



**FINAL
PHASE I RCRA FACILITY INVESTIGATION
REPORT
SWMU 70 – DISPOSAL AREA NORTHWEST
OF LANDFILL**



***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. N62470-07-D-0502
DO 0002

November 19, 2009

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

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DELIVERY ORDER 0002**

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.

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Date: November 19, 2009

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LIST OF ACRONYMS AND ABBREVIATIONS

AET	Apparent Effects Threshold
AFWTF	Atlantic Fleet Weapons Training Facility
APA	Aerial Photographic Analysis
AQUIRE	Aquatic Toxicity Information Retrieval
Baker	Michael Baker Jr., Inc.
bgs	below ground surface
BRAC	Base Realignment and Closure
CADD	Computer Aided Design and Drafting
CCME	Canadian Council of Ministers of the Environment
CERCLA	Comprehensive Environmental Recovery, Compensation, and Liability Act
CERFA	Community Environmental Response Facilitation Act
CRQL	Contract Required Quantitation Limit
CSF	Cancer Slope Factor
DGPS	Differential Global Positioning System
DO	Delivery Order
DPT	Direct Push Technology
DRO	Diesel-Range Organics
E2SS3	Estuarine-Intertidal-Scrub/Shrub
E2US3/4/5	Estuarine-Intertidal-Unconsolidated Shore Mud, Organic, Dead Matter
EC ₅₀	Median Effective Concentration
Eco-SSL	Ecological Screening Level
ECP	Environmental Condition of Property
EPA	Environmental Protection Agency
EqP	Equilibrium Partitioning
ER-L	Effects Range-Low
ER-M	Effects Range-Median
F	Fahrenheit
FCV	Final Chronic Value
GIS	Geographic Information System
GPS	Global Positioning System
GRO	Gasoline-Range Organics
HM	Hazardous Materials
HQ	Hazard Quotient
HSA	Hollow-Stem Auger
IAS	Initial Assessment Study
ID	Inside Diameter
IDW	Investigation-Derived Waste
ILCR	Incremental Lifetime Cancer Risk
IUR	Inhalation Unit Risk
J	Estimated Value

LIST OF ACRONYMS AND ABBREVIATIONS

(continued)

kg	Kilograms
LANTDIV	Naval Facilities Engineering Command, Atlantic Division
LC ₅₀	Median Lethal Concentration
LLPAH	Low-Level Polynuclear Aromatic Hydrocarbon
LOAEC	Lowest Observed Adverse Effect Concentration
LOEC	Lowest Observed Effect Concentration
LOEL	Lowest Observable Effect Level
MATC	Maximum Acceptable Toxicant Concentration
MC	Macro-Core®
MCL	Maximum Contaminant Level
MDL	Method Detection Limit
MGD	Million Gallons per Day
mg/kg	Milligrams per Kilograms
MHSPE	Ministry of Housing, Spatial Planning and Environment
ml	Milliliter
MS/MSD	Matrix Spike/Matrix Spike Duplicate
NAD	North American Datum
NAPR	Naval Activity Puerto Rico
NAVFAC	Naval Facilities Engineering Command
NAWQC	National Ambient Water Quality Criteria
NEESA	Naval Energy and Environmental Support Activity
NOAA	National Oceanic and Atmospheric Administration
NOAEC	No Observed Adverse Effect Concentration
NOEC	No Observed Effect Concentration
NSRR	Naval Station Roosevelt Roads
OP	Organo-Phosphorus
PAH	Polynuclear Aromatic Hydrocarbon
PCB	Polychlorinated Biphenyl
PEL	Probable Effects Level
PI	Photo Identified
PID	Photoionization Detector
PMO	Program Management Office
POL	Petroleum, Oils, and Lubricant
PVC	Polyvinyl Chloride
QA/QC	Quality Assurance/Quality Control
R	Rejected Value
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

LIST OF ACRONYMS AND ABBREVIATIONS

(continued)

RTK	Real-Time Kinematic
SCV	Secondary Chronic Values
SDG	Sample Delivery Group
SE	Southeast
SL	Screening Level
SQUIRTs	Screening Quick Reference Tables
SVOC	Semi-Volatile Organic Compound
SWMU	Solid Waste Management Unit
TEL	Threshold Effects Level
TGO	Trimble Geometrics Office™
TPH	Total Petroleum Hydrocarbons
U	Nondetect
USEPA	United States Environmental Protection Agency
VOA	Volatile Organic Analysis
VOC	Volatile Organic Compound

1.0 INTRODUCTION

This document presents the results of the Phase I Resource Conservation Recovery Act (RCRA) Facility Investigation (RFI) Report at Solid Waste Management Unit (SWMU) 70 – Disposal Area Northwest of Landfill located at Naval Activity Puerto Rico (NAPR), Ceiba, Puerto Rico, formerly known as Naval Station Roosevelt Roads (NSRR). 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 N62470-07-D-0502, Delivery Order [DO] 0002).

The United States Environmental Protection Agency (USEPA) issued a RCRA 7003 Administrative Order on Consent (USEPA Docket No. RCRA-02-2007-7301) (USEPA, 2007a) to NAPR which identified SWMU 70 (formerly referred to as ECP 16) as having documented releases of solid and/or hazardous waste and hazardous constituents. The Administrative Order required the preparation and submittal to the USEPA for their approval, an acceptable work plan to complete the equivalent of a Phase I RFI. The Phase I RFI Work Plan (Baker, 2007) was approved by USEPA on May 13, 2008. This Phase I RFI Report presents the results of the field investigation conducted in January 2009 following the approved Phase I RFI Work Plan for SWMU 70.

1.1 Purpose of Report

A Phase I RFI is required as outlined in the NAPR RCRA 7003 Order issued by USEPA Region II. 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 January 2009 Phase I RFI field work, which was implemented to confirm the presence of, and to further characterize volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), and metals detected in the surface soil and groundwater and metals detected in the subsurface soil and sediment during the Environmental Condition of Property (ECP) Phase II Investigation.

1.2 Objectives

The objectives of the RFI are to:

- Determine whether contaminants are present from past disposal activities at SWMU 70, from the completion of field activities (surface and subsurface soil, sediment, and groundwater sampling) as described in the approved Phase I RFI Work Plan (Baker, 2007);
- Screen the impacted media for potential human health risks posed by the site;
- Screen the impacted media for potential ecological risks posed by the site; and
- Provide recommendations as to whether additional action is warranted at this SWMU.

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 70. 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 including the site geology/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 from the RFI, while Section 8.0 lists report references.

2.0 BACKGROUND

This section discusses the history and description of NAPR and SWMU 70. This section also includes a summary of the results of previous investigations conducted at SWMU 70.

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 ten 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 41,000), which is about five miles north of NAPR off Route 3. Ceiba (population approximately 18,000) 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 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 required that the 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). NSRR has undergone operational closure as of March 31, 2004 and has been designated as Naval Activity Puerto Rico. 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 Naval Facilities Engineering Command, Atlantic Division (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 (NAVFAC Atlantic, 2005). The Final ECP report recommended completion of a RCRA facility investigation of SWMU 70, which was the basis for the Phase I RFI and this report.

The RCRA 7003 Administrative Order (Environmental Protection Agency [EPA] Docket No. RCRA-02-2007-7301) identified SWMU 70 (formerly referred to as ECP Site 16) as having documented releases of solid and/or hazardous waste and hazardous constituents and requires an

acceptable work plan to complete site characterization equivalent to a Phase I RFI. Following a public comment period the Administrative Order became effective on January 29, 2007.

2.2 SWMU 70 Description and History

SWMU 70 – Disposal Area Northwest of Landfill is located adjacent to Ensenada Honda, southeast of Building 394, and northwest of the closed base landfill (SWMU 3) (see Figure 2-2) and covers a large area (approximately 55 acres) of flat lying land consisting of open areas and areas covered by secondary growth vegetation as shown on Figures 2-3 and 2-4.

The Aerial Photo Analysis (APA) presented in the Phase I ECP Report (LANTDIV, 2004) identified this area as Photo Identified (PI) Site 22, due to the observation of a large suspect disposal area with disturbed ground, debris, a cleared or graded area, and stressed vegetation from 1976-1980s. Figure 2-3 presents the conditions of the site in 1976 along with the polygon features from 1976, 1977, 1985, and 1995 identified during the APA. These polygons identify the suspect areas from the respective aerial photographs. In addition, containers or drums had been discarded in a vegetated area north of the main disposal area. The records review did not identify any activities in this area. The physical site inspection observed numerous piles of construction debris (metal, concrete, polyvinyl chloride [PVC] piping), but no drums or evidence of stains or stressed vegetation. Interviews confirmed the area as a construction and/or solid waste disposal site, including potential disposal of petroleum, oils, and lubricant (POL) or hazardous materials (HM) containers.

