO

Sample ID	Compound	Results	Q flag
No qualifications			

Metals

Sample ID	Analyte	Results	Q flag
all samples >MDL up to RL	silver	>MDL up to RL	U at RL
67GW02, 67GW03, 67GW04, 67GW01, 67GW05, 67GW06	antimony	>MDL up to RL	U at RL
67SW03	zinc	>MDL up to RL	U at RL
67GW07	nickel	>MDL up to RL	U at RL
67GW01, 67GW02, 67GW03, 67GW04, 67GW05, 67GW06, 67GW08	lead	>MDL up to RL	U at RL
all samples	all analytes	+B	J

Tin by 6020

Sample ID	Analyte	Results	Q flag
67SD05	all results	+/-	J/UJ
all samples >MDL up to RL	tin	+J	U at RL

Glossary of Qualification Flags and Abbreviations

Qualification Flags (Q-Flags)

U	not detected above the reported sample quantitation limit
J	estimated value
UJ	reported quantitation limit is qualified as estimated
N	analyte has been tentatively identified
JN	analyte has been tentatively identified, estimated value
R	result is rejected; the presence or absence of the analyte cannot be verified

Method/Preparation/Field QC Blank Qualification Flags (Q-Flags)

Organic Methods

NA	The sample result for the blank contaminant is greater than the RL (2X sample RL for common laboratory contaminants) when the blank value is less than the RL. The sample result for the blank contaminant is not qualified with any blank qualifiers.
U*	The sample result for the blank contaminant is less than the RL (2X sample RL for common laboratory contaminants) but greater than the MDL when the blank value is less than the RL. The sample result for the blank contaminant is qualified as non-detect U at the reported concentration.
RL**	The sample result for the blank contaminant is less than the RL (2X sample RL for common laboratory contaminants) but greater than the MDL when the blank value is less than the RL. The sample result for the blank contaminant is changed to the RL and qualified as non-detect U.

* This guideline is used when the laboratory is reporting non-detects to the MDL. ** This guideline is used when the laboratory is reporting non-detects to the RL.

Inorganic Methods

ICB/CCB/PB Action:

No Action -	The sample result is greater than the RL and greater than ten times (10X) the blank value.
U -	The sample result is greater than or equal to the MDL but less than or equal to the RL, result is reported as non-detect at the reported concentration, when the ICB/CCB/PB result is less or greater than the RL.

Glossary of Qualification Flags and Abbreviations, continued

R -	Sample result is greater than the RL and less than the ICB/CCB/PB value when the ICB/CCB/PB value is greater than the RL.
J -	Sample result is greater than the ICB/CCB/PB value but less than 10X the ICB/CCB/PB value when ICB/CCB/PB value is greater than the RL.
J/UJ -	Sample result is less than 10X RL when blank result is below the negative RL.

Field QC Blank action:

Note – Use field blanks to qualify data only if field blank results are greater than prep blank results.

Do not use rinsate blank associated with soils to qualify water samples and vice versa.

No Action -	The sample result is greater than the RL and greater than ten times (10X) the blank value.
U -	The sample result is greater than or equal to the MDL but less than or equal to the RL, result is reported as non-detect at the reported concentration, when the FB result is less or greater than the RL.
R -	Sample result is greater than the RL and less than the FB value when the FB value is greater than the RL.
J -	Sample result is greater than the FB value but less than 10X the FB value when FB value is greater than the RL.

General Abbreviations

RL	reporting limit
IDL	instrument detection limit
MDL	method detection limit
CRDL	contract required detection limit
CRQL	contract required quantitation limit
+	positive result
-	non-detect result

DataQual

Environmental Services, LLC

Michael Baker, Jr., Inc.
Airside Business Park
100 Airside Drive
Moon Township, PA 15108

July 11, 2010

SDG# 1003198, CompuChem
NAPR SWMU 67; Ceiba, Puerto Rico

Dear Mr. Kimes,

The following Data Validation report is provided as requested for the parameters noted in the table below for SDG # 1003198. The data validation was performed in accordance with the SW-846 methods utilized by the laboratory. Region II has not developed a validation checklist SOP for the methods used to assess the inorganic methods in this SDG (SW-846 methods 6020, 6010B and 7470A). Therefore, alternative worksheets were provided. Region II flagging conventions were used. All areas of concern are discussed in the body of the report and a summary of data qualification is provided.

Sample ID	Lab ID	Matrix	Dissolved Metals	Dissolved Tin
67GW01	1003197-17	water	X	X
67GW02	1003197-19	water	X	X
67GW03	1003197-24	water	X	X
67GW04	1003197-20	water	X	X
67GW05	1003197-15	water	X	X
67GW06	1003197-16	water	X	X
67GW07	1003197-14	water	X	X
67GW08	1003197-10	water	X	X
67GW08D	1003197-11	water	X	X
67SW03	1003197-01	water	X	X
67GW08 MS	1003197-10MS	water	X	X
67GW08 MSD	1003197-10MSD	water	X	X

The following quality control samples were provided with this SDG: sample 67GW08D-field duplicate of sample 67GW08.

The samples were evaluated based on the following criteria:

- Data Completeness *
- Sample Condition *
- Technical Holding Times *
- ICP-MS Tuning *
- Initial/Continuing Calibrations *
- ICSA/ICSAB Standards *
- CRDL Standards *

- Blanks
- Internal Standards *
- Surrogate Recoveries *
- Laboratory Control Samples *
- Matrix Spike Recoveries *
- Matrix Duplicate RPDs *
- Serial Dilutions
- Field Duplicates *
- Identification/Quantitation
- Reporting Limits *

* - indicates that qualifications were not required based on this criteria

Overall Evaluation of Data/Potential Usability Issues

A summary of qualifications applied to the sample results are noted below for the fractions validated. Specific details regarding qualification of the data are addressed in the Specific Evaluation section of this narrative. If an issue is not addressed there were no actions required based on unmet quality criteria. When more than one qualifier is associated with a compound/analyte the validator has chosen the qualifier that best indicates possible bias in the results and flagged the data accordingly. However, information regarding all quality control issues is provided in the body of the report and on the qualification summary page.

Dissolved Metals by 6020 & 7471

Blank contamination was noted and qualification was required in the samples in this SDG.

The serial dilution analysis exhibited on non-compliant %D. The non-complaint analyte was flagged as estimated in the associated samples.

All results reported at concentrations between the method detection limit and the reporting limits (B flagged by the laboratory) were qualified as estimated J.

Dissolved Tin by 6010B

No qualifications to the data were required.

Specific Evaluation of Data

Data Completeness

The SDG was received complete and intact. Resubmissions were not required.

Technical Holding Times

According to chain of custody records, sampling was performed on 3/22-30/10 and samples were received at the laboratory 3/24-31/10. All sample preparation and analysis was performed within Region II and/or method holding time requirements.

Blanks

Metals by 6020 & 7471

Associated blanks exhibited contamination as noted in the following table. Please see the Glossary of Qualification Flags and Abbreviations for details.

Blank ID	Analyte	Concentration	Action Level	Q Flag
CCB	arsenic	0.097B ug/L	RL	U at RL
67FB02	nickel	0.11B ug/L	RL	U at RL
	lead	0.074B ug/L	RL	U at RL

Associated samples and required qualifications are noted in the following table.

Sample ID	Analyte	Q Flag
67SW03	arsenic	U at RL
67GW01, 67GW02, 67GW03, 67GW04, 67GW05, 67GW06	lead	U at RL
67GW007	nickel	U at RL

Serial Dilution

Metals by 6020 & 7471

The serial dilution analysis submitted in this SDG exhibited non-compliant %Ds for one analyte, requiring qualification in the field samples. A summary of these non-compliances and affected samples are noted in the following table.

SD	Analytes	Samples	%D	Q Flag
67GW08	vanadium	all samples	12	J/UJ

Identification/Quantitation

Metals

All results reported at concentrations between the method detection limit and the reporting limit (B flagged by the laboratory) were qualified as estimated J.

A summary of qualifications required is provided on the following page. Please do not hesitate to contact DataQual ES with any questions regarding this validation report.

Sincerely,

Jacqueline Cleveland

Jacqueline Cleveland
President

Summary of Data Qualifications

Metals by 6020 & 7471

Sample ID	Analyte	Results	Q flag
67SW03	arsenic	>MDL up to RL	U at RL
67GW01, 67GW02, 67GW03, 67GW04, 67GW05, 67GW06	lead	>MDL up to RL	U at RL
67GW007	nickel	>MDL up to RL	U at RL
all samples	vanadium	+/-	J/UJ
all samples	all analytes	+B	J

Tin by 6020

Sample ID	Analyte	Results	Q flag
No qualifications were required			

Glossary of Qualification Flags and Abbreviations

Qualification Flags (Q-Flags)

U	not detected above the reported sample quantitation limit
J	estimated value
UJ	reported quantitation limit is qualified as estimated
N	analyte has been tentatively identified
JN	analyte has been tentatively identified, estimated value
R	result is rejected; the presence or absence of the analyte cannot be verified

Method/Preparation/Field QC Blank Qualification Flags (Q-Flags)

Organic Methods

NA	The sample result for the blank contaminant is greater than the RL (2X sample RL for common laboratory contaminants) when the blank value is less than the RL. The sample result for the blank contaminant is not qualified with any blank qualifiers.
U*	The sample result for the blank contaminant is less than the RL (2X sample RL for common laboratory contaminants) but greater than the MDL when the blank value is less than the RL. The sample result for the blank contaminant is qualified as non-detect U at the reported concentration.
RL**	The sample result for the blank contaminant is less than the RL (2X sample RL for common laboratory contaminants) but greater than the MDL when the blank value is less than the RL. The sample result for the blank contaminant is changed to the RL and qualified as non-detect U.

* This guideline is used when the laboratory is reporting non-detects to the MDL. ** This guideline is used when the laboratory is reporting non-detects to the RL.

Inorganic Methods

ICB/CCB/PB Action:

No Action -	The sample result is greater than the RL and greater than ten times (10X) the blank value.
U -	The sample result is greater than or equal to the MDL but less than or equal to the RL, result is reported as non-detect at the reported concentration, when the ICB/CCB/PB result is less or greater than the RL.

Glossary of Qualification Flags and Abbreviations, continued

R -	Sample result is greater than the RL and less than the ICB/CCB/PB value when the ICB/CCB/PB value is greater than the RL.
J -	Sample result is greater than the ICB/CCB/PB value but less than 10X the ICB/CCB/PB value when ICB/CCB/PB value is greater than the RL.
J/UJ -	Sample result is less than 10X RL when blank result is below the negative RL.

Field QC Blank action:

Note – Use field blanks to qualify data only if field blank results are greater than prep blank results.

Do not use rinsate blank associated with soils to qualify water samples and vice versa.

No Action -	The sample result is greater than the RL and greater than ten times (10X) the blank value.
U -	The sample result is greater than or equal to the MDL but less than or equal to the RL, result is reported as non-detect at the reported concentration, when the FB result is less or greater than the RL.
R -	Sample result is greater than the RL and less than the FB value when the FB value is greater than the RL.
J -	Sample result is greater than the FB value but less than 10X the FB value when FB value is greater than the RL.

General Abbreviations

RL	reporting limit
IDL	instrument detection limit
MDL	method detection limit
CRDL	contract required detection limit
CRQL	contract required quantitation limit
+	positive result
-	non-detect result

DataQual

Environmental Services, LLC

Michael Baker, Jr., Inc.
Airside Business Park
100 Airside Drive
Moon Township, PA 15108

July 11, 2010

SDG# 1003212, CompuChem
NAPR SWMU 67; Ceiba, Puerto Rico

Dear Mr. Kimes,

The following Data Validation report is provided as requested for the parameters noted in the table below for SDG # 1003212. The data validation was performed in accordance with the SW-846 methods utilized by the laboratory, the Region II Standard Operating Procedures for the Validation of Organic Data Acquired Using SW-846 Methods (8260B-Rev 2, January 2006- SOP #HW-24, 8270D-Rev 3, October 2006-SOP #HW-22) and professional judgment. Region II has not developed a validation checklist SOP for the methods used to assess the organic methods for hydrocarbons and inorganic methods in this SDG (SW-846 methods 8015_DRO, 8015_GRO, 6020, 6010B and 7471A). Therefore, alternative worksheets were provided. Region II flagging conventions were used. All areas of concern are discussed in the body of the report and a summary of data qualifications is provided.

Sample ID	Lab ID	Matrix	VOA App IX	SVOA App IX w/ LL PAH	GRO	DRO	Metals	Tin
67SB02-00	1003212-01	soil	X	X	X	X	X	X
67SB02-01	1003212-02	soil	X	X	X	X	X	X
67SB02-02	1003212-03	soil	X	X	X	X	X	X
67SB06-00	1003212-04	soil	X	X	X	X	X	X
67SB06-01	1003212-05	soil	X	X	X	X	X	X
67SB06-01D	1003212-06	soil	X	X	X	X	X	X
67SB06-05	1003212-07	soil	X	X	X	X	X	X
67SB02-00 MS	1003212-01MS	soil	X	X	X	X	X	X
67SB02-00 MSD	1003212-01MSD	soil	X	X	X	X	X	X

The following quality control sample was provided with this SDG: sample 67SB06-01D-field duplicate of sample 67SB06-01.

The samples were evaluated based on the following criteria:

- Data Completeness *
- Sample Condition *
- Technical Holding Times *
- GC/MS Tuning *
- ICP-MS Tuning *

- GC Performance *
- Initial/Continuing Calibrations
- ICSA/ICSAB Standards *
- CRDL Standards *
- Blanks
- Internal Standards *
- Surrogate Recoveries *
- Laboratory Control Samples *
- Matrix Spike Recoveries
- Matrix Duplicate RPDs *
- Serial Dilutions
- Field Duplicates
- Identification/Quantitation
- Reporting Limits *
- Tentatively Identified Compounds NA

* - indicates that qualifications were not required based on this criteria

Overall Evaluation of Data/Potential Usability Issues

A summary of qualifications applied to the sample results are noted below for the fractions validated. Specific details regarding qualification of the data are addressed in the Specific Evaluation section of this narrative. If an issue is not addressed there were no actions required based on unmet quality criteria. When more than one qualifier is associated with a compound/analyte the validator has chosen the qualifier that best indicates possible bias in the results and flagged the data accordingly. However, information regarding all quality control issues is provided in the body of the report and on the qualification summary page.

VOA

The initial and continuing calibrations exhibited some compounds with low RRF values, which resulted in qualifying non-detected values as rejected for these compounds. Due to high %RSDs and %D values, in the initial and continuing calibrations, some compounds were qualified as estimated.

Blank contamination was noted in the method and/or QC blanks associated with samples in this batch. Qualifications were added to the data.

The matrix spike and matrix spike duplicate exhibited low recoveries that resulted in qualifying results as estimated in the associated sample.

The field duplicate pair did not exhibit comparable results for one sample; therefore results were qualified as estimated.

SVOA

Due to high %RSDs and %D values, in the initial and continuing calibrations, some compounds were qualified as estimated.

Blank contamination was noted in the method and/or QC blanks associated with samples in this batch. Qualifications were added to the data.

Due to below 10% recoveries for LCS samples, the associated sample non-detect results were qualified as rejected for one or more compounds. Non-compliant recoveries were also exhibited that required some compound results to be qualified as estimated.

The matrix spike and matrix spike duplicate exhibited below 10% recoveries that resulted in qualifying three compound results as rejected in the associated sample. Four compounds were also qualified as estimated due to low recoveries.

GRO

Blank contamination was noted in the method blank associated with samples in this batch. Qualifications were added to the data.

The matrix spike and matrix spike duplicate exhibited low recoveries that resulted in qualifying results as estimated in the associated sample.

DRO

Blank contamination was noted in the method blank associated with samples in this batch. Qualifications were added to the data.

Metals by 6020 & 7471

Blank contamination was noted and qualification was required in the samples in this SDG.

The matrix spikes pair submitted in this SDG exhibited non-compliant recoveries in both the MS and the MSD for one analyte for which qualifications were required.

The serial dilution submitted in this SDG exhibited non-compliant %Ds for six analytes. All results for these analytes in the metals samples were qualified as estimated J/UJ.

The field duplicate pair of sample 67SB06-01/67SB06-01D exhibited several analytes with non-compliant RPDs. These analytes were flagged based on Region II guidance in the field duplicate pair only.

All results reported at concentrations between the method detection limit and the reporting limits (B flagged by the laboratory) were qualified as estimated J.

Tin by 6010B

Blank contamination was noted and qualification was required in the samples in this SDG.

Specific Evaluation of Data

Data Completeness

The SDG was received complete and intact. Resubmissions were not required. Clarification of the metals calculations was requested from the laboratory.

Technical Holding Times

According to chain of custody records, sampling was performed on 3/23-25/10 and samples were received at the laboratory 3/26/10. All sample preparation and analysis was performed within Region II and/or method holding time requirements.

Initial/Continuing Calibration

VOA

Calibration standards exhibited %RSDs and RRF values that were non-compliant. A summary of these non-compliances and affected samples are noted in the following table. Sample results are qualified as indicated.

Standard ID	Compound(s)	RRF, %RSD, %D	Samples	Q Flag
IC 3/30/10	acrolein acrylonitrile propionitrile isobutyl alcohol 1,4-dioxane methylmethacrylate	0.028 0.046 0.018 0.006 0.002 0.049	all samples	J/R
	1,2-dichloropropane	16.913		J/UJ

SVOA

Calibration standards exhibited %RSDs and %D values that were non-compliant. A summary of these non-compliances and affected samples are noted in the following table. Sample results are qualified as indicated.

Standard ID	Compound(s)	RRF, %RSD, %D	Samples	Q Flag
IC full scan 4/16/10	2,6-dichlorophenol hexachloropropene 1,4-napthoquinone diallate (trans isomer) 4-nitroquinoline-1-oxide 7,12-dimethylbenz(a)anthracene benzo(k)fluoranthene	19.314 21.849 20.128 19.278 23.521 16.318 29.966	all samples	J/UJ
CC-full scan 4/23/10	3-methylphenol p-phenylenediamine methapyrilene benzo(g,h,i)perylene	-21.09 -39.97 -33.99 -25.02	67SB02-00, 67SB02-01 67SB02-02, 67SB06-00 67SB06-01	J/UJ
CC-full scan 4/24/10	p-phenylenediamine indeno(1,2,3-cd)pyrene	-37.28 20.40	67SB06-01D, 67SB06-05	J/UJ
CC-SIM 4/27/10	benzo(a)anthracene benzo(b)fluoranthene indeno(1,2,3-cd)pyrene dibenzo(a,h)anthracene	24.78 30.91 45.97 30.82	67SB02-00, 67SB02-01 67SB02-02, 67SB06-00 67SB06-01, 67SB06-05	J/UJ
CC-SIM 4/28/10	fluorene benzo(b)fluoranthene	-21.84 -40.40	67SB06-01D	J/UJ

Blanks

VOA

The associated method and/or QC blanks exhibited contamination as noted in the following table. Compounds for which there was no action required, are not included in the following table, see worksheets for full list of compounds.

Blank ID	Compound	Concentration	Reporting Limit
67ER02	acetone	3.2	2.5
	methylene chloride	1.3	0.5
	toluene	0.81	0.5
67ER04	acetone	3.9	2.5
	methylene chloride	1.1	0.5
	2-butanone	2.5	2.5
	toluene	0.53	0.5
67FB02	acetone	5.1	2.5
	toluene	0.054J	0.5

Associated samples and required qualifications are noted in the following table.

Sample ID	Compound	Q Flag
67SB06-05	acetone	U
67SB06-01, 67SB06-01D, 67SB06-05	methylene chloride	U at RL
67SB06-00	toluene	U at RL
67SB02-01	2-butanone	U at RL
67SB02-00, 67SB02-02	2-butanone	U

SVOA

The associated method and/or QC blanks exhibited contamination as noted in the following table. Compounds for which there was no action required, are not included in the following table, see worksheets for full list of compounds.

Blank ID	Compound	Concentration	Reporting Limit
SBLKRG	bis(2-ethylhexyl)phthalate	52J ug/Kg	170 ug/Kg
SBLKRG-SIM	naphthalene	1.3J	8.3

Associated samples and required qualifications are noted in the following table.

Sample ID	Compound	Q Flag
67SB02-00, 67SB06-00, 67SB06-01, 67SB06-05	bis(2-ethylhexyl)phthalate	U at RL
PAH SIM: all samples	naphthalene	U at RL

GRO

The associated method and/or QC blanks exhibited contamination as noted in the following table. Compounds for which there was no action required, are not included in the following table, see worksheets for full list of compounds.

Blank ID	Compound	Concentration	RL	Action Level
VBLKDD	GRO	0.041J mg/Kg	0.5 mg/Kg	RL

Associated samples and required qualifications are noted in the following table.

Sample ID	Compound	Q Flag
all samples	GRO	U at RL

DRO

The associated method and/or QC blanks exhibited contamination as noted in the following table. Compounds for which there was no action required, are not included in the following table.

Blank ID	Compound	Concentration	Action Level
PBLKRF	DRO	3.7J mg/Kg	RL

Associated samples and required qualifications are noted in the following table.

Sample ID	Compound	Q Flag
67SB02-01, 67SB06-00, 67SB06-01, 67SB06-01D, 67SB06-05	DRO	U at RL

Metals

Associated blanks exhibited contamination as noted in the following table. Please see the Glossary of Qualification Flags and Abbreviations for details.

Blank ID	Analyte	Concentration	Action Level	Q Flag
ICB	antimony	0.252B ug/L	RL	U at RL
	silver	0.052B ug/L	RL	U at RL
CCB3	arsenic	0.089B ug/L	RL	U at RL

Associated samples and required qualifications are noted in the following table.

Sample ID	Analyte	Q Flag
all samples except 67SB02-00 >MDL up to RL	antimony	U at RL
	silver	U at RL
67SB02-01	arsenic	U at RL

Tin by 6010B

Associated blanks exhibited contamination as noted in the following table. Please see the Glossary of Qualification Flags and Abbreviations for details.

Blank ID	Analyte	Concentration	Action Level	Q Flag
PBS	tin	0.879B mg/Kg	RL	U at RL

Associated samples and required qualifications are noted in the following table.

Sample ID	Analyte	Q Flag
all samples >MDL up to RL	tin	U at RL

Laboratory Control Sample

SVOA

The submitted LCS exhibited non-compliant recoveries requiring qualification or rejection in the field samples. A summary of these non-compliances and affected samples are noted in the following table.

LCS	Sample IDs	Compounds	%Recovery	QC Limit	Q Flag
SRGLCS full scan	all samples	2,4-dichlorophenol	39	42-119	J/UJ
		p-phenylenediamine	0	20-150	J/R
		methapyrilene	5	20-150	

Matrix Spike

VOA

The matrix spike and matrix spike duplicate associated with sample 67SB02-00 exhibited low recoveries for ethylbenzene at 69% and 73% (QC limit at 75-125%), m,p-xylene at 69% and 73% (QC limit 80-125%), o-xylene at 71% and 74% (QC limit 75-125%), styrene at 72% and 74% (QC limit 75-125%); therefore the result for these compounds were qualified as estimated (J/UJ).

SVOA

The submitted matrix spike and matrix spike duplicate exhibited non-compliant recoveries requiring qualification or rejection in the associated sample. A summary of these non-compliances and affected samples are noted in the following table.

MS/MSD Associated Sample ID	Compounds	MS %Rec	MSD % Rec	QC Limit	Q Flag
67SB02-00	1-naphthylamine	9	14	20-150	J/UJ
	2-naphthylamine	15	14	20-150	
	4-aminobiphenyl	15	13	20-150	
	hexachlorocyclopentadiene	36	7	20-134	
	p-phenylenediamine	0	0	20-150	J/R
	methapyrilene	9	9	20-150	
	3,3'-dimethylbenzidine	2	3	20-150	
67SB02-00 (SIM)	benzo(a)anthracene	121	121	50-110	J
	benzo(b)fluoranthene	142	137	45-115	

GRO

The matrix spike and matrix spike duplicate associated with sample 67SB02-00 exhibited low recoveries for gasoline at 62% and 67% (QC limit 75-125%); therefore the result for this compound was qualified as estimated (J/UJ).

Metals

The matrix spike analysis submitted in this SDG exhibited non-compliant %Rs for one analyte that required qualification in the field samples. A summary of these non-compliances and affected samples are noted in the following table.

MS/MSD	Analytes	Samples	%R	Q Flag
67SB02-00	antimony	all samples	14/16	J/UJ

Serial Dilutions

Metals

The serial dilution analysis submitted in this SDG exhibited non-compliant %D for six analytes, requiring qualification in the field samples. A summary of these non-compliances and affected samples are noted in the following table.

SD	Analytes	Samples	%D	Q Flag
67SB02-00	chromium	all samples	17	J/UJ
	cobalt		14	
	copper		22	
	nickel		18	
	vanadium		14	
	zinc		25	

Field Duplicates

VOA

Sample 67SB06-01 and field duplicate 67SB06-01D did not exhibit comparable results for carbon disulfide with 200% RPD; therefore results were qualified as estimated (J/UJ).

Metals

The field duplicate pair exhibited non-compliant field duplicate reproducibility for the following analytes. These field duplicate pairs and analytes were flagged as noted in the table below based on Region II guidelines.

Sample ID	Analyte	RPD	Q Flag
67SB06-01/67SB06-01D	barium	35	J+
	chromium	86	
	cobalt	82	
	lead	71	
	nickel	56	
	vanadium	53	
	zinc	66	

Identification/Quantitation

Metals

All results reported at concentrations between the method detection limit and the reporting limit (B flagged by the laboratory) were qualified as estimated J.

A summary of qualifications required is provided on the following page. Please do not hesitate to contact DataQual ES with any questions regarding this validation report.

Sincerely,

Laura Maschhoff
President

Jacqueline Cleveland
Vice- President

Summary of Data Qualifications

VOA

Sample ID	Compound	Results	Q flag
all samples	acrolein acrylonitrile propionitrile isobutyl alcohol 1,4-dioxane methylmethacrylate	+/-	J/R
all samples	1,2-dichloropropane	+/-	J/UJ
67SB06-05	acetone	+	U
67SB06-01, 67SB06-01D, 67SB06-05	methylene chloride	+	U at RL
67SB06-00	toluene	+	U at RL
67SB02-01	2-butanone	+	U at RL
67SB02-00, 67SB02-02	2-butanone	+	U
67SB02-00	ethylbenzene, m,p-xylene, o-xylene, styrene	+/-	J/UJ
67SB06-01, 67SB06-01D	carbon disulfide	+/-	J/UJ

SVOA

Sample ID	Compound	Results	Q flag
all samples	2,6-dichlorophenol hexachloropropene 1,4-napthoquinone diallate (trans isomer) 4-nitroquinoline-1-oxide 7,12-dimethylbenz(a)anthracene benzo(k)fluoranthene	+/-/	J/UJ
67SB02-00, 67SB02-01, 67SB02-02, 67SB06-00, 67SB06-01	3-methylphenol p-phenylenediamine methapyrilene benzo(g,h,i)perylene	+/-	J/UJ
67SB06-01D, 67SB06-05	p-phenylenediamine indeno(1,2,3-cd)pyrene	+/-	J/UJ
PAH SIM: 67SB02-00, 67SB02-01, 67SB02-02, 67SB06-00, 67SB06-01, 67SB06-05	benzo(a)anthracene benzo(b)fluoranthene indeno(1,2,3-cd)pyrene dibenzo(a,h)anthracene	+/-	J/UJ
PAH SIM: 67SB06-01D	fluorene benzo(b)fluoranthene	+/-	J/UJ
67SB02-00, 67SB06-00, 67SB06-01, 67SB06-05	bis(2-ethylhexyl)phthalate	+	U at RL
PAH SIM: all samples	naphthalene	+	U at RL
all samples	2,4-dichlorophenol	+/-	J/UJ
all samples	p-phenylenediamine methapyrilene	+/-	J/R

Summary of Data Qualifications

SVOA

Sample ID	Compound	Results	Q flag
67SB02-00	1-naphthylamine 2-naphthylamine 4-aminobiphenyl hexachlorocyclopentadiene	+/-	J/UJ
67SB02-00	p-phenylenediamine methapyrilene 3,3'-dimethylbenzidine	+/-	J/R
PAH SIM: 67SB02-00	benzo(a)anthracene benzo(b)fluoranthene	+	J

GRO

Sample ID	Compound	Results	Q flag
all samples	GRO	+	U at RL
67SB02-00	GRO	+/-	J/UJ

DRO

Sample ID	Compound	Results	Q flag
67SB02-01, 67SB06-00, 67SB06-01, 67SB06-01D, 67SB06-05	DRO	+JB	U at RL

Metals

Sample ID	Analyte	Results	Q flag
all samples except 67SB02-00	antimony	>MDL up to RL	U at RL
	silver	>MDL up to RL	U at RL
67SB02-01	arsenic	>MDL up to RL	U at RL
all samples	antimony	+/-	J/UJ
all samples	chromium cobalt copper nickel vanadium zinc	+/-	J/UJ
67SB06-01, 67SB06-01D	barium chromium cobalt lead nickel vanadium zinc	+	J
all samples	all analytes	+B	J

Summary of Data Qualifications

Tin by 6020

Sample ID	Analyte	Results	Q flag
all samples >MDL up to RL	tin	+J	U at RL

Glossary of Qualification Flags and Abbreviations

Qualification Flags (Q-Flags)

U	not detected above the reported sample quantitation limit
J	estimated value
UJ	reported quantitation limit is qualified as estimated
N	analyte has been tentatively identified
JN	analyte has been tentatively identified, estimated value
R	result is rejected; the presence or absence of the analyte cannot be verified

Method/Preparation/Field QC Blank Qualification Flags (Q-Flags)

Organic Methods

NA	The sample result for the blank contaminant is greater than the RL (2X sample RL for common laboratory contaminants) when the blank value is less than the RL. The sample result for the blank contaminant is not qualified with any blank qualifiers.
U*	The sample result for the blank contaminant is less than the RL (2X sample RL for common laboratory contaminants) but greater than the MDL when the blank value is less than the RL. The sample result for the blank contaminant is qualified as non-detect U at the reported concentration.
RL**	The sample result for the blank contaminant is less than the RL (2X sample RL for common laboratory contaminants) but greater than the MDL when the blank value is less than the RL. The sample result for the blank contaminant is changed to the RL and qualified as non-detect U.