During the Phase II ECP investigation, numerous piles of construction debris (metal, concrete, and PVC piping) were observed in different portions of the site, as was the case during the physical site inspection. The Final Phase I/II ECP report also noted that there were no drums or evidence of stains or stressed vegetation. Appendix A provides photographs that were obtained during the Phase I RFI to show current site features/conditions. Photo 1 presents an example of the construction debris observed. As shown in Photo 2, SWMU 70 is bordered on the southwest by the Ensenada Honda. A majority of this site is covered in thick secondary growth vegetation, as shown on Photo 3. In addition, the central and southern portions of the site are classified as wetlands consisting of either estuarine-intertidal-scrub/shrub (broad-leaved evergreen) (E2SS3), or estuarine-intertidal-unconsolidated shore mud, organic, dead matter (E2US3/4/5).

Figure 2-4 shows the SWMU layout and sample locations from the ECP. The polygons from the APA have been overlaid on this and other figures to show how these historical areas related to the present site conditions. As discussed in more detail in the following section, the result of the Phase II ECP concluded that SWMU 70 has been impacted by past operations at NAPR and recommended the site be incorporated into the RCRA Corrective Action Program to permit a more detailed assessment.

2.3 Previous Investigations

The Phase I/II ECP investigation included the sampling and analysis of surface soil at six locations, subsurface soil at two locations, groundwater at three locations, and surface water with co-located sediment from two locations along the shoreline of the surface water body, Ensenada Honda. Analytical data from the Phase I/II ECP are presented in Appendix B, including comparisons to human health and ecological screening criteria used at that time. The tables also include comparison to the then applicable facility background levels for metals. It should be noted that the 2004 ECP analytical data did not go through a formal data validation process.

The area indicated as a disposal area located northwest of the current landfill was investigated during the ECP investigation, as shown on Figure 2-4. Surface soil samples were collected from six soil boring locations (16E-01 through 16E-06) from a depth of 0 to 1 foot below ground surface (bgs). Subsurface soil samples were only collected from soil boring 16E-01 and 16E-02. No subsurface samples were collected from soil boring locations 16E-03, 16E-04, 16E-05, and 16E-06 because the groundwater at these four locations was encountered at depths ranging from 0.3 foot bgs to 1.2 feet bgs. The subsurface soil that was obtained from 16E-01 and 16E-02 were collected to a depth of 15 feet bgs and 5 feet bgs, respectively. Groundwater at both locations was encountered at 5 feet bgs. The soil samples were obtained from 3 to 5 feet bgs and analyzed for Appendix IX VOCs, SVOCs, pesticides/polychlorinated biphenyls (PCBs), organophosphorus- (OP-) pesticides, chlorinated herbicides, and metals.

A temporary monitor well was installed at soil boring location 16E-01, and groundwater samples were collected. Due to the shallow depth of groundwater at soil boring locations 16E-05 and 16E-06, the groundwater samples were collected by digging a sump in the area of the soil boring and utilizing the direct dip method immediately upon the sump filling with water. All groundwater samples were analyzed for Appendix IX VOCs, SVOCs, pesticides/PCBs, OP-pesticides, chlorinated herbicides, and metals.

Two surface water and sediment sample locations were collected from the shoreline of this site along Ensenada Honda. Both surface water and sediment samples were analyzed for Appendix IX VOCs, SVOCs, pesticides/PCBs, OP-pesticides, chlorinated herbicides, and metals.

Results indicated SWMU 70 has locations with detections of VOCs and SVOCs that are consistent with a former disposal area use. Only one organic compound, indeno(1,2,3-cd)pyrene, exceeded the USEPA Region III Tap Water Risk Based Concentration (RBC) in the groundwater at sample location 16E-05. In the soil, arsenic and vanadium exceeded their respective USEPA Region III Residential RBCs in all surface samples. Chromium exceeded its USEPA Region III Residential RBC at 16E-06. Arsenic and vanadium exceeded their USEPA Region III Industrial RBCs in surface samples at 16E-01 through 16E-05. Arsenic was found at its highest concentrations in surface soil in the area around location 16E-04 and 16E-05. Of these two, only arsenic also exceeded the background screening values used during the Phase I/II ECP for surface soil and subsurface soil at NAPR (NAVFAC Atlantic, 2005). Concentrations of arsenic in subsurface soil were higher than in surface soil, exceeding the USEPA Region III Industrial RBCs at 16E-01 and 16E-02. Vanadium exceeded the USEPA Region III Tap Water RBC in groundwater at 16E-01 and 16E-06. This is likely due to high background vanadium concentrations in the soil at NAPR. In the sediment samples, copper and tin exceeded the marine sediment screening values at 16E-SD01 and 16E-SD02. The sediment sample at 16E-SD02 also exceeded the marine sediment screening value for silver. No exceedances of criteria were noted in the surface water.

All analytical results from the ECP investigation can be found in Appendix B. No detections of pesticides/PCBs, OP-pesticides, or chlorinated herbicides were found during the Phase II ECP investigation performed at SWMU 70.

From the detections of compounds noted above, and the exceedances of criteria at this site, the Final Phase I/II ECP report (NAVFAC Atlantic, 2005) concluded that the soil, groundwater, and sediment may be slightly impacted from previous site activities. Therefore, the report recommended further investigation of the media at this SWMU.

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 below present descriptions of the geologic, hydrologic, and hydrogeologic conditions across NAPR. These are generally applicable, but may or may not be specifically-applicable, to the SWMU 70 area. Site specific geologic, hydrologic, and hydrogeologic information can be referenced in sections 5.2.1 through 5.2.3.

3.3.1 Soils

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

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

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

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

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

The Caguabo-Mucara-Naranjito Association consists generally of shallow and moderately deep, well drained, sloping to very steep soils on volcanic uplands. This association consists of soils that formed in residual material weathered from volcanic rocks. This association is represented at

NAPR by soils of the Sabana series, which are found on the side slopes and the hilly terrain west of Langley Drive in the Fort Bundy area. These soils are suited for pasture and woodland. Steep slopes, susceptibility to erosion, and depth to bedrock are the main limitations for farming and for recreation and urban areas.

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

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

3.3.2 Regional Geology

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

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

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

3.3.3 Regional Hydrology

The surface waters that flow across the northeastern plain of Puerto Rico, where NAPR is located, originate on the eastern slopes of the Sierra De Luquillo Mountains. Surface runoff is channeled into various rivers and streams that eventually flow into the Caribbean Sea. The Daguao River and Quebrada Seca Stream (a tributary to Rio Daguao) collect surface waters from the hills immediately north of NAPR and, in periods of heavy rain, flooding on NAPR occurs. The Daguao-Quebrada Seca watershed comprises an area of approximately 7.6 square miles (4,900 acres), and the river falls some 700 feet from its source to sea level. Increased

development in the town of Ceiba, especially in areas adjacent to NAPR's northern boundary, has significantly increased the surface runoff reaching NAPR, causing ponding and erosion in the Boxer Drive area. Boxer Drive, for a major portion of its length, is subject to surface water flooding, as are Hangar 200 and AIMD Hangar 379 and adjacent apron areas. This condition has been alleviated by the construction of a new highway (Route 3) immediately outside the fence and the realignment of Boxer Drive both with attendant storm water management features.

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

The quality of surface waters is variable, reflecting the drainage area through which the water flows. Generally, surface waters have high turbidities and bio-organics (naturally occurring organics, such as decay products of vegetable and animal matter) due to the periodic heavy rains that can easily erode soils from steep slopes, exposed areas and disturbed streambeds. Water from alluvial aquifers along the coast of NAPR is of a calcium bicarbonate type, and has high concentrations of iron and manganese. The source of these minerals is unknown, but they may be derived from buried swamp or lagoon deposits.

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

The NAPR potable water treatment plant receives raw water from the Rio Blanco through a 27-inch reinforced concrete pipe that replaced the old, open channel. The intake is located at the foot of the El Yunque rain forest. This buried raw water line traverses a distance of 14 miles from the intake to the NAPR boundary. A raw water reservoir is located at the water treatment plant and has a 45 million gallon capacity. Additionally, there are two fire protection storage reservoirs with a total capacity of 520,000 gallons.

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

3.3.4 Regional Hydrogeology

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

In 2004, Baker conducted a Phase II ECP investigation involving 20 sites throughout NAPR (NAVFAC Atlantic, 2005). Some consistent stratigraphic trends were observed during the ECP. The site hydrogeology can be better understood in the context of NAPR regional geology. For the sake of simplicity, the NAPR regional geology can be divided into three regions:

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

The upland areas of NAPR include the hills encompassing the Tow Way Fuel Farm and hospital areas, and the hills encompassing the area behind the Exchange, the former Atlantic Fleet Weapons Training Facility (AFWTF) Command, and Fort Bundy area. These upland areas are underlain by bedrock (predominately Gabbro) and exhibit varying degrees of weathering. Typically, the bedrock is overlain by a relatively thin residual soil (i.e., residuum). Residuum is unconsolidated soil, originating from weathered-in-place bedrock. This residuum generally consists of sand, silt, and clay.

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

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

SWMU 70 (ECP Site 16) is located adjacent to Ensenada Honda, southeast of Building 394, and northwest of the closed base landfill (SWMU 3). The central and southern portions of the SWMU are classified as wetlands consisting of either estuarine-intertidal-scrub/shrub (broad-leaved evergreen) (E2SS3), or estuarine-intertidal-unconsolidated shore mud, organic, dead matter (E2US3/4/5), while the northern and eastern portions are located in the upland area.

4.0 PHASE I RCRA FACILITY INVESTIGATION ACTIVITIES

This section summarizes the Phase I RFI field work, analytical, and data validation activities that were conducted during the January 2009 investigation. The work was conducted mainly in accordance with the Final Phase I RFI Work Plan for SWMU 70 (Baker, 2007). However, minor deviations from the Work Plan were made as a result of field conditions observed during the investigation. Minor deviations are explained at the end of Section 4.0. Figures 4-1 and 4-2 depict sampling locations at SWMU 70.

The field activities conducted at SWMU 70 primarily consisted of the following:

- The collection of six surface soil samples (five environmental and one duplicate) from five locations. All surface soil samples were submitted for laboratory analysis of Appendix IX VOCs, SVOCs (including low-level polynuclear aromatic hydrocarbons [LLPAHs]), PCBs, metals, and total petroleum hydrocarbon (TPH) diesel-range organics (DRO)/gasoline-range organics (GRO).
- The collection of seven subsurface soil samples (five environmental and two duplicate) from five locations. All subsurface soil samples were submitted for laboratory analysis of Appendix IX VOCs, SVOCs (including LLPAHs), PCBs, metals, and TPH DRO/GRO.
- The collection of four open water sediment samples (three environmental and one duplicate) from three locations along the shoreline of the Ensenada Honda. All open water sediment samples were submitted for laboratory analysis of Appendix IX VOCs, SVOCs (including LLPAHs), PCBs, metals, and TPH DRO/GRO.
- The collection of three estuarine sediment samples from three locations in the southwestern part of the SWMU that were originally proposed for collection of soil (70SB06, 70SB07, 70SB08). Field observations indicated the environmental medium more appropriately represented sediment rather than soil. All estuarine sediment samples were submitted for laboratory analysis of Appendix IX VOCs, SVOCs (including LLPAHs), PCBs, metals, TPH DRO/GRO, and total organic carbon (TOC).
- The collection of nine groundwater samples (eight environmental and one duplicate) from eight locations. Four groundwater samples were collected from permanent wells installed at the upland locations (70SB01, 70SB02, 70SB03, and 70SB04). The remaining samples were collected from temporary wells installed at the transitional/estuarine locations (70SB05, 70SB06, 70SB07, and 70SB08), three of which were from the estuarine sediment sample locations (70SB06, 70SB07, and 70SB08). All groundwater samples were submitted for laboratory analysis of Appendix IX VOCs, SVOCs (including LLPAHs), PCBs, total and dissolved metals, and TPH DRO/GRO.
- Other field activities were also conducted in support of the investigation of this SWMU including utility clearance, site clearing, groundwater elevation measurement, surveying, management of investigation derived wastes, and QA/QC sampling.

Section 4.1 provides a more detailed discussion of surface and subsurface soil sampling activities. Section 4.2 discusses the permanent monitoring well installation and groundwater sampling proposed in the Work Plan. Section 4.3 discusses the temporary well installation and

groundwater sampling activities. Section 4.4 discusses open water and estuarine sediment sampling activities. Sections 4.5 through 4.12 discuss other field activities that were conducted in support of the investigation.

The environmental samples collected from the site were analyzed at a fixed-base laboratory and the data was validated by an independent third party. A summary matrix showing 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) collected and the analyses conducted on these samples are shown in Table 4-2. The analytical parameter lists and the contract required quantitation limits are shown in Table 4-3.

Field notes containing descriptions of the site activities, boring logs and well construction details, chain-of-custody records, and site photographs are presented in Appendix A. Appendix B includes a summary of analytical results from the Phase II ECP investigation. Analytical results are presented in Appendix C. Data validation report summaries are provided in Appendix D.

Minor deviations from the work plan were made as a result of field conditions observed during the investigation. Some of those modifications include:

1. Only one subsurface soil sample was collected from borings 70SB01, 70SB02, 70SB03, 70SB04, and 70SB05 due to the presence of groundwater at approximately three feet bgs.
2. Boring location 70SB05 was found to be in a transitional area within an estuarine wetland (approximately 100 feet from designated upland habitat). Although determined in the field to be soil rather than sediment, shallow groundwater was evident. A hand auger was used to bore a hole and a 2-inch PVC well screen was inserted into the soil to serve as a temporary well. A sample was collected immediately after the screen filled with water. It should be noted that field conditions such as saturated/inundated wetland areas to the south and west, various topographical changes, and mounding to the north and east limited the drilling rig from gaining access to 70SB05 and subsequently installing the proposed permanent well.
3. Boring locations 70SB06, 70SB07, and 70SB08 were found to be located in an estuarine wetland with saturated sediment and shallow groundwater. Although permanent monitoring wells were not installed, a hand auger was used to bore a hole and a 2-inch PVC well screen was inserted into the sediment and served as a temporary well. A sample was collected immediately after the screen filled with water.

4.1 Surface and Subsurface Soil Sampling

Surface soil samples were collected from five locations (70SB01, 70SB02, 70SB03, 70SB04, and 70SB05, as shown on Figures 4-1 and 4-2) using Macro-Cores® during boring advancement from a depth of 0.0 to 1.0 foot bgs. Surface soil samples were collected after removing any vegetation and topsoil/root zones. The samples were transferred directly into pre-labeled sample jars and placed on ice. Including a field duplicate from 70SB04, a total of six surface soil samples were analyzed for Appendix IX VOCs, SVOCs (including LLPAHs), PCBs, metals, and TPH DRO/GRO. Sample collection for VOCs included the use of Terra Core kits. The Terra Core kits included one disposal syringe, one dry weight container, two-40 milliliter (ml) volatile organic analysis (VOA) vials (with stir bar) including 5 ml of laboratory grade deionized water

and one-40 ml VOA vial (with stir bar) including 5 ml of methanol solution. The deionized water vials were frozen within 24 hours and then shipped to laboratory. Table 4-1 provides a summary of the surface soil samples collected at SWMU 70.

Subsurface soil samples were also collected from soil boring locations 70SB01, 70SB02, 70SB03, 70SB04, and 70SB05, as shown on Figures 4-1 and 4-2. The subsurface samples were collected from a depth interval of 1 to 3 feet bgs. Only one subsurface soil sample was collected from each boring location because groundwater was encountered at approximately three feet. Including two field duplicates from 70SB04 and 70SB05, a total of seven subsurface soil samples were collected and analyzed for Appendix IX VOCs, SVOCs (including LLPAHs), PCBs, metals, and TPH DRO/GRO. Sample locations 70SB01, 70SB02, and 70SB03 were advanced around ECP sample location 16E-01, where arsenic was detected at elevated levels in the subsurface soil, within the perimeters of the disturbed areas identified in historical aerial photographs. Sample location 70SB04 was advanced downgradient (southwest) of ECP sample location 16E-02. Sample location 70SB05 was advanced within the central area of the SWMU at the northern boundary of the disturbed areas within the wetland boundary identified in historical aerial photographs.

Additionally, 70SB06, 70SB07, and 70SB08 were proposed in the southwestern part of the SWMU based upon disturbed areas identified in historical aerial photographs (near/in the mangrove swamp) to determine potential migration of contaminants toward the Ensenada Honda. However, these locations were found to be located in an estuarine wetland with saturated sediment and shallow groundwater and were therefore, reclassified as estuarine sediment. Only one surface sediment sample was collected from each of these three locations.