* This guideline is used when the laboratory is reporting non-detects to the MDL. ** This guideline is used when the laboratory is reporting non-detects to the RL.

Inorganic Methods

ICB/CCB/PB Action:

No Action -	The sample result is greater than the RL and greater than ten times (10X) the blank value.
U -	The sample result is greater than or equal to the MDL but less than or equal to the RL, result is reported as non-detect at the reported concentration, when the ICB/CCB/PB result is less or greater than the RL.

Glossary of Qualification Flags and Abbreviations, continued

R -	Sample result is greater than the RL and less than the ICB/CCB/PB value when the ICB/CCB/PB value is greater than the RL.
J -	Sample result is greater than the ICB/CCB/PB value but less than 10X the ICB/CCB/PB value when ICB/CCB/PB value is greater than the RL.
J/UJ -	Sample result is less than 10X RL when blank result is below the negative RL.

Field QC Blank action:

Note – Use field blanks to qualify data only if field blank results are greater than prep blank results.

Do not use rinsate blank associated with soils to qualify water samples and vice versa.

No Action -	The sample result is greater than the RL and greater than ten times (10X) the blank value.
U -	The sample result is greater than or equal to the MDL but less than or equal to the RL, result is reported as non-detect at the reported concentration, when the FB result is less or greater than the RL.
R -	Sample result is greater than the RL and less than the FB value when the FB value is greater than the RL.
J -	Sample result is greater than the FB value but less than 10X the FB value when FB value is greater than the RL.

General Abbreviations

RL	reporting limit
IDL	instrument detection limit
MDL	method detection limit
CRDL	contract required detection limit
CRQL	contract required quantitation limit
+	positive result
-	non-detect result

DataQual

Environmental Services, LLC

Michael Baker, Jr., Inc.
Airside Business Park
100 Airside Drive
Moon Township, PA 15108

July 11, 2010

SDG# 1003231, CompuChem
NAPR SWMU 67; Ceiba, Puerto Rico

Dear Mr. Kimes,

The following Data Validation report is provided as requested for the parameters noted in the table below for SDG # 1003231. The data validation was performed in accordance with the SW-846 methods utilized by the laboratory, the Region II Standard Operating Procedures for the Validation of Organic Data Acquired Using SW-846 Methods (8260B-Rev 2, January 2006- SOP #HW-24, 8270D-Rev 3, October 2006-SOP #HW-22) and professional judgment. Region II has not developed a validation checklist SOP for the methods used to assess the organic methods for hydrocarbons and inorganic methods in this SDG (SW-846 methods 8015_DRO, 8015_GRO, 6020, 6010B and 7471A). Therefore, alternative worksheets were provided. Region II flagging conventions were used. All areas of concern are discussed in the body of the report and a summary of data qualification is provided.

Sample ID	Lab ID	Matrix	VOA App IX	SVOA App IX w/ LL PAH	GRO	DRO	Metals	Tin
67SB03-00	1003231-04	soil	X	X	X	X	X	X
67SB03-01	1003231-05	soil	X	X	X	X	X	X
67SB03-04	1003231-06	soil	X	X	X	X	X	X
67SB04-00	1003231-02	soil	X	X	X	X	X	X
67SB04-01	1003231-01	soil	X	X	X	X	X	X
67SB04-03	1003231-03	soil	X	X	X	X	X	X
67SS01	1003231-07	soil	X	X	X	X	X	X
67SS02	1003231-08	soil	X	X	X	X	X	X
67SB03-04 MS	1003231-06MS	soil	X	X	X	X	X	X
67SB03-04 MSD	1003231-06MSD	soil	X	X	X	X	X	X

The samples were evaluated based on the following criteria:

- Data Completeness *
- Sample Condition *
- Technical Holding Times *
- GC/MS Tuning *
- ICP-MS Tuning *
- GC Performance *
- Initial/Continuing Calibrations

- ICSA/ICSAB Standards *
- CRDL Standards *
- Blanks
- Internal Standards *
- Surrogate Recoveries *
- Laboratory Control Samples *
- Matrix Spike Recoveries
- Matrix Duplicate RPDs
- Serial Dilutions
- Field Duplicates NA
- Identification/Quantitation
- Reporting Limits *
- Tentatively Identified Compounds NA

* - indicates that qualifications were not required based on this criteria

Overall Evaluation of Data/Potential Usability Issues

A summary of qualifications applied to the sample results are noted below for the fractions validated. Specific details regarding qualification of the data are addressed in the Specific Evaluation section of this narrative. If an issue is not addressed there were no actions required based on unmet quality criteria. When more than one qualifier is associated with a compound/analyte the validator has chosen the qualifier that best indicates possible bias in the results and flagged the data accordingly. However, information regarding all quality control issues is provided in the body of the report and on the qualification summary page.

VOA

The initial and continuing calibrations exhibited some compounds with low RRF values, which resulted in qualifying non-detected values as rejected for these compounds. Due to high %RSDs and %D values, in the initial and continuing calibrations, some compounds were qualified as estimated.

Blank contamination was noted in the method and/or QC blanks associated with samples in this batch. Qualifications were added to the data.

SVOA

Due to high %RSDs and %D values, in the initial and continuing calibrations, some compounds were qualified as estimated.

Blank contamination was noted in the method and/or QC blanks associated with samples in this batch. Qualifications were added to the data.

Due to below 10% recoveries for LCS samples, the associated sample non-detect results were qualified as rejected for one or more compounds.

The matrix spike and matrix spike duplicate exhibited below 10% recoveries that resulted in qualifying three compound results as rejected in the associated sample. Two compounds were also qualified as estimated due to high recoveries.

Two compound results, for two samples, were qualified as tentatively identified with approximate concentration as the laboratory could not resolve the compounds chromatographically.

GRO

Blank contamination was noted in the method blank associated with samples in this batch. Qualifications were added to the data.

DRO

Blank contamination was noted in the method blank associated with samples in this batch. Qualifications were added to the data.

Metals by 6020 & 7471

The matrix spikes pair submitted in this SDG exhibited non-compliant recoveries in both the MS and the MSD for two analytes for which qualifications were required.

The matrix duplicate analysis exhibited one analyte with a RPD >35%. Qualifications were added to the data.

The serial dilution submitted in this SDG exhibited one non-compliant %D. Qualifications were added to the data.

All results reported at concentrations between the method detection limit and the reporting limits (B flagged by the laboratory) were qualified as estimated J.

Tin by 6010B

Blank contamination was noted and qualification was required in the samples in this SDG.

The matrix spikes pair submitted in this SDG exhibited non-compliant recoveries in both the MS and the MSD for the target analyte for which qualifications were required.

Specific Evaluation of Data

Data Completeness

The SDG was received complete and intact. Resubmissions were not required. Clarification of the metals calculations was requested from the laboratory.

Technical Holding Times

According to chain of custody records, sampling was performed on 3/25-30/10 and samples were received at the laboratory 3/27-31/10. All sample preparation and analysis was performed within Region II and/or method holding time requirements.

Initial/Continuing Calibration

VOA

Calibration standards exhibited %RSDs, %D and RRF values that were non-compliant. A summary of these non-compliances and affected samples are noted in the following table. Sample results are qualified as indicated.

Standard ID	Compound(s)	RRF, %RSD, %D	Samples	Q Flag
IC 3/30/10	acrolein acrylonitrile propionitrile isobutyl alcohol 1,4-dioxane methylmethacrylate	0.028 0.046 0.018 0.006 0.002 0.049	all samples	J/R
	1,2-dichloropropane	16.913		J/UJ
CC 4/01/10	acetone	0.048	67SB03-01, 67SB03-04 67SS01, 67SS02	J/R
	chloromethane	24.14		J/UJ

SVOA

Calibration standards exhibited %RSDs and %D values that were non-compliant. A summary of these non-compliances and affected samples are noted in the following table. Sample results are qualified as indicated.

Standard ID	Compound(s)	RRF, %RSD, %D	Samples	Q Flag
IC full scan 4/16/10	2,6-dichlorophenol hexachloropropene 1,4-napthoquinone diallate (trans isomer) 4-nitroquinoline-1-oxide 7,12-dimethylbenz(a)anthracene benzo(k)fluoranthene	19.314 21.849 20.128 19.278 23.521 16.318 29.966	all samples	J/UJ

Standard ID	Compound(s)	RRF, %RSD, %D	Samples	Q Flag
CC-full scan 4/24/10	p-phenylenediamine indeno(1,2,3-cd)pyrene	-37.28 20.40	67SB04-01, 67SB04-00 67SB04-03, 67SB03-00	J/UJ
CC-full scan 4/25/10	p-phenylenediamine	-38.30	67SB03-01, 67SB03-04 67SS01, 67SS02	J/UJ

Blanks

VOA

The associated method and/or QC blanks exhibited contamination as noted in the following table. Compounds for which there was no action required, are not included in the following table, see worksheets for full list of compounds.

Blank ID	Compound	Concentration	Reporting Limit
67TB05	toluene	0.037J ug/L	5 ug/L
67ER05	acetone	5.1	2.5
	toluene	0.082J	0.5
67ER08	acetone	4	2.5
	toluene	1.0	0.5
67FB02	acetone	5.1	2.5
	toluene	0.054J	0.5

Associated samples and required qualifications are noted in the following table.

Sample ID	Compound	Q Flag
67SB04-00	toluene	U at RL
67SB04-01	acetone	U

SVOA

The associated method and/or QC blanks exhibited contamination as noted in the following table. Compounds for which there was no action required, are not included in the following table, see worksheets for full list of compounds.

Blank ID	Compound	Concentration	Reporting Limit
SBLKRP (SIM)	naphthalene	1.6J ug/Kg	8.3 ug/Kg
	2-methylnaphthalene	1.0J	8.3
	fluorene	0.48J	8.3
67ER05	benzo(k)fluoranthene	0.011J ug/L	0.20 ug/L
67ER08	naphthalene	0.11J	0.20
	2-methylnaphthalene	0.020J	0.20

Associated samples and required qualifications are noted in the following table.

Sample ID	Compound	Q Flag
PAH SIM: all samples	naphthalene	U at RL
PAH SIM: 67SB03-04, 67SS01, 67SS02, 67SB04-01, 67SB04-00	2-methylnaphthalene	U at RL
PAH SIM: 67SB03-04, 67SS01, 67SS02, 67SB04-01, 67SB04-00	fluorene	U at RL
PAH SIM: 67SB03-00, 67SB04-00, 67SB04-01	benzo(k)fluoranthene	U at RL

GRO

The associated method and/or QC blanks exhibited contamination as noted in the following table. Compounds for which there was no action required, are not included in the following table.

Blank ID	Compound	Concentration	RL	Action Level
VBLKDG	GRO	0.043J mg/Kg	0.5 mg/Kg	RL
VBLKDI	GRO	0.044J	0.5	RL

Associated samples and required qualifications are noted in the following table.

Sample ID	Compound	Q Flag
all samples	GRO	U at RL

DRO

The associated method and/or QC blanks exhibited contamination as noted in the following table. Compounds for which there was no action required, are not included in the following table.

Blank ID	Compound	Concentration	Action Level	Q Flag
PBLKRO	DRO	4.3J mg/Kg	RL	U at RL

Associated samples and required qualifications are noted in the following table.

Sample ID	Compound	Q Flag
all samples	DRO	U at RL

Tin by 6010B

Associated blanks exhibited contamination as noted in the following table. Please see the Glossary of Qualification Flags and Abbreviations for details.

Blank ID	Analyte	Concentration	Action Level	Q Flag
PBS	tin	1.544B mg/Kg	RL	U at RL

Associated samples and required qualifications are noted in the following table.

Sample ID	Analyte	Q Flag
all samples >MDL up to RL	tin	U at RL

Laboratory Control Sample

SVOA

The submitted LCS exhibited zero percent recovery for p-phenylenediamine; therefore all non-detected results for this compound were qualified as rejected (R).

Matrix Spike

SVOA

The submitted matrix spike and matrix spike duplicate exhibited non-compliant recoveries requiring qualification or rejection in the associated sample. A summary of these non-compliances and affected samples are noted in the following table.