Field observations and photoionization detector (PID) readings did not indicate the presence of specific zones of contamination. The sampling depths were selected in accordance with the approved work plan with some modifications noted (i.e., only one sample collected just above the water table due to the presence of shallow groundwater). The samples were transferred directly into pre-labeled sample jars and placed on ice. Samples were shipped in coolers with chain-of-custody forms (presented in Appendix A), which included the requested analyses for the samples. The subsurface soil samples were analyzed for Appendix IX VOCs, SVOCs (including LLPAHs), PCBs, TPH DRO/GRO, and metals, as summarized on Table 4-1.

Soil borings were advanced using Direct Push Technology (DPT) (Geoprobe 66DT rig operated by JFA Geological and Environmental Scientists, P.S.C., Aguadilla, Puerto Rico). Surface soil and subsurface soil samples were collected using 4-foot Macro-Cores®. Soil boring logs are presented in Appendix A.

Soil samples were field-screened for non-specific, total VOCs using a 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 A). The field screening procedure for soils collected using the Geoprobe Macro-Core® (MC) Sampler (disposable plastic liner) involved making a longitudinal cut along the entire length of the Geoprobe MC liner, separating the two edges of the liner, and screening the entire length of the soil core with a PID. Measurable organic vapors above background levels were not observed in any of the eight boreholes, with the exception of natural organic readings from the encountered peat material.

4.2 Monitoring Well Installation and Groundwater Sampling

Four permanent monitoring wells were installed at SWMU 70 at soil boring locations 70SB01, 70SB02, 70SB03, and 70SB04 in the northern portion of the SWMU. Permanent wells were proposed to be installed at all eight soil boring locations. However, permanent wells were not installed at 70SB05, 70SB06, 70SB07, and 70SB08. Boring location 70SB05 was found to be in a transitional area within an estuarine wetland (approximately 100 feet from designated upland habitat). Shallow groundwater was encountered and precluded the installation of a permanent monitoring well. Similarly, boring locations 70SB06, 70SB07, and 70SB08 were located in an estuarine wetland with shallow groundwater present. Based on these findings during the field investigation, temporary monitoring wells were installed at these locations. Temporary monitoring well installation is discussed in the following section (Section 4.3).

All monitoring wells were installed using a GeoProbe 66-DT with 4-1/4-in Inside Diameter (ID) Hollow Stem Augers (HSAs). Soil borings were advanced using DPT methods (refer to Section 4.1). The four monitoring wells were installed to a total depth of 14 feet bgs each based on the interpreted depth to the saturated soil. The wells were constructed of 2-inch ID, Schedule 40 PVC, with flush joint threads. The wells were generally constructed with a 10-foot long well screen installed to straddle the water table. 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 HSAs were withdrawn from the borehole. The sand was extended to approximately 1.5 to 2 feet above the top of the screened interval at all monitoring well locations. An approximate 1 to 2-foot thick sodium bentonite seal was placed above the sand pack. The bentonite seal was hydrated with potable water. The annular space above the bentonite seal was backfilled with cement/bentonite grout to prevent surface water from infiltrating into the screened groundwater monitoring zone. An expandable, water tight locking cap or slip-cap with a vent hole was placed at the top of the casing.

All of the monitoring wells were installed and completed with 2 to 3 feet of "stickup" above ground surface given that all of the monitoring wells installed are in heavily vegetated areas. Steel protective casings were placed over the risers and surrounded by concrete pads. The pads were approximately 2 feet by 2 feet (length x width) and 6 inches in thickness (with 2 inches set into the ground outside the casing). Steel bollards were installed around the concrete pad as additional protection and painted a bright color to aid in visibility. All wells were equipped with a locking cap installed on the protective steel casing.

Each new monitoring well was initially developed using an over-pumping technique as described in the work plan, after allowing suitable time for the cement/bentonite grout to cure (typically a minimum of 24 hours was allowed). The purpose of well development was to restore the permeability of the formation which may have been reduced by the drilling operations and to remove fine-grained materials that may have entered/accumulated in the well or filter pack.

Groundwater samples were collected using the USEPA Region II low-flow sampling technique as presented in the work plan. Field parameters of pH, temperature, turbidity, conductivity, dissolved oxygen, and oxidation-reduction potential were obtained with appropriate instrumentation during sampling. The groundwater samples were placed into appropriate laboratory supplied containers. The groundwater samples were filtered in the field for the dissolved metals analyses. Notes containing the groundwater parameters during well development, purging, and sample collection are provided in Appendix A.

Including field duplicate 70GW02D, a total of five groundwater samples were collected from the four permanent monitoring wells. Groundwater samples were transferred to pre-labeled sampling containers and placed on ice. Samples were shipped in coolers with chain-of-custody forms (presented in Appendix A), which included the requested analyses for the samples. All groundwater samples were analyzed for Appendix IX VOCs, SVOCs (including LLPAHs), PCBs, total and dissolved metals, and TPH DRO/GRO as outlined on Table 4-1.

4.3 Temporary Well Installation and Groundwater Sampling

Four temporary monitoring wells were installed at SWMU 70 at soil boring locations 70SB05, 70SB06, 70SB07, and 70SB08 in the central and southern portions of the SWMU. Permanent wells were proposed to be installed at these locations. However, installation of permanent wells was not possible due to conditions encountered during the field investigation. Boring location 70SB05 was found to be in a transitional area within an estuarine wetland (approximately 100 feet from designated upland habitat). Shallow groundwater was encountered and precluded the installation of a permanent monitoring well. Similarly, boring locations 70SB06, 70SB07, and 70SB08 were located in an estuarine wetland with shallow groundwater present. Therefore, temporary monitoring wells were installed at these locations.

The temporary wells were installed at locations 70SB05 through 70SB08 using a hand auger to bore a hole; a 2-inch PVC well screen was inserted into the soil. A sample was collected immediately after the screen filled with water. The temporary wells were not developed since a sand pack was not placed around the screen with a known grain size and appropriate seal. A total of four groundwater samples were collected from the four temporary monitoring wells. Groundwater samples were transferred to pre-labeled sampling containers and placed on ice. Samples were shipped in coolers with chain-of-custody forms (presented in Appendix A), which included the requested analyses for the samples. All groundwater samples were analyzed for Appendix IX VOCs, SVOCs (including LLPAHs), PCBs, total and dissolved metals, and TPH DRO/GRO as outlined on Table 4-1.

4.4 Sediment Sampling

Two types of sediment samples were collected at SWMU 70: open water sediment and estuarine sediment. Open water sediment samples were collected from three locations (70SD01, 70SD02, and 70SD03), as shown on Figure 4-1. The open water sediment samples were collected as described in the work plan. Sediment was scooped into an aluminum pan container using a disposable stainless steel spoon. The contents collected were noted in the field logbook, and VOC and GRO samples were collected immediately to reduce loss of VOCs. The sample was then homogenized following the removal of debris (e.g., vegetation/roots), and a portion was transferred into pre-labeled glass jars and polyethylene containers and placed on ice. Three open water sediment samples (70SD01, 70SD02, and 70SD03) and one duplicate (70SD03D) were collected.

One estuarine sediment sample was collected from each of three locations (70SD06, 70SD07, and 70SD08), as shown on Figure 4-1. The estuarine samples were collected using a disposable stainless steel spoon. Sediment characteristics such as texture and saturation were noted in the field logbook, in addition to dominant vegetation, hydric soils, and any evidence of crustacean activity. 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 polyethylene containers and placed on ice. Three estuarine sediment samples (70SD06, 70SD07, and 70SD08) were collected.

All sediment samples were analyzed for Appendix IX VOCs, SVOCs (including LLPAHs), PCBs, metals, and TPH DRO/GRO. Estuarine sediment samples were also analyzed for TOC. Sample collection for VOCs and GRO included the use of Terra Core kits and was conducted prior to homogenizing the samples to avoid loss of VOCs. The Terra Core kits included one disposal syringe, one dry weight container, two-40 ml VOA vials (with stir bar) including 5 ml of deionized water, and one-40 ml VOA vial (with stir bar) including 5 ml of methanol solution. The deionized water vials were frozen within 24 hours and then shipped to laboratory. Samples were shipped in coolers with chain-of-custody forms (presented in Appendix A), which included the requested analyses for the samples. Table 4-1 provides a summary of the sediment samples collected at SWMU 70.

4.5 Groundwater Level Measurements

Groundwater level measurements were taken during well development and purging from SWMU 70 on January 15 through January 17, and January 20, 2009 and are provided in the field logs in Appendix A. A final round of water level measurements was taken on January 23, 2009. Water levels were measured from the top of PVC riser and the groundwater elevations were calculated from the surveyed elevation of the top of riser. The elevations of the tops of the risers were surveyed on January 23, 2009 following the methods described in Section 4.9. The groundwater elevations are shown on Table 4-4 and discussed further in Section 5.0.

4.6 Utility Clearance

All boring locations were first checked for the presence of subsurface utilities. A facility map showing all utilities was obtained which indicated that there were no obvious utility concerns at the SWMU. The sampling locations were field-located using a mapping-grade Global Positioning System (GPS) and the absence of subsurface utilities was field verified. No interferences with the proposed drilling locations were encountered.

4.7 Site Clearing

Once utility clearance was achieved and the proposed sample locations were field-located using a mapping-grade GPS, site clearing activities were initiated in order to assist the drill rig and provide access routes to some of the proposed sample locations. The proposed sample locations were flagged and were not disrupted by site clearing activities.

4.8 Investigation Derived Waste

Disposable sampling tools were used for soil and groundwater sampling to the extent practicable, in order to minimize the generation of liquid investigation-derived waste (IDW) from decontamination. Surface and subsurface soil samples were collected using the Geoprobe® DPT and 4-foot Macro-Core® sleeves and groundwater samples were collected using polyethylene and silicon tubing. Wastewater from decontamination of the drill rig before and after entering the site was containerized. The soil cuttings from the subsurface soil sampling were placed back into the boring from which they came (no contamination was encountered). As much as possible, soils last out of the hole were returned first, thereby, approximating original stratigraphy.

One IDW sample was collected during the field investigation at SWMU 70. Specifically, one composite aqueous sample was collected from drums containing decontamination fluid (from the drill rig). The water IDW sample was collected on January 22, 2009 and analyzed for total Appendix IX metals, ignitability, reactive sulfide, reactive cyanide, and pH. The IDW data

package indicates the IDW collected is non-hazardous and will be disposed of accordingly. The drums were moved and stored at a secure location following the field work completion in January 2009. The water IDW will be removed and disposed of from the site by an approved vendor during the next scheduled field event in June 2009. The IDW analytical data for the composite aqueous sample are presented in Appendix A.

4.9 Surveying

Sampling locations were surveyed using a mapping grade differential (satellite Differential Global Positioning System [DGPS] corrections from Omnistar or “real-time”) GPS unit. 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. The coordinate system used for the survey was U.S. State Plane 1983, Puerto Rico/Virgin Island 5200, and the North American Datum (NAD) 1983, with units in U.S. survey feet.

After the permanent and temporary monitoring wells were installed, their coordinates were more accurately surveyed using Real-Time Kinematic (RTK) GPS methods. RTK GPS surveying was selected specifically because of the accuracy of data it provides to produce groundwater contour mapping. RTK GPS surveying employs a GPS base station and a GPS rover that reads satellite carrier phase signals. Using the carrier phase signal in conjunction with a base station is expected to provide a horizontal accuracy of approximately 0.1 feet and an elevation accuracy of approximately 0.02 feet. 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.

Each permanent and temporary monitoring well at SWMU 70 was surveyed using the RTK GPS method. 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 downloaded and processed using Trimble Geomatics Office™ (TGO), which is a software application tool used to convert survey data collected in the field into electronic files 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.

4.10 QA/QC Sampling

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

- Field Duplicates
- Trip Blanks
- MS/MSDs
- Field Blanks
- Equipment Rinsate Blanks

4.10.1 Field Duplicates

Field duplicates were collected at the rate of ten percent of primary environmental samples in accordance with the work plan. One field duplicate surface soil sample (70SB04-00D) was collected corresponding to five surface soil samples. Two subsurface soil duplicate samples

(70SB04-01D and 70SB05-01D) were collected corresponding to five subsurface soil samples. One field duplicate sediment sample (70SD03D) was collected corresponding to six sediment samples. One field duplicate groundwater sample (70GW02D) 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.

4.10.2 Trip Blanks

One trip blank sample was included in each cooler containing samples from the site intended for VOC and/or GRO analysis. A total of seven trip blanks, as shown on Table 4-2 accompanied samples from this site. All seven trip blanks were analyzed for Appendix IX VOCs and TPH GRO. Trip blank samples were collected in order to evaluate whether cross contamination occurred during shipping of samples.

4.10.3 MS/MSDs

MS/MSDs were collected at the rate of approximately 5 percent of primary environmental samples from the surface and subsurface soil, open water sediment, estuarine sediment, and groundwater samples. One set of MS/MSD (70SB04-00MS/MSD) was collected corresponding to five surface soil samples. One set of MS/MSD (70SB04-01MS/MSD) was collected corresponding to five subsurface soil samples. One set of MS/MSD (70SD03MS/MSD) was collected corresponding to six sediment samples. One set of MS/MSD (70GW02MS/MSD) was collected corresponding to eight groundwater samples. 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.

4.10.4 Field Blanks

Two field blank samples (JAN09-FB01 and JAN09-FB02) were collected from laboratory-grade deionized water and NAPR potable water, respectively, as part of the multi-site field investigation. JAN09-FB01 was collected on January 14, 2009, and JAN09-FB02 was collected on January 20, 2009. These collection dates correspond to the period of time environmental samples were collected at SWMU 70. Laboratory-grade deionized water was used as source water for the equipment rinsate samples. No store bought distilled water was purchased during this investigation, so an additional field blank for store bought distilled water was not necessary. The field blank sample was analyzed for Appendix IX VOCs, SVOCs (including LLP AHs), PCBs, metals, and TPH GRO and DRO to determine whether the water used for generating the equipment rinsates was free of chemicals at levels of concern for the site.

4.10.5 Equipment Rinsates

Equipment rinsate sample JAN09-ER03 was collected from a Macro Core Liner used on January 14, 2009; equipment rinsate sample JAN09-ER04 was collected from groundwater sample tubing used on January 15, 2009; equipment rinsate sample JAN09-ER05 was collected from a stainless steel spoon used on January 16, 2009; equipment rinsate sample JAN09-ER06 was collected from a stainless steel spoon used on January 17, 2009; equipment rinsate sample JAN09-ER08 was collected from groundwater sample tubing used on January 20, 2009; and equipment rinsate sample JAN09-ER10 was collected from groundwater sample tubing used on January 22, 2009. Equipment rinsate samples were analyzed for one or more of the following parameters (Appendix IX VOCs, SVOCs (including LLP AHs), PCBs, metals, and TPH GRO and DRO), as shown on

Table 4-2. The analysis requested for each equipment rinsate sample was dependent on what sampling was conducted in the field the day the rinsate was collected, as discussed in the following paragraph.

Multiple site investigations (in addition to the Phase I RFI at SWMU 70) were conducted simultaneously at NAPR during January 2009. Those investigations include the Full RFI for SWMU 9 (Area B, Tank 214 Area), the Phase I RFI at SWMU 60 (Former Landfill at the Marina), and the Phase II ECP Investigation at Cabras Island. One equipment rinsate was collected per day for one piece of disposable sampling equipment (i.e., stainless steel spoon, bucket auger, groundwater sampling tubing, or macro core liners) and the selected analysis for the rinsate samples corresponds to the sampling and analytical programs developed for each SWMU.

4.11 Laboratory Analysis

Fixed-base laboratory analysis was conducted by Test America, Savannah, Georgia. The list of parameters under the analytical program and the Contract Required Quantitation Limits (CRQLs) are provided in Table 4-3. Puerto Rico chemist certification documentation is provided with this RFI as part of Appendix D.

4.12 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. Validation reports are provided for each Sample Delivery Group (SDG) in Appendix D.

5.0 PHYSICAL RESULTS

The following sections provide a brief discussion of the current site conditions at SWMU 70 at the time of the Phase I RFI field investigation, conducted from January 12 to January 23, 2009. The site geology and hydrogeology, as ascertained from the soil boring program and other available information, is described herein.

5.1 Current Conditions

SWMU 70 covers an area of approximately 55 acres (as shown on Figure 5-1) and the former disposal area is currently not utilized. The area is located in near-shore flat lands and consists of flat lying land with open areas and areas covered by thick secondary growth vegetation. During a physical site inspection and the Phase II ECP investigation (NAVFAC Atlantic, 2005), numerous piles of construction debris (metal, concrete, and PVC piping) were observed in different portions of the site. General solid waste debris (i.e., metal, rope, etc.) was present, and the central portion of the site appeared to have excavation type of debris (i.e., concrete, rocks, etc.). However, there were no drums or evidence of stains or stressed vegetation. In addition, the central and southern portions of the site are classified as wetlands consisting of either estuarine-intertidal-scrub/shrub (broad-leaved evergreen) (E2SS3), or estuarine-intertidal-unconsolidated shore mud, organic, dead matter (E2US3/4/5).