MS/MSD Associated Sample ID	Compounds	MS %Rec	MSD % Rec	QC Limit	Q Flag
67SB04-01	p-phenylenediamine	0	0	20-150	J/R
	1-naphthylamine	10	9	20-150	
	methapyrilene	0	0	20-150	
	3,3'-dimethylbenzidine	7	6	20-150	
67SB04-01 (SIM)	anthracene	107	116	55-105	J
	benzo(a)anthracene	114	122	50-110	

Metals by 6020 & 7471

The matrix spike analysis submitted in this SDG exhibited non-compliant %Rs for two analytes, requiring qualification in the field samples. A summary of these non-compliances and affected samples are noted in the following table.

MS/MSD	Analytes	Samples	%R	Q Flag
67SB04-01	antimony	all samples	19/18	J/UJ
	cadmium		128/127	J+

Tin by 6010B

The matrix spike analysis submitted in this SDG exhibited non-compliant %Rs for tin, requiring qualification in the field samples. A summary of these non-compliances and affected samples are noted in the following table.

MS/MSD	Analytes	Samples	%R	Q Flag
67SB04-01	tin	all samples	72.1/73.4	J/UJ

Matrix Duplicate

Metals by 6020 & 7471

The matrix duplicate analysis submitted in this SDG exhibited one non-compliant RPD, requiring qualification in the field samples. A summary of this non-compliance and affected samples are noted in the following table.

MD	Analytes	Samples	RPD	Q Flag
67SB04-01	chromium	all samples	72	J/UJ

Serial Dilutions

Metals by 6020 & 7471

The serial dilution analysis submitted in this SDG exhibited a non-compliant %D for zinc, requiring qualification in the field samples. A summary of these non-compliances and affected samples are noted in the following table.

SD	Analytes	Samples	%D	Q Flag
67SB04-01	chromium	all samples	14	J/UJ

Identification/Quantitation

SVOA

According to the case narrative, and raw data, benzo(b)fluoranthene and benzo(k)fluoranthene could not be chromatographically resolved for sample 67SB03-01 (SIM) and 67SB03-04 (SIM). Therefore results for these compounds were flagged JN, indicating the presence of the compounds was tentatively identified and the associated numerical value represents its approximate concentration.

Metals by 6020 & 7471

All results reported at concentrations between the method detection limit and the reporting limit (B flagged by the laboratory) were qualified as estimated J.

A summary of qualifications required is provided on the following page. Please do not hesitate to contact DataQual ES with any questions regarding this validation report.

Sincerely,

Laura Maschhoff
President

Jacqueline Cleveland
Vice- President

Summary of Data Qualifications

VOA

Sample ID	Compound	Results	Q flag
all samples	acrolein acrylonitrile propionitrile isobutyl alcohol 1,4-dioxane methylmethacrylate	+/-	J/R
all samples	1,2-dichloropropane	+/-	J/UJ
67SB03-01, 67SB03-04, 67SS01, 67SS02	acetone	+/-	J/R
67SB03-01, 67SB03-04, 67SS01, 67SS02	chloromethane	+/-	J/UJ
67SB04-00	toluene	+	U at RL
67SB04-01	acetone	+	U

SVOA

Sample ID	Compound	Results	Q flag
all samples	2,6-dichlorophenol hexachloropropene 1,4-napthoquinone diallate (trans isomer) 4-nitroquinoline-1-oxide 7,12-dimethylbenz(a)anthracene benzo(k)fluoranthene	+/-	J/UJ
67SB04-01, 67SB04-00, 67SB04-03, 67SB03-00	p-phenylenediamine indeno(1,2,3-cd)pyrene	+/-	J/UJ
67SB03-01, 67SB03-04, 67SS01, 67SS02	p-phenylenediamine	+/-	J/UJ
PAH SIM: all samples	naphthalene	+	U at RL
PAH SIM: 67SB03-04, 67SS01, 67SS02, 67SB04-01, 67SB04-00	2-methylnaphthalene	+	U at RL
PAH SIM: 67SB03-04, 67SS01, 67SS02, 67SB04-01, 67SB04-00	fluorene	+	U at RL
PAH SIM: 67SB03-00, 67SB04-00, 67SB04-01	benzo(k)fluoranthene	+	U at RL
all samples	p-phenylenediamine	-	R
67SB04-01	p-phenylenediamine 1-naphthylamine methapyrilene 3,3'-dimethylbenzidine	+/-	J/R
PAH SIM: 67SB04-01	anthracene benzo(a)anthracene	+	J
PAH SIM: 67SB03-01, 67SB03-04	benzo(b)fluoranthene benzo(k)fluoranthene	+/-	JN

GRO

Sample ID	Compound	Results	Q flag
all samples	GRO	+	U at RL

Summary of Data Qualifications

DRO

Sample ID	Compound	Results	Q flag
all samples	DRO	+BJ	U at RL

Metals by 6020 & 7471

Sample ID	Analyte	Results	Q flag
all samples	antimony	+/-	J/UJ
all samples	cadmium	+	J
all samples	chromium	+/-	J/UJ
all samples	zinc	+/-	J/UJ
all samples	all analytes	+B	J

Tin by 6020

Sample ID	Analyte	Results	Q flag
all samples >MDL up to RL	tin	+J	U at RL

Glossary of Qualification Flags and Abbreviations

Qualification Flags (Q-Flags)

U	not detected above the reported sample quantitation limit
J	estimated value
UJ	reported quantitation limit is qualified as estimated
N	analyte has been tentatively identified
JN	analyte has been tentatively identified, estimated value
R	result is rejected; the presence or absence of the analyte cannot be verified

Method/Preparation/Field QC Blank Qualification Flags (Q-Flags)

Organic Methods

NA	The sample result for the blank contaminant is greater than the RL (2X sample RL for common laboratory contaminants) when the blank value is less than the RL. The sample result for the blank contaminant is not qualified with any blank qualifiers.
U*	The sample result for the blank contaminant is less than the RL (2X sample RL for common laboratory contaminants) but greater than the MDL when the blank value is less than the RL. The sample result for the blank contaminant is qualified as non-detect U at the reported concentration.
RL**	The sample result for the blank contaminant is less than the RL (2X sample RL for common laboratory contaminants) but greater than the MDL when the blank value is less than the RL. The sample result for the blank contaminant is changed to the RL and qualified as non-detect U.

* This guideline is used when the laboratory is reporting non-detects to the MDL. ** This guideline is used when the laboratory is reporting non-detects to the RL.

Inorganic Methods

ICB/CCB/PB Action:

No Action -	The sample result is greater than the RL and greater than ten times (10X) the blank value.
U -	The sample result is greater than or equal to the MDL but less than or equal to the RL, result is reported as non-detect at the reported concentration, when the ICB/CCB/PB result is less or greater than the RL.

Glossary of Qualification Flags and Abbreviations, continued

R -	Sample result is greater than the RL and less than the ICB/CCB/PB value when the ICB/CCB/PB value is greater than the RL.
J -	Sample result is greater than the ICB/CCB/PB value but less than 10X the ICB/CCB/PB value when ICB/CCB/PB value is greater than the RL.
J/UJ -	Sample result is less than 10X RL when blank result is below the negative RL.

Field QC Blank action:

Note – Use field blanks to qualify data only if field blank results are greater than prep blank results.

Do not use rinsate blank associated with soils to qualify water samples and vice versa.

No Action -	The sample result is greater than the RL and greater than ten times (10X) the blank value.
U -	The sample result is greater than or equal to the MDL but less than or equal to the RL, result is reported as non-detect at the reported concentration, when the FB result is less or greater than the RL.
R -	Sample result is greater than the RL and less than the FB value when the FB value is greater than the RL.
J -	Sample result is greater than the FB value but less than 10X the FB value when FB value is greater than the RL.

General Abbreviations

RL	reporting limit
IDL	instrument detection limit
MDL	method detection limit
CRDL	contract required detection limit
CRQL	contract required quantitation limit
+	positive result
-	non-detect result

PUERTO RICAN CHEMIST CERTIFICATION

Daliz Estades Santaliz

Licensed Chemist

To Whom It May Concern:

I, Daliz M. Estades Santaliz, in my capacity as Puerto Rico Certified Chemist, hereby certify the attached Analytical Results of samples analyzed for Wet Chemistry fraction following current EPA methods, from Project Name NAPR SWMU67/DO, and Laboratory ID Numbers.

1003194-01
1003194-02
1003194-03
1003194-05
1003194-06

Lcda. Daliz Estades Santaliz

ESTADO LIBRE ASOCIADO DE PUERTO RICO
Daliz M. Estades Santaliz
Lic. 4026
QUIMICO LICENCIADO
A 1325609

PO Box 727
Dorado, PR 00646-0727

Daliz Estades Santaliz

Licensed Chemist

To Whom It May Concern:

I, Daliz M. Estades Santaliz, in my capacity as Puerto Rico Certified Chemist, hereby certify the attached Analytical Results of samples analyzed for Metal Tin following Method SW 846, from Project Name NAPR SWMU67/DO, and Laboratory ID Numbers:

1003194-01	1003194-11
1003194-02	1003194-12
1003194-03	1003194-13
1003194-04	1003194-14
1003194-05	1003194-15
1003194-06	1003194-16
1003194-07	1003194-17
1003194-08	1003194-18
1003194-09	1003194-19
1003194-10	1003194-20

Lcda. Daliz M. Estades Santaliz

Daliz M. Estades Santaliz
Lic. 4026
QUIMICO LICENCIADO

A 1325613

PO Box 727
Dorado, PR 00646-0727

Daliz Estades Santaliz

Licensed Chemist

To Whom It May Concern:

I, Daliz M. Estades Santaliz, in my capacity as Puerto Rico Certified Chemist, hereby certify the attached Analytical Results of samples analyzed for Gasoline Range Organics (GRO) following Method 8015B, from Project Name NAPR SWMU67/DO, and Laboratory ID Numbers:

1003194-01	1003194-11
1003194-02	1003194-12
1003194-03	1003194-13
1003194-04	1003194-14
1003194-05	1003194-15
1003194-06	1003194-16
1003194-07	1003194-17
1003194-08	1003194-18
1003194-09	1003194-19
1003194-10	1003194-20

Lcda. Daliz M. Estades Santaliz

Estades Santaliz Lic. 4026

A 1325614

PO Box 727
Dorado, PR 00646-0727

Daliz Estades Santaliz

Licensed Chemist

To Whom It May Concern:

I, Daliz M. Estades Santaliz, in my capacity as Puerto Rico Certified Chemist, hereby certify the attached Analytical Results of samples analyzed for Diesel Range organics fraction following Method 8015C, from Project Name NAPR SWMU67/DO, and Laboratory ID Numbers:

1003194-01	1003194-11
1003194-02	1003194-12
1003194-03	1003194-13
1003194-04	1003194-14
1003194-05	1003194-15
1003194-06	1003194-16
1003194-07	1003194-17
1003194-08	1003194-18
1003194-09	1003194-19
1003194-10	1003194-20

Lcda. Daliz M. Estades Santaliz

Lic. 4026

A 1325615

PO Box 727
Dorado, PR 00646-0727

Daliz Estades Santaliz

Licensed Chemist

To Whom It May Concern:

I, Daliz M. Estades Santaliz, in my capacity as Puerto Rico Certified Chemist, hereby certify the attached Analytical Results of samples analyzed for APPIX metals (minus tin) and mercury following Method SW 846-6020, from Project Name NAPR SWMU67/DO, and Laboratory ID Numbers:

1003194-01	1003194-11
1003194-02	1003194-12
1003194-03	1003194-13
1003194-04	1003194-14
1003194-05	1003194-15
1003194-06	1003194-16
1003194-07	1003194-17
1003194-08	1003194-18
1003194-09	1003194-19
1003194-10	1003194-20

Lcda. Daliz M. Estades Santaliz

A 1325622

PO Box 727
Dorado, PR 00646-0727

Daliz Estades Santaliz

Licensed Chemist

To Whom It May Concern:

I, Daliz M. Estades Santaliz, in my capacity as Puerto Rico Certified Chemist, hereby certify the attached Analytical Results of samples analyzed for Volatile Fraction following Method 8260B, from Project Name NAPR SWMU67/DO, and Laboratory ID Numbers:

1003194-01	1003194-11
1003194-02	1003194-12
1003194-03	1003194-13
1003194-04	1003194-14
1003194-05	1003194-15
1003194-06	1003194-16
1003194-07	1003194-17
1003194-08	1003194-18
1003194-09	1003194-19
1003194-10	1003194-20

Lcda. Daliz M. Estades Santaliz

A 1325624

PO Box 727
Dorado, PR 00646-0727

Daliz Estades Santaliz

Licensed Chemist

To Whom It May Concern:

I, Daliz M. Estades Santaliz, in my capacity as Puerto Rico Certified Chemist, hereby certify the attached Analytical Results of samples analyzed for Semivolatile fraction following Method 8260B, from Project Name NAPR SWMU67/DO, and Laboratory ID Numbers:

1003194-01	1003194-11
1003194-02	1003194-12
1003194-03	1003194-13
1003194-04	1003194-14
1003194-05	1003194-15
1003194-06	1003194-16
1003194-07	1003194-17
1003194-08	1003194-18
1003194-09	1003194-19
1003194-10	1003194-20

Lcda. Daliz M. Estades Santaliz

A 1325623

PO Box 727
Dorado, PR 00646-0727

Daliz Estades Santaliz

Licensed Chemist

To Whom It May Concern:

I, Daliz M. Estades Santaliz, in my capacity as Puerto Rico Certified Chemist, hereby certify the attached Analytical Results of samples analyzed for VOC following Method 8260B, from Project Name NAPR NAPR SWMU67/DO, and Laboratory ID Numbers:

1003197-01	1003197-14
1003197-02	1003197-15
1003197-03	1003197-16
1003197-04	1003197-17
1003197-05	1003197-18
1003197-06	1003197-19
1003197-07	1003197-20
1003197-08	1003197-21
1003197-09	1003197-22
1003197-10	1003197-23
1003197-11	1003197-24
1003197-12	1003197-25
1003197-13	

Lcda. Daliz M. Estades Santaliz

A 1325605

PO Box 727
Dorado, PR 00646-0727

Daliz Estades Santaliz

Licensed Chemist

To Whom It May Concern:

I, Daliz M. Estades Santaliz, in my capacity as Puerto Rico Certified Chemist, hereby certify the attached Analytical Results of samples analyzed for Diesel Range organics fraction following Method 8015C, from Project Name NAPR SWMU67/DO, and Laboratory ID Numbers:

1003197-01	1003197-14
1003197-02	1003197-15
1003197-03	1003197-16
1003197-04	1003197-17
1003197-06	1003197-18
1003197-07	1003197-19
1003197-08	1003197-20
1003197-10	1003197-21
1003197-11	1003197-23
1003197-12	1003197-24

Lcda. Daliz M. Estades Santaliz

Daliz M. Estades Santaliz
Lic. 4026
QUIMICO LICENCIADO
A 1325604

PO Box 727
Dorado, PR 00646-0727

Daliz Estades Santaliz

Licensed Chemist

To Whom It May Concern:

I, Daliz M. Estades Santaliz, in my capacity as Puerto Rico Certified Chemist, hereby certify the attached Analytical Results of samples analyzed for Gasoline Range Organics (GRO) following Method 8015B, from Project Name NAPR SWMU67/DO, and Laboratory ID Numbers:

1003197-01	1003197-14
1003197-02	1003197-15
1003197-03	1003197-16
1003197-04	1003197-17
1003197-05	1003197-18
1003197-06	1003197-19
1003197-07	1003197-20
1003197-08	1003197-21
1003197-09	1003197-22
1003197-10	1003197-23
1003197-11	1003197-24
1003197-12	1003197-25
1003197-13	

ESTADO LIBRE ASOCIADO DE PUERTO RICO
Daliz M. Estades Santaliz
Lic. 4026
QUIMICO LICENCIADO

Lcda. Daliz M. Estades Santaliz

A 1325603

PO Box 727
Dorado, PR 00646-0727

Daliz Estades Santaliz

Licensed Chemist

To Whom It May Concern:

I, Daliz M. Estades Santaliz, in my capacity as Puerto Rico Certified Chemist, hereby certify the attached Analytical Results of samples analyzed for Metal Tin following Method SW 846, from Project Name NAPR SWMU67/DO, and Laboratory ID Numbers:

1003197-01	1003197-14
1003197-02	1003197-15
1003197-03	1003197-16
1003197-04	1003197-17
1003197-06	1003197-18
1003197-07	1003197-19
1003197-08	1003197-20
1003197-10	1003197-21
1003197-11	1003197-23
1003197-12	1003197-24

ESTADO LIBRE ASOCIADO DE PUERTO RICO
Daliz M. Estades Santaliz
Lic. 4630
QUIMICO LICENCIADO

Lcda. Daliz M. Estades Santaliz

A 1325602

PO Box 727
Dorado, PR 00646-0727

Daliz Estades Santaliz

Licensed Chemist

To Whom It May Concern:

I, Daliz M. Estades Santaliz, in my capacity as Puerto Rico Certified Chemist, hereby certify the attached Analytical Results of samples analyzed for APPIX metals (minus tin) and mercury following Method SW 846-6020, from Project Name NAPR SWMU67/DO, and Laboratory ID Numbers:

1003197-01	1003197-14
1003197-02	1003197-15
1003197-03	1003197-16
1003197-04	1003197-17
1003197-06	1003197-18
1003197-07	1003197-19
1003197-08	1003197-20
1003197-10	1003197-21
1003197-11	1003197-23
1003197-12	1003197-24

ESTADO LIBRE ASOCIADO DE PUERTO RICO
Daliz M. Estades Santaliz
Lic. 4020
QUIMICO LICENCIADO

Lcda. Daliz Estades Santaliz

A 1325601

PO Box 727
Dorado, PR 00646-0727

Daliz Estades Santaliz

Licensed Chemist

To Whom It May Concern:

I, Daliz M. Estades Santaliz, in my capacity as Puerto Rico Certified Chemist, hereby certify the attached Analytical Results of samples analyzed for Semivolatile fraction following Method 8260B, from Project Name NAPR SWMU67/DO, and Laboratory ID Numbers:

1003197-01	1003197-14
1003197-02	1003197-15
1003197-03	1003197-16
1003197-04	1003197-17
1003197-06	1003197-18
1003197-07	1003197-19
1003197-08	1003197-20
1003197-10	1003197-21
1003197-11	1003197-23
1003197-12	1003197-24

Lcda. Daliz M. Estades Santaliz

A 1325606

PO Box 727
Dorado, PR 00646-0727

Daliz Estades Santaliz

Licensed Chemist

To Whom It May Concern:

I, Daliz M. Estades Santaliz, in my capacity as Puerto Rico Certified Chemist, hereby certify the attached Analytical Results of samples analyzed for APPIX metals (minus tin) and mercury following Method SW 846-6020, from Project Name NAPR SWMU67/DO, and Laboratory ID Numbers:

1003198-01	1003198-06
1003198-02	1003198-07
1003198-03	1003198-08
1003198-04	1003198-09
1003198-05	1003198-10

Lcda. Daliz M. Estades Santaliz

ESTADO LIBRE ASOCIADO DE PUERTO RICO
Daliz M. Estades Santaliz
Lic. 1020
QUIMICO LICENCIADO

A 1325607

PO Box 727
Dorado, PR 00646-0727

Daliz Estades Santaliz

Licensed Chemist

To Whom It May Concern:

I, Daliz M. Estades Santaliz, in my capacity as Puerto Rico Certified Chemist, hereby certify the attached Analytical Results of samples analyzed for Metal Tin following Method SW 846, from Project Name NAPR SWMU67/DO, and Laboratory ID Numbers:

1003198-01	1003198-06
1003198-02	1003198-07
1003198-03	1003198-08
1003198-04	1003198-09
1003198-05	1003198-10

Lcda. Daliz M. Estades Santaliz

LICENSO LIBRE ASOCIADO DE PUERTO RICO
Daliz M. Estades Santaliz
Lic. 4026
"QUIMICO LICENCIADO"

A 1325608

PO Box 727
Dorado, PR 00646-0727

Daliz Estades Santaliz

Licensed Chemist

To Whom It May Concern:

I, Daliz M. Estades Santaliz, in my capacity as Puerto Rico Certified Chemist, hereby certify the attached Analytical Results of samples analyzed for volatile fraction, following Method 8260B from Project Name NAPR SWMU67/DO, and Laboratory ID Numbers.

1003212-01
1003212-02
1003212-03
1003212-04
1003212-05
1003212-06
1003212-07

Lcda. Daliz M. Estades Santaliz

Lic. 4026

A 1325639

PO Box 727
Dorado, PR 00646-0727

Daliz Estades Santaliz

Licensed Chemist

To Whom It May Concern:

I, Daliz M. Estades Santaliz, in my capacity as Puerto Rico Certified Chemist, hereby certify the attached Analytical Results of samples analyzed for Diesel range organics fraction, following Method 8015C from Project Name NAPR SWMU67/DO, and Laboratory ID Numbers.

1003212-01
1003212-02
1003212-03
1003212-04
1003212-05
1003212-06
1003212-07

Lcda. Daliz M. Estades Santaliz

A 1325636

PO Box 727
Dorado, PR 00646-0727

Daliz Estades Santaliz

Licensed Chemist

To Whom It May Concern:

I, Daliz M. Estades Santaliz, in my capacity as Puerto Rico Certified Chemist, hereby certify the attached Analytical Results of samples analyzed for Diesel and Oil range organics fraction, following Method 8015C from Project Name NAPR SWMU67/DO, and Laboratory ID Numbers.

1003231-01
1003231-02
1003231-03
1003231-04
1003231-05
1003231-06
1003231-07
1003231-08

Lcda. Daliz M. Estades Santaliz

A 1294637

PO Box 727
Dorado, PR 00646-0727

Daliz Estades Santaliz

Licensed Chemist

To Whom It May Concern:

I, Daliz M. Estades Santaliz, in my capacity as Puerto Rico Certified Chemist, hereby certify the attached Analytical Results of samples analyzed for volatile fraction, following Method 8260B from Project Name NAPR SWMU67/DO, and Laboratory ID Numbers.

1003231-01
1003231-02
1003231-03
1003231-04
1003231-05
1003231-06
1003231-07
1003231-08

Lcda. Daliz M. Estades Santaliz

A 1325633

PO Box 727
Dorado, PR 00646-0727

Daliz Estades Santaliz

Licensed Chemist

To Whom It May Concern:

I, Daliz M. Estades Santaliz, in my capacity as Puerto Rico Certified Chemist, hereby certify the attached Analytical Results of samples analyzed for Wet Chemistry fraction following current EPA methods, from Project Name NAPR SWMU67/DO, and Laboratory ID Numbers.

1003249-02

Lcda. Daliz M. Estades Santaliz

ESTADO LIBRE ASOCIADO DE PUERTO RICO
Daliz M. Estades Santaliz
Lic. 4026
QUIMICO LICENCIADO
$1.00
A 1325667

PO Box 727
Dorado, PR 00646-0727

Daliz Estades Santaliz

Licensed Chemist

To Whom It May Concern:

I, Daliz M. Estades Santaliz, in my capacity as Puerto Rico Certified Chemist, hereby certify the attached Analytical Results of samples analyzed for Volatile Fraction following Method 8260B, from Project Name NAPR SWMU67/DO, and Laboratory ID Numbers:

1003249-01

ESTADO LIBRE ASOCIADO DE PUERTO RICO
Daliz M. Estades Santaliz
Lic. 4026
QUIMICO LICENCIADO

Lcda. Daliz M. Estades Santaliz

A 1325668

PO Box 727
Dorado, PR 00646-0727

Daliz Estades Santaliz

Licensed Chemist

To Whom It May Concern:

I, Daliz M. Estades Santaliz, in my capacity as Puerto Rico Certified Chemist, hereby certify the attached Analytical Results of samples analyzed for TCLP metals and mercury following Method SW846, from Project Name NAPR SWMU67/DO, and Laboratory ID Numbers:

1003249-01

Lcda. Daliz M. Estades Santaliz

PO Box 727
Dorado, PR 00646-0727

Daliz Estades Santaliz

Licensed Chemist

To Whom It May Concern:

I, Daliz M. Estades Santaliz, in my capacity as Puerto Rico Certified Chemist, hereby certify the attached Analytical Results of samples analyzed for TCLP metals and mercury following Method SW846, from Project Name NAPR SWMU67/DO, and Laboratory ID Numbers:

1003250-01

Lcda. Daliz M. Estades Santaliz

ESTADO LIBRE ASOCIADO DE PUERTO RICO
Daliz M. Estades Santaliz
Lic. 4026
QUIMICO LICENCIADO

A 1325671

PO Box 727
Dorado, PR 00646-0727

Daliz Estades Santaliz

Licensed Chemist

To Whom It May Concern:

I, Daliz M. Estades Santaliz, in my capacity as Puerto Rico Certified Chemist, hereby certify the attached Analytical Results of samples analyzed for Wet Chemistry fraction following current EPA methods, from Project Name NAPR SWMU67/DO, and Laboratory ID Numbers.

1003250-02

Lcda. Daliz M. Estades Santaliz

ESTADO LIBRE ASOCIADO DE PUERTO RICO
Daliz M. Estades Santaliz
Lic. 4026
QUIMICO LICENCIADO

$1.00 $1.00 A 1325672

PO Box 727
Dorado, PR 00646-0727

Daliz Estades Santaliz

Licensed Chemist

To Whom It May Concern:

I, Daliz M. Estades Santaliz, in my capacity as Puerto Rico Certified Chemist, hereby certify the attached Analytical Results of samples analyzed for Volatile Fraction following Method 8260B, from Project Name NAPR SWMU67/DO, and Laboratory ID Numbers:

1003250-01

Lcda. Daliz M. Estades Santaliz

ESTADO LIBRE ASOCIADO DE PUERTO RICO
Daliz M. Estades Santaliz
Lic. 4026
QUIMICO LICENCIADO
A 1325670

PO Box 727
Dorado, PR 00646-0727

APPENDIX E
WETLAND DELINEATION REPORT

DRAFT

WETLAND DELINEATION REPORT
SWMU 67 – FORMER GAS STATION

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

OCTOBER 29, 2010

Prepared for:

DEPARTMENT OF THE NAVY
NAVFAC SOUTHEAST
North Charleston, SC

Under:

Contract No. N62470-10-D-3000
DELIVERY ORDER JM01

Prepared by:

MICHAEL BAKER JR., INC.
Moon Township, Pennsylvania

I certify under penalty of law that I have examined and am familiar with the information submitted in this document and all attachments and that this document and its attachments were prepared either by me personally or under my direction or supervision in a manner designed to ensure that qualified and knowledgeable personnel properly gather and present the information contained therein. I further certify, based on my personal knowledge or on my inquiry of those individuals immediately responsible for obtaining the information, that the information is true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowingly and willfully submitting a materially false statement.

Signature: _____

Name: _____

Title: _____

Date: _____

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LIST OF ACRONYMS AND ABBREVIATIONS

CFR	Code for Federal Regulations
DGPS	Differential Global Positioning System
EPA	Environmental Protection Agency
GIS	Geographic Information System
GPS	Global Positioning System
NWI	National Wetland Inventory
RCRA	Resource Conservation and Recovery Act
RFI	RCRA Facility Investigation
SWMU	Solid Waste Management Unit
USACE	United States Army Corp of Engineers
USDA	United States Department of Agriculture
USFWS	United States Fish and Wildlife Service

1.0 PROJECT DESCRIPTION

On May 13, 2008, the Environmental Protection Agency (EPA) approved the Final Phase I Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) Work Plan for Solid Waste Management Unit (SWMU) 67 dated December 20, 2007. The work plan was developed in order to obtain the data to further characterize the impacts to the environment due to past operations at SWMU 67.

SWMU 67 is approximately 2.5 acres in size and includes a small parking area and tennis court. The tennis court is surrounded by secondary growth vegetation to the north, east, and south. Langley Drive abuts the SWMU to the west. The entire SWMU is relatively flat, with elevation increasing slightly south of the SWMU (see Figure 1).

An initial field inspection of the wetland boundary in the vicinity of SWMU 67 was conducted on March 22, 2010, while locating proposed environmental sampling points. A field delineation of the wetland boundary was deemed necessary after the field team noted discrepancies in the December 1999 delineation by GeoMarine.