5.2 Geology/Hydrogeology

The following sections provide a discussion of the geology and hydrogeology of SWMU 70, based on observations made during the Phase I RFI field investigation.

5.2.1 Geology

SWMU 70 is located within both the upland area and estuarine-intertidal wetlands as previously described and stated in Section 3.3.4. A total of eight borings were advanced during the 2009 RFI field effort. Boring logs for each borehole are presented in Appendix A. Borings 70SB01 through 70SB04 were located within the upland area, and borings 70SB05 through 70SB08 within the transitional and estuarine-intertidal wetlands. The upland borings encountered sand and shells in the near surface (most likely fill material) followed by deposits of sand and silt with an occasional peat zone. Weathered bedrock was encountered at location 70SB02 at 10.5 feet bgs. Bedrock was not encountered in the other three borings located in the upland area. Borings within the wetland areas were advanced using a hand auger. Deposits consisted of sand, shells, and coral fragments in the near surface. Hand auger locations were only advanced a few feet due to the presence of shallow groundwater.

A geologic cross section was drawn depicting the geologic conditions and water levels relative to well placement and topography from borings 70SB02, 70SB03, and 70SB04. The cross section depicts the unconsolidated deposits in relation to the weathered bedrock at 70SB02 and the peat zones observed at 70SB02 and 70SB04. A geologic cross section location map is presented as Figure 5-1 and Geologic Cross Section A-A' is shown on Figure 5-2.

5.2.2 Hydrogeology

Groundwater was observed at shallow depths during drilling ranging from 4.1 feet at 70SB01 to 0.5 feet at 70SB06. Water occurred within the sand rich deposits found at the SWMU. Wells that contained peat deposits, created groundwater with a sweet pungent odor and slight yellow discoloration. No surface water was observed at SWMU 70 upland areas. The footprint of the SWMU did not contain asphalt or concrete covered areas, allowing the site to drain surface water directly to the shallow groundwater.

5.2.3 Groundwater Flow Direction and Velocity

Groundwater levels were measured during well development and purging from SWMU 70 on January 15, 16, 17, and 20, 2009. One additional round of water levels was taken on January 23, 2009. All groundwater levels were recorded using an electronic water level meter to the nearest 0.01 foot. Water level measurements (from January 23, 2009) and calculated groundwater elevations are presented on Table 4-4 and are shown on Figure 5-3. Groundwater contours are shown as estimated due to the quick turnaround of the field event and lack of knowledge pertaining to tidal influences on the water table. Elevations shown on Figure 5-3 show groundwater flow is to the south and southwest towards the Ensenada Honda.

6.0 ANALYTICAL RESULTS

This section discusses the nature of SWMU 70 contamination determined from chemical analysis of environmental samples collected during the 2009 Phase I RFI. All laboratory analytical data went through a formal data validation process. Validated 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 SDGs are provided in Appendix D. In addition, a summary discussion of the necessary laboratory level data adjustments to the 2009 data is presented in Section 6.5. As previously mentioned, the analytical results from the Phase II ECP (NAVFAC Atlantic, 2005) are provided in Appendix B.

The 2009 PID field screening results are presented on the Test Boring Records in Appendix A (not validated). While these readings were taken to protect the field team from excessive exposure and to assist with soil sample selection, they can also provide initial insight into historical impacts and potential geographic “hot spots.” PID readings during the SWMU 70 investigation were all below background levels, as noted on the boring logs provided in Appendix A.

6.1 Human Health and Ecological Screening Values

Analytical results for surface and subsurface soil, sediment, and groundwater are discussed in the following sections. Detected compounds for each media are compared to applicable human health and ecological screening criteria, as well as to background concentrations. The upper limit of means background levels (inorganics only) (Baker, 2008) were used to compare concentrations of inorganic constituents in soil, sediment, and groundwater at SWMU 70 to those present at NAPR in corresponding unimpacted media. Both surface soil background levels and subsurface soil background levels for a fine sand/silt soil type (most prevalent soil type at SWMU 70) were used in screening. The human health and ecological screening criteria, and the rationale for their use for comparison to a specific medium, are described in detail below.

6.1.1 Human Health

Applicable human health criteria for soils include USEPA Regional Industrial Screening Levels (SLs) and USEPA Regional Residential SLs (USEPA, 2008a), and the upper limit of means background levels (inorganics only) (Baker, 2008). In the absence of human health screening criteria specific to sediment, USEPA Regional Residential and Industrial Soil SLs (USEPA, 2008a) were conservatively used along with sediment background levels present in open water and estuarine sediment (Baker, 2008), as applicable. Applicable human health criteria for groundwater are USEPA Regional Tap Water SLs, Federal Drinking Water Maximum Contaminant Levels (MCLs) (USEPA, 2008b), and any inorganic background levels present in the groundwater at NAPR (Baker, 2008).

6.1.1.1 Regional Screening Levels

The EPA recently developed the Regional SLs to support the risk assessment screening process, while improving consistency across EPA 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 1×10^{-6} . 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 will be 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 SL table is updated periodically to reflect such changes. It should be noted that the most recent update was in September 2008 (USEPA, 2008a).

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. MCLs are 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 also consider the technical feasibility of removing the contaminant from the public water supply (USEPA, 2008b).

6.1.2 Ecological

6.1.2.1 Soil

USEPA ecological soil screening levels (Eco-SSLs) for terrestrial plants and invertebrates (available at <http://www.epa.gov/ecotox/ecossl/>) were preferentially used as soil screening values. For a given metal, if an Eco-SSL has been established for both terrestrial plants and invertebrates, the lowest value was selected as the soil screening value. For a given chemical, if an Eco-SSL was available for both receptor groups, the lowest value was selected as the soil screening value. In the case of chromium and vanadium, insufficient data are available from the literature for derivation of Eco-SSLs for terrestrial plants and/or invertebrates (USEPA, 2008c and 2005). However, both Eco-SSL documents list toxicological data from studies eligible for Eco-SSL derivation. The chromium Eco-SSL document cites two studies (Van Gestel et al., 1992 and 1993) that investigated the effect of chromium on earthworm (*Eisenia andrei*) reproduction, while the vanadium Eco-SSL document cites two studies (Kaplan et al., 1990) that investigated the effect of vanadium on broccoli (*Brassica oleracea*) growth. The chromium studies using earthworms reported Maximum Acceptable Toxicant Concentration (MATC) values of 57 milligrams/kilograms (mg/kg), while the vanadium studies using broccoli reported a Lowest Observed Adverse Effect Concentration (LOAEC) of 100 mg/kg and a No Observed Adverse Effect Concentration (NOAEC) of 100 mg/kg. For this Phase I RFI, the MATC value of 57 mg/kg based on earthworm reproduction was used as the soil screening value for chromium and the LOAEC value based on broccoli growth (with a safety factor of 10; Wentsel et al., 1996) was used as the soil screening value for vanadium.

For those chemicals lacking terrestrial plant and invertebrate Eco-SSLs or toxicological data eligible for Eco-SSL derivation, the literature-based toxicological benchmarks listed below were used as soil screening values.

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

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

- Toxicity reference values for plants and invertebrates listed in USEPA, 1999.
- Soil standards developed by the Ministry of Housing, Spatial Planning and Environment (MHSPE) (MHSPE, 2000), assuming a minimum default soil organic carbon content of 2.0 percent.
- Canadian soil quality guidelines (agricultural land use) developed by the Canadian Council of Ministers of the Environment (CCME) (CCME, 2007).

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

In addition, the upper limit of means background levels (inorganics only) (Baker, 2008) were used to compare the soil concentrations to those present at NAPR in un-impacted soil. Both surface soil background levels and subsurface soil background levels for a fine sand/silt soil type (most prevalent soil type at SWMU 70) were used in screening.

6.1.2.2 Sediment

The literature-based estuarine/marine toxicological benchmarks listed below, expressed as bulk sediment concentrations (dry weight), were selected for use as sediment screening values.

- Effects-Range low (ER-L) marine and estuarine sediment quality guidelines (Long and Morgan, 1991 and Long et al., 1995)
- Threshold Effects Level (TEL) marine sediment quality guidelines (MacDonald, 1994)
- Apparent Effects Threshold (AET) marine sediment quality guidelines (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 sediment quality guidelines. Long and Morgan (1991) developed effects-based sediment quality guidelines using literature-based data from Equilibrium Partitioning (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.