The previous delineation by GeoMarine identified one unit, E2SS3 (estuarine, intertidal, scrub-shrub, broad-leaved evergreen) with the boundary approximately 250 feet northeast of the SWMU boundary. The result of the 2010 field delineation identified an E2FO3 (estuarine, intertidal, forested, broad-leaved evergreen) wetland resource immediately adjacent to SWMU 67 (with a very small portion [0.01 acre] located within the SWMU boundary). Prior to entering the field, the E2FO3 area was originally considered upland habitat. The 2010 field delineation (E2FO3) and the E2SS3 boundaries can be referenced on Figure 2, with each community type being depicted for comparison purposes. The E2SS3 community type was not verified during the 2010 field delineation, as the objective of the field delineation was to identify and revise the wetland resource boundary (and identify the associated community type) as it relates to SWMU 67.

On March 24 and May 25, 2010, Adam Gailey; Environmental Scientist of Michael Baker Jr., Inc., field delineated the jurisdictional wetland boundary. Mr. Gailey has 7 years of wetland delineation experience and is a Certified Wetland Delineator (2003) by the Institute for Wetland & Environmental Education & Research. Site reconnaissance revealed that one forested estuarine wetland exists within the northeast confines of SWMU 67.

Jurisdictional wetlands were delineated according to the U.S. Army Corps of Engineers *Wetlands Delineation Manual* (Manual), (Environmental Laboratory, 1987), and the U.S. Army Corps of Engineers Interim Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Caribbean Islands Region (Environmental Laboratory, 2009). Wetland findings and a description of how the wetlands were identified and delineated are presented in the following sections.

Although no other natural aquatic resource features (i.e., wetlands, streams, or ditches) were identified during the field delineation; upgradient (or roadway) runoff along the eastern side of Langley Drive is conveyed through SWMU 67. A set of culverts; one on each side of the small parking area divert runoff below ground. The culvert located on the northwestern portion of the SWMU outlets to an earthen drainage feature (see Appendix B - photo # 6). This feature is approximately 165 linear feet and transports precipitation runoff in a northern direction. However, beyond 165 feet, the characteristics of the drainage feature terminate (see Figure 2). This feature does not appear to provide a surface water connection to any other resource (stream, wetland, or ditch) adjacent to SWMU 67. Vegetative species such as white lead tree (*Leucaena*

leucocephala), white indigo berry *(Randia aculeate*, and guinea grass (*Urochloa maxima*) were observed adjacent to and within this drainage feature.

Additional dominant vegetative species identified throughout SWMU 67 include ocean blue morning glory (*Ipomea indica*), golden leather fern (*Acrostichum aureum*), bread and cheese *(Paullinia pinnata)*, Puerto Rico royal palm (*Roystonea borinquena)*, and black mangrove (*Avicennia germinans*).

Hydrology within the upper reaches of the wetland (east of Langley Drive and north of SWMU 67) is supplied by upland runoff via a large (36") culvert (see Photo #5). Although the upper reaches are supplied by a freshwater source; the majority of the wetland (downgradient) receives tidal influence due to the close proximity to Ensenada Honda. Therefore, the system as a whole will be referred to as estuarine.

2.0 WETLAND FINDINGS

2.1 Introduction

The term "Waters of the United States" has broad meaning and incorporates both deepwater aquatic habitats and special aquatic sites [United States Army Corps of Engineers (USACE) (33 Code of Federal Regulations (CFR) 328.3)]. The definition includes:

- The territorial seas with respect to the discharge of fill material.
- Coastal and inland waters, lakes, rivers, and streams that are navigable “Waters of the United States”, including their adjacent wetlands.
- Tributaries to navigable “Waters of the United States”, including adjacent wetlands.
- Interstate waters and their tributaries, including adjacent wetlands.
- All other “Waters of the United States” not identified above, such as: isolated wetlands and lakes, intermittent streams, prairie potholes, and other waters that are not a part of a tributary system to interstate waters or navigable “Waters of the United States”, the degradation or destruction of which could affect interstate commerce.

Wetland environs are described by the USACE (33 CFR 328.3) and the EPA (40 CFR 230.3) and jointly defined as “areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions.

Wetland vegetation is defined as "macrophytic plant life growing in water, soil or on a substrate that is at least periodically deficient in oxygen as a result of excessive water content" (Federal Interagency Committee for Wetland Delineation, 1989). Hydrophytic species generally have physiological adaptations and the ability to grow, compete effectively, and/or persist in anaerobic soil conditions.

The U.S. Fish and Wildlife Service categorize species according to their probability of occurring in wetlands. The categories and their definitions are presented in Table 1. At each potential wetland on the site, vegetation was identified and a vegetation species list was completed. The dominant species in each plant community were assigned a wetland indicator status according to the *National List of Vascular Plant Species That Occur in Wetlands* (USFWS, 1996).

TABLE 1
Plant Indicator Status Categories

Indicator Category	Indicator Symbol	Definition
Obligate Wetland Plants	OBL	Plants that occur almost always (99% of the time) in wetlands under natural conditions, but which may also occur rarely (<1%) in nonwetlands.
Facultative Wetland Plants	FACW	Plants that occur usually (67-99%) in wetlands, but also occur (1-33%) in nonwetlands.
Facultative Plants	FAC	Plants with a similar likelihood (33-67%) of occurring in both wetlands and nonwetlands.
Facultative Upland Plants	FACU	Plants that occur sometimes (1-33%) in wetlands, but occur more often (67%-99%) in nonwetlands.
Obligate Upland Plants	UPL	Plants that occur rarely (<1%) in wetlands, but occur almost always (>99%) in nonwetlands under natural conditions.
No Indicator	NI	Species for which insufficient information was available to determine an indicator status.
No Agreement	NA	Species for which a unanimous decision was not achieved for indicator status.

Note: A "+" sign following an indicator status (e.g., FACW+) means that the species generally has a greater estimated probability of occurring in wetlands than species having the general indicator status, but a lesser estimated probability of occurring in wetlands than those having the next highest general indicator. A "-" sign following an indicator status means that the species generally has a lesser estimated probability of occurring in wetlands than species having the general indicator status, but a greater estimated probability of occurring in wetlands than those having the next lowest general indicator.

2.2 Methodology

A routine on-site determination was used, which subjects the site to the three-parameter wetland test. These tests require review of the vegetative community, soil conditions, and hydrologic indicators.

Sample points (set within a basic transect) were chosen to best represent the characteristics of each terrestrial community within the study area. These sample points are shown on the Aquatic Resources and Photo Location Map (Figure 2). A wetland determination "data form" was completed for these points and can be found in Appendix A. Those areas that did not exhibit the three characteristics of a wetland were considered upland (non-wetland). Wetlands were classified in accordance with the USFWS' *Classification of Wetlands and Deep Water Habitats in the United States* (Cowardin, et al., 1979). Adjacent non-wetland (i.e., upland) areas were examined for the purposes of comparison.

In general, according to Cowardin, et al., estuarine wetland systems consist of deepwater tidal habitats and adjacent tidal wetlands that are usually semi-enclosed by land but have open, partly obstructed, or sporadic access to the open ocean and in which ocean water is at least occasionally diluted by freshwater runoff from the land.

At SWMU 67, the estuarine wetland system was then further classified by the general appearance of the habitat. The following descriptions are the subclasses that were encountered during the site visits:

- Estuarine intertidal forested (E2FO) wetlands include areas where the substrate is exposed and flooded by tides; and dominated by woody vegetation that is 6.0 meters (20 feet) tall or taller.

Prior to conducting the sampling investigation at SWMU 67, the SWMU was located on USGS mapping (Naguabo, PR 7.5 minute Quadrangle, photo revised 1982) and evaluated for topographic relief, drainage patterns, and subwatershed characteristics (see Figure 1). Streams, tributaries, and other water bodies located within the project area were identified. The United States Fish and Wildlife Service's NWI map was reviewed for previously inventoried wetlands. The United States Department of Agriculture (USDA) Soil Conservation Service's *Web Soil Survey of Humacao Area, Puerto Rico Eastern Part* was used to determine soil drainage classification in the study area. Those soils classified as having poorly or very poorly-drained conditions may suggest wetland areas. The Web Soil Survey also served as a source of hydrological data. Potential wetland areas identified by any of these sources were recorded for a detailed field evaluation and can also be referenced in Appendix C. Synthesis of these sources indicated the highest potential for wetlands to occur east of SWMU 67.

The Humacao Area, Puerto Rico Eastern Part Soils Survey lists the SWMU soils as DeE2 – Descalabrado clay loam, 20 to 40 percent slopes, eroded, JaC2 – Jacana clay, 5 to 12 percent slopes, eroded, and Md – Made land. All three map units are listed as "not hydric". However, based on the physical soil properties documented during the delineation (see Appendix B) hydric soils were confirmed within the delineated wetland boundary (part of the Md – Made land soil map unit).

As noted in Section I, one previously mapped wetland area is located within the study area. However, the wetland resource boundary previously depicted was delineated by Geo-marine, Inc. in December 1999 from 1993 color infrared and 1998 true color photography. As such, it was determined that the E2SS3 wetland boundary did not represent a field delineated jurisdictional boundary and that the wetland community type (scrub-shrub) would need to be verified.

Fieldwork concentrated on field delineating the entire wetland boundary on site, and a portion of the wetland boundary adjacent to SWMU 67. Boundary delineation was accomplished by using a small shovel to take soil samples at areas along the wetland's edge, which supported facultative plant species. Obvious changes in topography and hydrology were used to locate these sampling areas. The soil, to a maximum depth of 46 centimeters (18 inches), was then examined for wetland characteristics (mottles and/or low matrix chroma, gleying, iron and manganese concretions). Soil samples (colors) were then compared to the Munsell Soil Color Charts (1994) for categorization. Hydrologic indicators were also examined. Depending on the results of the soil sample, additional samples were taken either closer to the wetland or upland until the boundary was determined. The wetland boundaries were identified and marked with plastic "wetland delineation" survey tape and each flag numbered sequentially for ease of surveying. For the purposes of mapping, the wetland boundary was further identified through the use of mapping grade differential global positioning system (DGPS). A Global Positioning System (GPS) receiver was used in conjunction with its companion geographic information system (GIS) data collector (Trimble Recon). The DGPS (satellite DGPS corrections from Omnistar or "real-time") field data was post-processed for maximum accuracy, entered into a GIS, and overlain on digital basemapping. Wetland boundaries are shown on the Aquatic Resources and Photo Location Map (Figure 2). Photographs of the aquatic resources/features identified on site are available in Appendix B.

2.3 Results

This section of the report characterizes the aquatic resources within the proposed project site. A description of the palustrine wetlands and stream channels encountered is provided below and shown on the Aquatic Resources and Photo Location Map (Figure 2). A Wetland Determination Data Form was completed in field designated emergent, forested, and upland community areas. Wetland Determination Data Forms are presented in Appendix B. Table 2 identifies the only identified and delineated palustrine wetlands, while Table 3 identifies the ephemeral, intermittent and perennial unnamed tributaries located on site.

TABLE 2
Wetland Resources

Wetland Sample ID	Classification	Hydrology	Total Area (acres within SWMU 67)
52510-EFO-2	E2FO3	Non-Isolated (groundwater and tidal influences)	0.01
52510-UPL-1	UPL	None	NA
52510-UPL-2	UPL	None	NA
TOTAL			**0.01**

Sample point 52510-EFO-2 was taken within the estuarine forested portion of the resource northeast of the SWMU. This area receives most of its hydrology from a high water table, and infrequent flooding (tidal influence). The primary hydrologic indicators (see Appendix A) were noted as a high water table (A2), soil saturation (A3), water-stained leaves (B9), oxidized rhizospheres on living roots (C3), and fiddler crab burrows (C10). The dominant herbaceous and woody vegetative species identified included black mangrove (*Avicennia germinans*), Puerto Rico royal palm (*Roystonea borinquena*), and golden leather fern (*Acrostichum aureum*). 100 percent of these species are hydrophytic (i.e., plants that grow in wet or oxygen depleted soil conditions). The soil profile from 0 to 10 inches exhibited a color at 10YR 3/1, and from 10 to 18 inches 7.5YR 4/0, and no mottles features. This indicates the presence of hydric soils and anaerobic activity. The wetland boundary was surveyed with the GPS and entered into the GIS for analysis.

Hydrology within the upper reaches of the wetland (east of Langley Drive and north of SWMU 67) is supplied via a large (36”) culvert (see Photo #5). Although the upper reaches are supplied by a freshwater source; the majority of the wetland (downgradient) receives tidal influence due to the close proximity to Ensenada Honda. Therefore, the system as a whole has been referred to as estuarine.

2.4 Summary

On February 23, 2010, the jurisdictional wetland boundary associated with SWMU 67 was field delineated which revealed one estuarine intertidal forested (E2F03) wetland system exists within the confines of SWMU 67. 0.01 acre of jurisdictional wetland is contained within the SWMU 67 boundary. In addition, one earthen drainage feature (approximately 165 linear feet) was also identified. However, this feature does not contribute to the hydrology of the adjacent forested estuarine wetland.

3.0 REFERENCES

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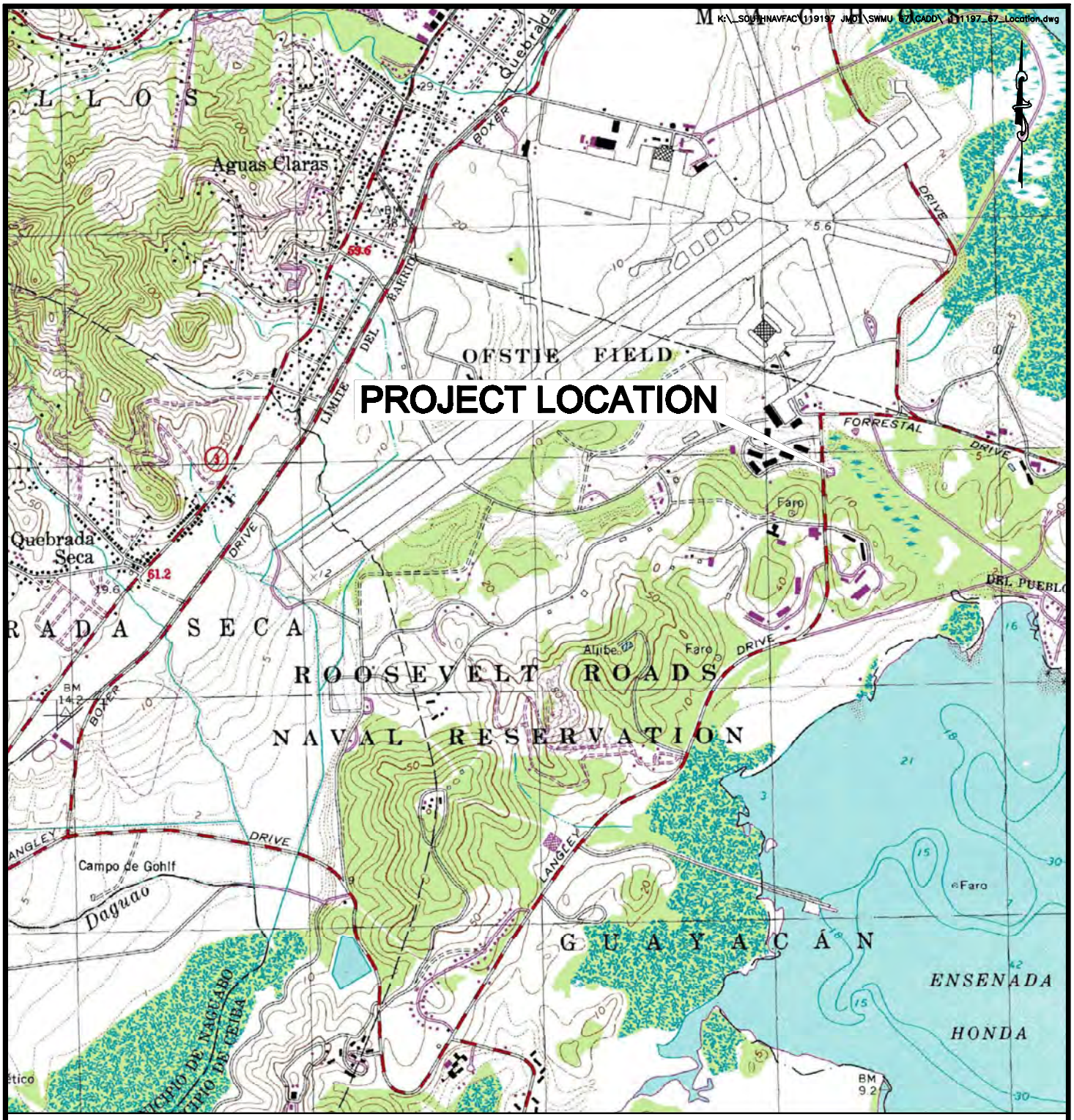
FIGURES



2000 0 1000 2000 4000

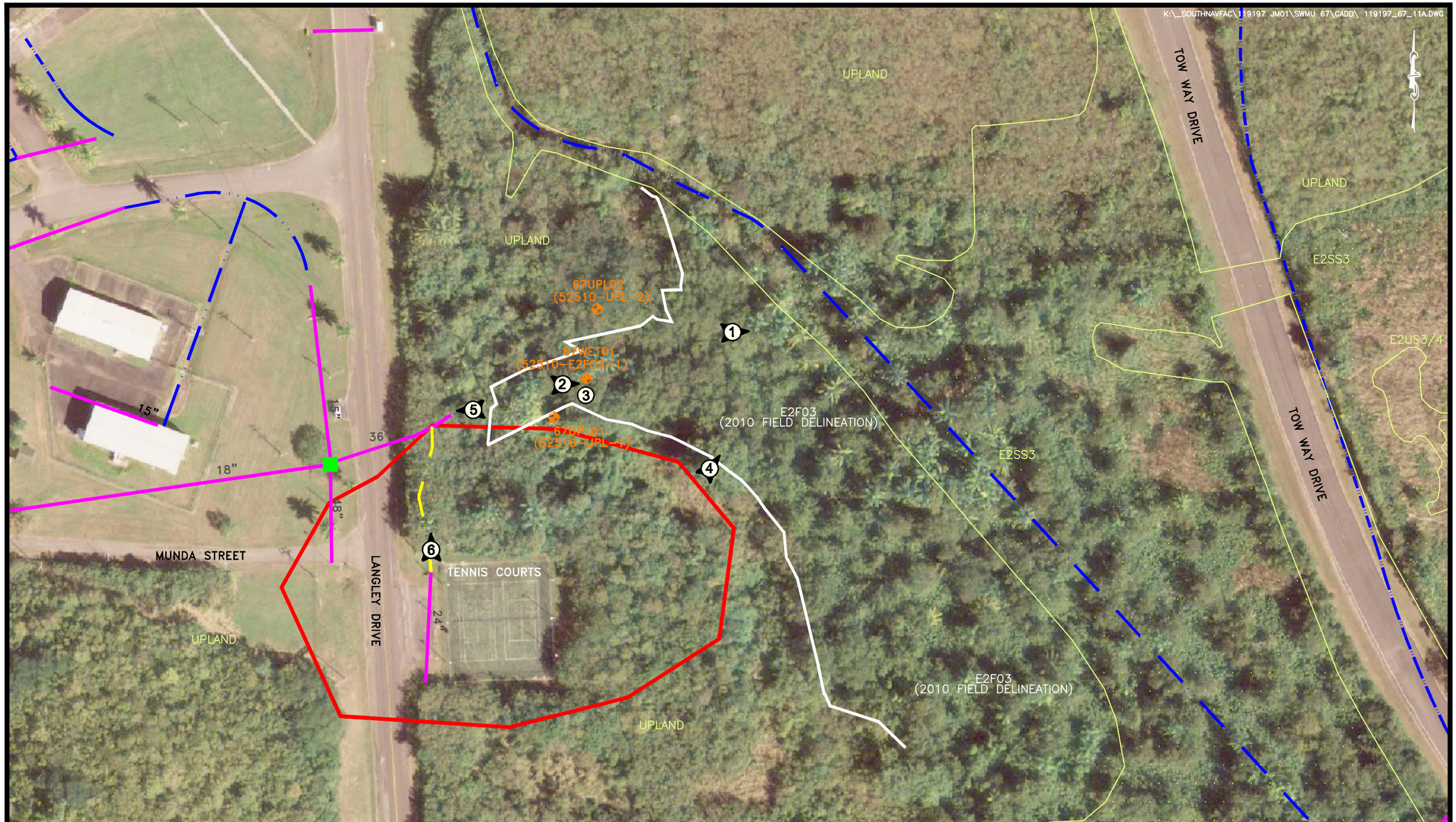
1 inch = 2000 Feet

Baker

FIGURE 1
PROJECT LOCATION MAP
SWMU 67–FORMER GAS STATION
WETLAND DELINEATION REPORT

SOURCE: METRODATA, INC., 1999.

NAVAL ACTIVITY PUERTO RICO



LEGEND

- EARTHEN DRAINAGE FEATURE
- SWMU BOUNDARY
- DITCH
- 24" STORM SEWER AND SIZE
- INLET
- ESTUARINE WETLAND BOUNDARY
- E2SS3 ESTUARINE WETLAND IDENTIFICATION
- 2010 FIELD DELINEATED WETLAND BOUNDARY
- EXISTING SOIL SAMPLING LOCATION
- 3 PHOTO LOCATION AND DIRECTION

100 0 50 100

1 inch = 100 ft.

SOURCE: USGS, NOV, 2006.

Baker

FIGURE 2
AQUATIC RESOURCES AND PHOTO LOCATION MAP
SWMU 67–FORMER GAS STATION
WETLAND DELINEATION REPORT

NAVAL ACTIVITY PUERTO RICO

APPENDIX A
WETLAND DETERMINATION DATA FORMS

WETLAND DETERMINATION DATA FORM – Caribbean Islands Region

Project/Site: NAPR - SWMU 67 Municipality/Town: Ceiba Sampling Date: 5-25-10

Applicant/Owner: U.S. NAVY PR or USVI: PR Sampling Point: 52570-EFO-1

Investigator(s): A. Gailey Ward/Estate: _____

Landform (hillslope, terrace, etc.): _____ Local relief (concave, convex, none): _____ Slope (%): _____

Lat: 804937.042 Long: 933297.844 Datum: NAD 83

Soil Map Unit Name: Md - Made LAND NWI classification: E2EF03

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No _____
Hydric Soil Present?	Yes X	No _____
Wetland Hydrology Present?	Yes X	No _____

Is the Sampled Area within a Wetland? Yes X No _____

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status
1. Avicennia germinans	40	Yes	OBL
2. Acrostichum aureum	40	Yes	OBL
3. Rhystonea borinquena	20	Yes	FAC
4.			
5.			
	100 = Total Cover		

Sapling/Shrub Stratum (Plot size: _____)			
1.			
2.			
3.			
4.			
5.			
	_____ = Total Cover		

Herb Stratum (Plot size: _____)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	_____ = Total Cover		

Woody Vine Stratum (Plot size: _____)			
1.			
2.			
3.			
4.			
	_____ = Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species _____	x 1 = _____
FACW species _____	x 2 = _____
FAC species _____	x 3 = _____
FACU species _____	x 4 = _____
UPL species _____	x 5 = _____
Column Totals: _____ (A)	_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

- ___ Rapid Test for Hydrophytic Vegetation
- ___ Dominance Test is >50%
- ___ Prevalence Index is ≤3.0[1]
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No _____

Remarks: Dominant - wetland vegetative species present.

SOIL

Sampling Point: 52510-EFO-1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-10	10YR 3/1						Silty clay loam	Saturated
10-18	7.5YR 4/0						Silty Clay	Saturated.

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Organic Bodies (A6)
- ___ 5 cm Mucky Mineral (A7)
- ___ Muck Presence (A8)
- X Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- X Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ Stratified Layers (A5)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ___

Depth (inches): ___

Hydric Soil Present? Yes X No ___

Remarks: Saturated - hydric soil.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- X High Water Table (A2)
- X Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- X Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Hydrogen Sulfide Odor (C1)
- X Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- X Fiddler Crab Burrows (C10)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): NA

Water Table Present? Yes X No ___ Depth (inches): 6"

Saturation Present? (includes capillary fringe) Yes X No ___ Depth (inches): 0-18"

Wetland Hydrology Present? Yes X No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: In addition to a shallow water table - Hydrology within the upper/headwater Reaches of this Resource are supplied via a Concrete Culvert Outlet. It is assumed that downgradient Portions of this resource receive Tidal influence.

WETLAND DETERMINATION DATA FORM – Caribbean Islands Region

Project/Site: NAPR - SWMU 67 Municipality/Town: Ceiba Sampling Date: 5-25-10

Applicant/Owner: U.S. NAVY PR or USVI: PR Sampling Point: 52510-UPL-1

Investigator(s): A. Gailey Ward/Estate: _____

Landform (hillslope, terrace, etc.): _____ Local relief (concave, convex, none): _____ Slope (%): 5-12 %

Lat: 804904.060 Long: 933258.844 Datum: NAD 83

Soil Map Unit Name: JaC2 - Jacana Clay, 5-12% slopes, eroded NWI classification: NA

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No X	**Is the Sampled Area within a Wetland?** Yes _____ No X
Hydric Soil Present?	Yes _____	No X	
Wetland Hydrology Present?	Yes _____	No X	

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status
1. Urochloa Maxima	60	Yes	FACU*
2. Samyda dodecandra	40	yes	NA
3.			
4.			
5.			
	100 = Total Cover		

Sapling/Shrub Stratum (Plot size: _____)			
1.			
2.			
3.			
4.			
5.			
	_____ = Total Cover		

Herb Stratum (Plot size: _____)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	_____ = Total Cover		

Woody Vine Stratum (Plot size: _____)			
1.			
2.			
3.			
4.			
	_____ = Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	_____	x 1 = _____
FACW species	_____	x 2 = _____
FAC species	_____	x 3 = _____
FACU species	_____	x 4 = _____
UPL species	_____	x 5 = _____
Column Totals:	_____ (A)	_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

__ Rapid Test for Hydrophytic Vegetation

__ Dominance Test is >50%

__ Prevalence Index is ≤3.0[1]

__ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes _____ No X

Remarks: upland species identified at this location.

52510-UPL-1

SOIL

Sampling Point: _____

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-8	10YR 4/4						clay loam	gravel/stones throughout.

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Organic Bodies (A6)
- ___ 5 cm Mucky Mineral (A7)
- ___ Muck Presence (A8)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ Stratified Layers (A5)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No X

Remarks: Hydric Soils NOT Present. Refusal beyond 8" at this location.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Fiddler Crab Burrows (C10)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes _____ No X Depth (inches): —

Water Table Present? Yes _____ No X Depth (inches): —

Saturation Present? (includes capillary fringe) Yes _____ No X Depth (inches): —

Wetland Hydrology Present? Yes _____ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Wetland Hydrology NOT Present. Upland area.

WETLAND DETERMINATION DATA FORM – Caribbean Islands Region

Project/Site: NAPR - SWMU 67 Municipality/Town: Ceiba Sampling Date: 5-25-10

Applicant/Owner: U.S. NAVY PR or USVI: PR Sampling Point: S2510 - UPL - 2

Investigator(s): A. Gailey Ward/Estate: _____

Landform (hillslope, terrace, etc.): _____ Local relief (concave, convex, none): _____ Slope (%): _____

Lat: 805007.726 Long: 933308.798 Datum: NAD 83

Soil Map Unit Name: Md - Made Land. NWI classification: NA

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No _____	**Is the Sampled Area within a Wetland?** Yes _____ No X
Hydric Soil Present?	Yes _____	No _____	
Wetland Hydrology Present?	Yes _____	No _____	

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status
1. Erythroxylum sp.	60	yes	NA
2. Pithecellobium ptercarpum	40	yes	NA
3.			
4.			
5.			
	100 = Total Cover		

Sapling/Shrub Stratum (Plot size: _____)			
1.			
2.			
3.			
4.			
5.			
	_____ = Total Cover		

Herb Stratum (Plot size: _____)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	_____ = Total Cover		

Woody Vine Stratum (Plot size: _____)			
1.			
2.			
3.			
4.			
	_____ = Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	_____	x 1 = _____
FACW species	_____	x 2 = _____
FAC species	_____	x 3 = _____
FACU species	_____	x 4 = _____
UPL species	_____	x 5 = _____
Column Totals:	_____ (A)	_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

___ Rapid Test for Hydrophytic Vegetation

___ Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes _____ No X

Remarks:

52510-UPL-2

SOIL

Sampling Point: _____

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-10	10YR 3/2		—				clay loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Organic Bodies (A6)
- ___ 5 cm Mucky Mineral (A7)
- ___ Muck Presence (A8)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ Stratified Layers (A5)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No X

Remarks: Upland Sample Point - hydric soils NOT Present. Refusal beyond 10".