TEL marine sediment quality guidelines. The updated and revised data set used by Long et al. (1995) also was used by MacDonald (1994) to calculate sediment quality assessment guidelines (TELs and Probable Effect Levels [PELs]) for Florida coastal waters. 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.

AET marine sediment quality guidelines. 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 selected as sediment screening values represent the lowest AET value reported by Buchman (2008) from a suite of seven biological indicators (amphipod mortality, oyster larval abnormality, Microtox luminescence, infaunal community impacts, bivalve larvae mortality/abnormality, Echinoderm larvae mortality/abnormality, and juvenile polychaete growth).

For a given chemical, when more than one marine/estuarine sediment quality guideline was available from the sources listed above, the minimum value was conservatively selected as the sediment screening value. For those chemicals lacking a literature-based, bulk-sediment toxicological threshold, EqP-based benchmarks were used as sediment screening values. EqP-values were derived using the USEPA EqP approach (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) guidance and also was

available from Di Toro and McGrath (2000), the minimum value was selected as the sediment screening value.

6.1.2.3 Groundwater

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

- Final Chronic Values (FCVs) for saltwater contained in Ecotox Thresholds (USEPA, 1996)
- Chronic screening values for saltwater contained in Ecological Risk Assessment Bulletins – Supplement to Risk Assessment Guidelines (Risk Assessment Guidance for Superfund [RAGS]) (USEPA, 2001)
- Minimum chronic toxicity test endpoints (No Observed Effect Concentration [NOEC] and MATC values) for saltwater species reported in the ECOTOX Database System (Aquatic Toxicity Information Retrieval [AQUIRE] database) (USEPA, 2007b)
- 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 5 (Wentzel et al., 1996)

The order of preference was selected based on their level of protection. For example, FCVs would be expected to offer a greater degree of protection than a single species NOEC, MATC, or LOEL since their derivation considers a larger toxicological database. In the absence of FCVs, USEPA Region 4 chronic screening values, chronic test endpoints, and chronic LOELs, screening values were derived from the acute literature values listed below:

- Acute LOELs for saltwater contained in NOAA SQUIRTs (Buchman, 2008)
- Acute toxicity test endpoints (NOEC, Lowest Observed Effect Concentration [LOEC], median lethal concentration [LC₅₀], and median effective concentration [EC₅₀] values) for saltwater species contained in the ECOTOX Database System (AQUIRE database) (USEPA, 2007b).
- LC₅₀ values for saltwater species contained in Superfund Chemical Matrix (USEPA, 2004)

Chronic-based screening values were extrapolated from acute NOEC, LOEC, LOEL, LC₅₀, and EC₅₀ values as follows:

- An uncertainty factor of 30 was used to convert an acute NOEC or NOEL to chronic-based screening value (Wentsel et al., 1996)
- An uncertainty factor of 50 was used to convert an Acute LOEC or LOEL to a chronic-based screening value (Wentsel et al., 1996)
- An uncertainty factor of 100 was used to convert an EC₅₀ or LC₅₀ to a chronic-based screening value (Wentsel et al., 1996)

When acute toxicity data were used to extrapolate a chronic screening value, NOECs were given preference over LOECs/LOELs, LOECs/LOELs were given preference over LC₅₀ and EC₅₀ values, and EC₅₀ values were given preference over LC₅₀ 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. For those chemicals lacking saltwater toxicological thresholds and literature values, screening values were developed from the sources listed below in their order of decreasing preference.

- 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 (<http://www.epa.gov/reg5rcra/ca/ESL.pdf>) (USEPA, 2003)
- Minimum chronic toxicity test endpoints (NOEC, NOEL, and MATC values) for freshwater species reported in the ECOTOX Database System (USEPA, 2007b)
- Great Lakes basin Tier II Secondary Chronic Values (SCVs) listed in the Great Lakes Initiative Toxicity Data Clearinghouse (<http://www.epa.gov/gliclearinghouse/>) (USEPA, 2007c)
- Chronic LOELs for freshwater contained in NOAA SQUIRTs (Buchman, 2008) with a safety factor of 5 (Wentsel et al., 1996).

Identical to the saltwater values, the order of preference for selecting freshwater values is based on their level of protection. 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, SCVs, and freshwater chronic LOELs, screening values were derived from the acute literature values listed below:

- Acute LOELs for freshwater contained in NOAA SQUIRTs (Buchman, 2008)
- Acute toxicity test endpoints (NOEC, NOEL, LOEL, LOEC, LC₅₀, EC₅₀ values) for freshwater species contained in the ECOTOX Database System (USEPA, 2007b)
- LC₅₀ values for freshwater species contained in Superfund Chemical Matrix (USEPA, 2004)

Chronic-based screening values were extrapolated from acute NOEC, NOEL, LOEC, LOEL, LC₅₀, and EC₅₀ values using the safety factors identified above for saltwater acute values.

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 LC₅₀ and EC₅₀ values, and EC₅₀ values were given preference over LC₅₀ 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.

NAPR base wide groundwater background criteria (inorganics only) were also used in the comparison (Baker, 2008), when available.

6.2 Surface Soil

Five surface soil samples (70SB01-00 through 70SB05-00) and one duplicate sample (70SB04-00D) were collected and analyzed during the 2009 Phase I RFI at SWMU 70. All of the surface soil samples were analyzed for Appendix IX VOCs, SVOCs (including LLPAHs), PCBs, metals, and TPH GRO/DRO. The detected results for the surface soil data set are provided in Table 6-1. Results are compared to appropriate media specific criteria as described in Section 6.1. Figure 6-1 presents the locations of the detected inorganic compounds above human health screening criteria and NAPR basewide background values. The complete surface soil data set is provided in Appendix C.

Two VOCs, benzene and carbon disulfide, were detected in the surface soil data set. Benzene was detected in one sample, 70SB05-00. Carbon disulfide was also only detected in one surface soil sample, 70SB02-00. The detections were relatively low (i.e., near the detection limits) and were well below the listed criteria.

As shown in Table 6-1, twelve polynuclear aromatic hydrocarbons (PAHs), were detected in the surface soil samples. PAHs were found at all locations at low concentrations. However, the PAHs were predominantly encountered in sample 70SB05-00. Most PAH concentrations were estimated concentrations. None of the PAHs exceeded the listed screening criteria. Additionally, there were no exceedances of low or high molecular weight PAHs.

PCBs were not detected in the surface soil samples collected at SWMU 70.

TPH DRO was detected in samples 70SB03-00 and 70SB05-00. TPH GRO was also detected in 70SB05-00. The DRO and GRO concentrations were well below the total TPH screening value of 100 mg/kg.

As shown in Table 6-1, twelve metals were detected in the surface soil samples at SWMU 70 including:

- Arsenic
- Barium
- Beryllium
- Cadmium
- Chromium
- Cobalt
- Copper

- Lead
- Mercury
- Nickel
- Vanadium
- Zinc

Barium, beryllium, cadmium, chromium, copper, lead, mercury, nickel, and zinc were detected at various locations but did not exceed corresponding residential or industrial soil Regional SLs, background screening values, or ecological surface soil screening values at any location. Arsenic exceeded one or more of the Regional SLs at four locations: 70SB01, 70SB03, 70SB04, and 70SB05. Arsenic also exceeded its background screening level at 70SB01, 70SB04, and 70SB05. Cobalt was detected at all five locations and exceeded its residential SL at one location (70SB05); however, the detected concentrations were all less than background.

Vanadium was detected at all locations and exceeded its ecological surface soil screening value at 70SB01 and 70SB05. However, these concentrations were less than the background screening level.

Based on the exceedances of background and regulatory screening concentrations of arsenic in the surface soil, it appears that contamination has occurred in the surface soil at SWMU 70 due to human activities. Although surface soil contamination is limited to three locations (70SB01, 70SB04, and 70SB05), information obtained to date indicates that the lateral extent of this contamination has not yet been fully defined.

6.3 Subsurface Soil

As previously noted, all subsurface soil samples were collected from the 1 to 3 foot depth interval at SWMU 70. As such, all subsurface soil sample analytical results were compared to all listed screening criteria for the subsurface soil evaluation at SWMU 70. NAPR basewide background screening values for fine sand/silt were also used to screen all subsurface soil samples.