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Fiddler Crab Burrows (C10)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes _____ No X Depth (inches): —

Water Table Present? Yes _____ No X Depth (inches): —

Saturation Present? (includes capillary fringe) Yes _____ No X Depth (inches): —

Wetland Hydrology Present? Yes _____ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: wetland hydrology NOT Present - upland sample location.

APPENDIX B
PHOTOS

Photo 1. E2FO3 wetland – dominant species:
Acrostichum aureum and *Avicennia germinans*. View looking east

Photo 2. Estuarine wetland sample point location: 52510-EFO-1
View looking east

Photo 3. Estuarine wetland sample point location: 52510-EFO-1.
Evidence of saturation and a high groundwater table.

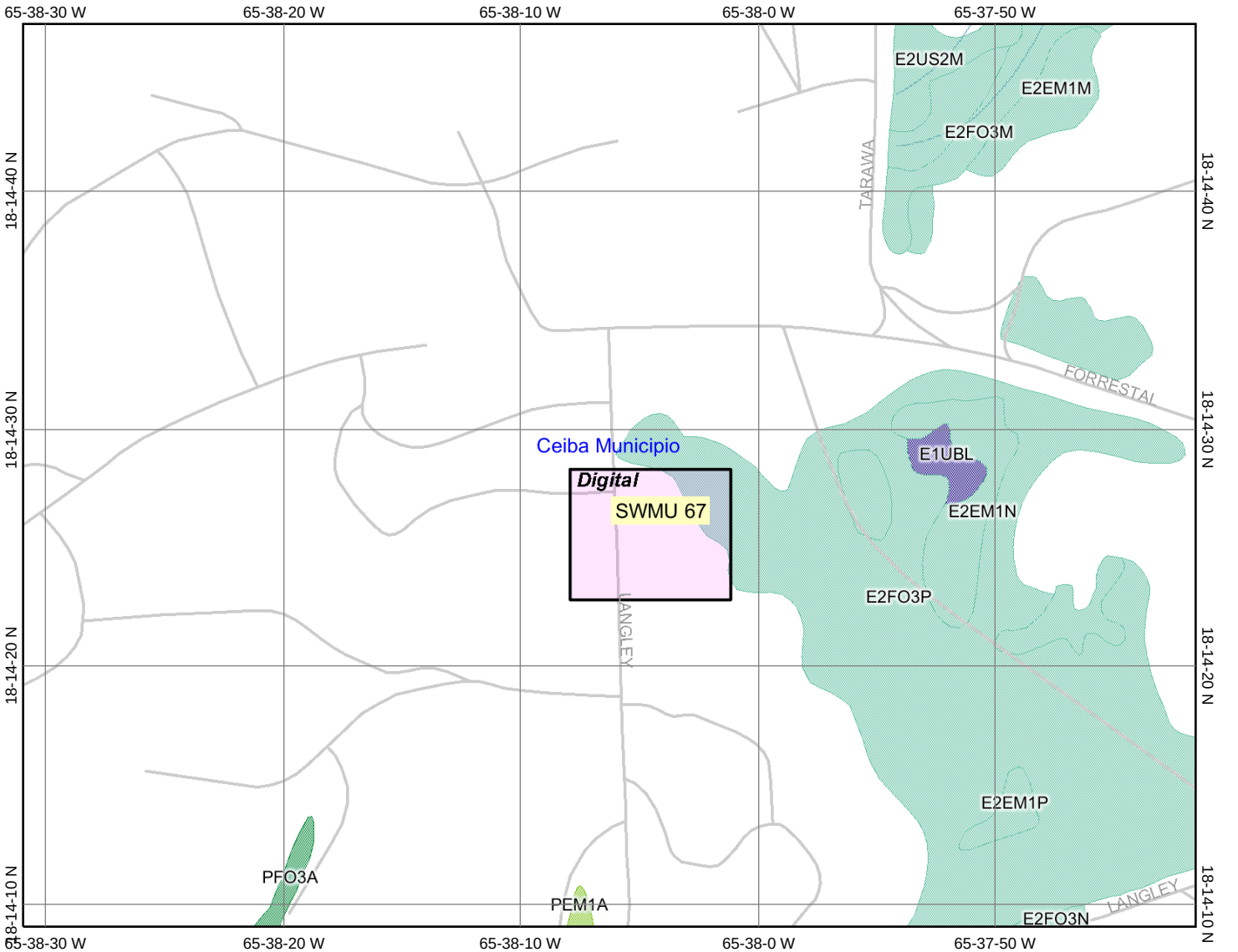
Photo 4. Boundary delineation flagging: “WETLAND DELINEATION”
View looking northeast

Photo 5. 36-inch Culvert outlet – freshwater hydrologic source (East of Langley Drive, and north of SWMU 67). View looking west

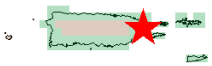
Photo 6. Earthen drainage feature - no surface connection with E2FO3 resource. View looking north

APPENDIX C
NATIONAL WETLANDS INVENTORY (NWI) MAP AND USDA SOIL SURVEY DATA

SWMU 67 - Phase I RFI



Map center: 18° 14' 28.0" N, 65° 38' 6.2" W



Legend

Major Roads

- Other Road
- Interstate
- State highway
- US highway

Roads

PRVI Cities

PRVI Wetland Polygons

- Estuarine and Marine Deepwater
- Estuarine and Marine Wetland
- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Lake
- Other
- Riverine

PRVI Available Wetland Data

- Non-Digital
- Digital
- No Data
- Scan

Waterbodies 2M

Streams 2M

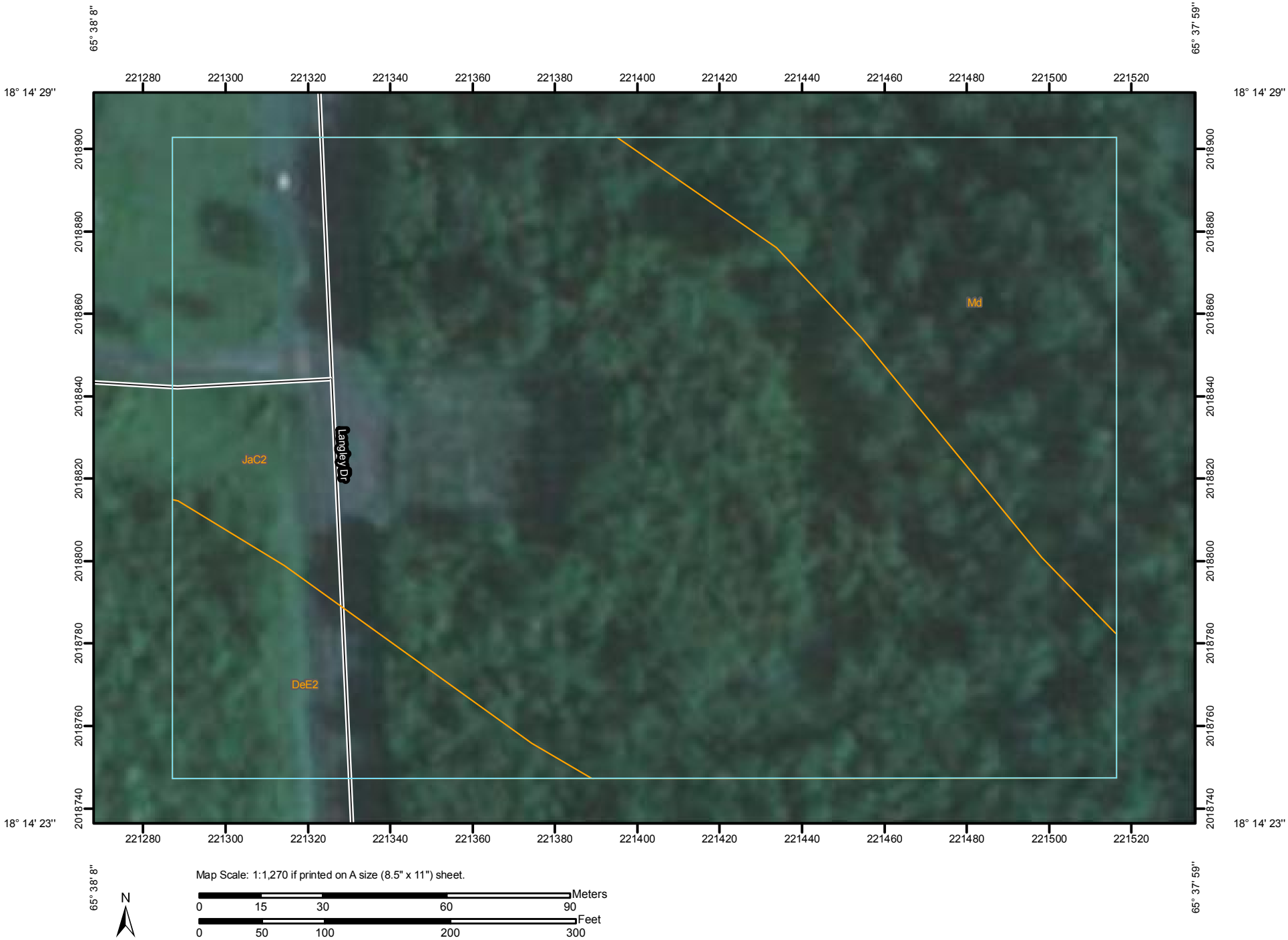
PRVI Counties 2M

N

Scale: 1:8,223

This map is a user generated static output from an Internet mapping site and is for general reference only. Data layers that appear on this map may or may not be accurate, current, or otherwise reliable. THIS MAP IS NOT TO BE USED FOR NAVIGATION.

Soil Map—Humacao Area, Puerto Rico Eastern Part
(SWMU 67)



MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Map Units

Special Point Features

Blowout

Borrow Pit

Clay Spot

Closed Depression

Gravel Pit

Gravelly Spot

Landfill

Lava Flow

Marsh or swamp

Mine or Quarry

Miscellaneous Water

Perennial Water

Rock Outcrop

Saline Spot

Sandy Spot

Severely Eroded Spot

Sinkhole

Slide or Slip

Sodic Spot

Spoil Area

Stony Spot

Very Stony Spot

Wet Spot

Other

Special Line Features

Gully

Short Steep Slope

Other

Political Features

Cities

Water Features

Oceans

Streams and Canals

Transportation

Rails

Interstate Highways

US Routes

Major Roads

Local Roads

MAP INFORMATION

Map Scale: 1:1,270 if printed on A size (8.5" × 11") sheet.

The soil surveys that comprise your AOI were mapped at 1:20,000.

Please rely on the bar scale on each map sheet for accurate map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: UTM Zone 20N NAD83

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Humacao Area, Puerto Rico Eastern Part
Survey Area Data: Version 3, Aug 19, 2008

Date(s) aerial images were photographed: 2004

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Humacao Area, Puerto Rico Eastern Part (PR689)			
Map Unit Symbol	**Map Unit Name**	**Acres in AOI**	**Percent of AOI**
DeE2	Descalabrado clay loam, 20 to 40 percent slopes, eroded	0.9	9.8%
JaC2	Jacana clay, 5 to 12 percent slopes, eroded	6.3	71.6%
Md	Made land	1.6	18.6%
Totals for Area of Interest		**8.8**	**100.0%**

Humacao Area, Puerto Rico Eastern Part

DeE2—Descalabrado clay loam, 20 to 40 percent slopes, eroded

Map Unit Setting

Elevation: 30 to 710 feet
Mean annual precipitation: 30 to 40 inches
Mean annual air temperature: 77 to 81 degrees F
Frost-free period: 365 days

Map Unit Composition

Descalabrado and similar soils: 100 percent

Description of Descalabrado

Setting

Landform: Hillslopes, mountain slopes, ridges, ridges
Landform position (two-dimensional): Backslope, shoulder, summit
Landform position (three-dimensional): Mountainflank, mountaintop, head slope, crest, side slope
Down-slope shape: Convex, concave
Across-slope shape: Convex, concave
Parent material: Residuum and colluvium

Properties and qualities

Slope: 20 to 40 percent
Depth to restrictive feature: 10 to 20 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 2 percent
Available water capacity: Very low (about 2.2 inches)

Interpretive groups

Land capability (nonirrigated): 7s

Typical profile

0 to 6 inches: Clay loam
6 to 19 inches: Gravelly clay
19 to 23 inches: Unweathered bedrock

Data Source Information

Soil Survey Area: Humacao Area, Puerto Rico Eastern Part
Survey Area Data: Version 3, Aug 19, 2008

Humacao Area, Puerto Rico Eastern Part

JaC2—Jacana clay, 5 to 12 percent slopes, eroded

Map Unit Setting

Elevation: 20 to 250 feet
Mean annual precipitation: 30 to 40 inches
Mean annual air temperature: 79 to 81 degrees F
Frost-free period: 365 days

Map Unit Composition

Jacana and similar soils: 100 percent

Description of Jacana

Setting

Landform: Hillslopes
Landform position (two-dimensional): Toeslope, footslope, backslope, shoulder, summit
Landform position (three-dimensional): Base slope, side slope, crest
Down-slope shape: Convex, linear
Across-slope shape: Convex, linear
Parent material: Weathered materials

Properties and qualities

Slope: 5 to 12 percent
Depth to restrictive feature: 20 to 40 inches to paralithic bedrock
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 1 percent
Maximum salinity: Nonsaline (0.0 to 2.0 mmhos/cm)
Available water capacity: Low (about 4.5 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability (nonirrigated): 4c

Typical profile

0 to 5 inches: Clay
5 to 21 inches: Clay
21 to 26 inches: Clay loam
26 to 30 inches: Unweathered bedrock

Data Source Information

Soil Survey Area: Humacao Area, Puerto Rico Eastern Part
Survey Area Data: Version 3, Aug 19, 2008

Humacao Area, Puerto Rico Eastern Part

Md—Made land

Map Unit Composition

Made land: 100 percent

Data Source Information

Soil Survey Area: Humacao Area, Puerto Rico Eastern Part
Survey Area Data: Version 3, Aug 19, 2008