Five subsurface soil samples (70SB01-01 through 70SB05-01) and two duplicate samples (70SB04-01D and 70SB05-01D) were collected and analyzed during the 2009 Phase I RFI at SWMU 70. The subsurface soil samples were analyzed for Appendix IX VOCs, SVOCs (including LLPAHs), PCBs, metals, and TPH DRO/GRO as summarized in Table 4-1. The detected results for the subsurface soil data are provided in Table 6-2. Figure 6-2 presents the locations of detected inorganic compounds above the applicable ecological screening criteria and NAPR basewide background values in subsurface soil. The complete data set is provided in Appendix C.

Two VOCs, benzene and carbon disulfide, were detected in the subsurface soil. Benzene was detected in one of seven samples, and carbon disulfide was detected in two of seven samples. Both were detected at low, estimated concentrations. The detections were relatively low (i.e., near the detection limits) and were well below the listed criteria.

As shown on Table 6-2, only one PAH, 2-methylnaphthalene, was detected in the subsurface soil samples. 2-Methylnaphthalene was detected in two of five locations at low concentrations and below the listed criteria. There were no exceedances of low or high molecular weight PAHs.

PCBs were not detected in the subsurface soil samples collected at SWMU 70.

TPH GRO was detected in sample 70SB05-01D at a concentration well below the total TPH screening value of 100 mg/kg.

As shown in Table 6-2, nine metals were detected in the subsurface soil at SWMU 70 including:

- Arsenic
- Barium
- Beryllium
- Chromium
- Cobalt
- Copper
- Mercury
- Nickel
- Vanadium

Barium, beryllium, chromium, copper, and mercury were detected at various locations but did not exceed corresponding residential or industrial soil Regional SLs, background screening values, or ecological surface soil screening values at any location. Arsenic exceeded both the residential and industrial soil Regional SLs at all locations. Cobalt was detected at all five locations and exceeded its residential SL at one location (70SB02). However, these concentrations were less than corresponding background screening levels.

Nickel was detected in all seven samples. Nickel exceeded both the background screening level and the ecological screening criterion in one sample, 70SB02-01. Vanadium was detected in four out of seven samples, with all concentrations exceeding the ecological screening criterion. However, the vanadium concentrations were less than the background screening level.

Based on the exceedances of background and regulatory screening criteria in the subsurface soil, nickel contamination has occurred in the subsurface soil at SWMU 70. Although the subsurface soil contamination is limited to one sample in the northern portion of the SWMU, the lateral extent of contamination has not been fully defined.

6.4 Open Water Sediment

Three open water sediment samples (70SD01 through 70SD03) and one duplicate sample (70SD03D) were collected and analyzed during the 2009 Phase I RFI at SWMU 70. The open water sediment samples were analyzed for Appendix IX VOCs, SVOCs (including LLPAHs), PCBs, metals, and TPH DRO/GRO as summarized in Table 4-1. The detected results for the open water sediment data are provided in Table 6-3. Figure 6-3 presents the locations of detected organic and inorganic compounds above the applicable human health and ecological screening criteria and NAPR basewide background values in sediment. The complete data set is provided in Appendix C.

Four VOCs were detected in the open water sediment including acetone, benzene, carbon disulfide, and methylene chloride. Acetone was detected in all four samples at concentrations exceeding the ecological screening value. Carbon disulfide was also detected in all four samples, exceeding the ecological screening value in one of the samples (70SD02). Benzene was detected in one of four samples, and methylene chloride was detected in two of four samples. Both were detected at low, estimated concentrations that were well below the listed criteria.

As shown in Table 6-3, ten SVOCs, including eight PAHs, were detected in the open water sediment samples. PAHs were found at all locations. Most PAH concentrations were also estimated concentrations. It should be noted that the PAHs were predominantly encountered in sample 70SD01. The remaining SVOCs were detected at low, estimated concentrations. None of the SVOCs exceeded the listed screening criteria.

PCBs were not detected in the open water sediment samples collected at SWMU 70.

TPH DRO was detected in sample 70SD03. TPH GRO was detected in samples 70SD03 and 70SD03D. The DRO and GRO concentrations were well below the total TPH screening value of 100 mg/kg.

As shown in Table 6-3, twelve metals were detected in the open water sediment at SWMU 70 including:

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

Beryllium, lead, mercury, selenium, vanadium, and zinc were detected at various locations but did not exceed corresponding residential or industrial soil Regional SLs, background screening values, or ecological surface soil screening values at any location. Arsenic exceeded both the residential and industrial soil Regional SLs at all locations but did not exceed the background screening value. Cobalt was detected in all four samples. Cobalt exceeded both the background screening level and the residential soil SL screening criterion in three samples: 70SD02, 70SD03, and 70SD03D.

Copper was detected in all four samples, with three of the four concentrations exceeding the ecological screening criterion. However, the copper concentrations were less than the background screening value. Barium, chromium, and nickel were detected in all samples and exceeded only corresponding background screening values in two locations (70SD02 and 70SD03).

6.5 Estuarine Sediment

Three estuarine sediment samples (70SD06 through 70SD08) were collected and analyzed during the 2009 Phase I RFI at SWMU 70. The estuarine sediment samples were analyzed for Appendix IX VOCs, SVOCs (including LLPAHs), PCBs, metals, TPH DRO/GRO, and TOC as summarized in Table 4-1. The detected results for the estuarine sediment data are provided in Table 6-4. Figure 6-4 presents the locations of detected organic and inorganic compounds above

the applicable human health and ecological screening criteria and NAPR basewide background values in sediment. The complete data set is provided in Appendix C.

Three VOCs were detected in the estuarine sediment including acetone, carbon disulfide, and methylene chloride. Acetone was detected in all three samples at concentrations exceeding the ecological screening value. Carbon disulfide was detected in one sample (70SD08) at an estimated concentration less than its human health and ecological screening criteria. Methylene chloride was detected in all three samples at low, estimated concentrations that were well below the listed criteria.

Two PAHs, fluoranthene and pyrene, were detected in the estuarine sediment. Fluoranthene was detected in all three samples at low, estimated concentrations that were well below the listed criteria. Pyrene was detected in only one sample (70SD07) also at a low, estimated concentration that was below its human health and ecological screening criteria.

PCBs and TPH DRO/GRO were not detected in the estuarine sediment samples collected at SWMU 70.

As shown in Table 6-4, ten metals were detected in the estuarine sediment at SWMU 70 including:

- Arsenic
- Barium
- Chromium
- Cobalt
- Copper
- Lead
- Mercury
- Nickel
- Vanadium
- Zinc

Lead, mercury, and zinc were detected at various locations but did not exceed corresponding residential or industrial soil Regional SLs, background screening values, or ecological surface soil screening values at any location. Arsenic was detected in two of three samples at concentrations exceeding both residential and industrial soil SLs but did not exceed the background screening value.

Cobalt was detected at concentrations exceeding the residential soil SL at all locations and the ecological screening value at one location, but did not exceed the background screening value. Vanadium was detected at all locations. Vanadium exceeded the residential soil SL and ecological screening value in all three samples and also exceeded the background screening level in one sample (70SD07).

Chromium, copper, and nickel were also detected in all three samples. Chromium and nickel exceeded corresponding ecological screening values and background in one sample (70SD07). Copper exceeded the ecological screening value in all three samples but did not exceed the background screening value at any location.

Barium was detected in all three samples and exceeded only background in one sample (70SD06).

TOC concentrations ranged from 5,400 mg/kg in sample 70SB07 (described as a sandy silt in the boring log) to 36,000 mg/kg in sample 70SB08 (described as sand and shells in the boring log).

6.6 Groundwater

Eight groundwater samples (70GW01, 70GW02, 70GW03, 70GW04, 70GW05, 70GW06, 70GW07, and 71GW08) and one duplicate sample (70GW02D) were collected and analyzed during the 2009 Phase I RFI at SWMU 70. The groundwater samples were analyzed for Appendix IX VOCs, SVOCs (including LLPAs), PCBs, total and dissolved metals, and TPH DRO/GRO as outlined in Table 4-1. The detected results for the groundwater data set are provided in Table 6-5. Figure 6-5 presents the location of detected organic and inorganic compounds above the applicable NAPR basewide background value and either the human health or ecological screening value. The complete data set is provided in Appendix C.

Three VOCs (acetone, carbon disulfide, and vinyl chloride) were detected in the groundwater. Acetone was detected in three of eight locations, and carbon disulfide was detected in one of eight locations. Acetone and carbon disulfide were detected at low, estimated concentrations. The detections were relatively low (i.e., near the detection limits) and were well below the listed criteria. Vinyl chloride was detected in one of eight locations at a concentration exceeding the Regional tap water SL.

Seven SVOCs, including four PAHs, were detected at relatively low concentrations at various locations but did not exceed corresponding human health or ecological screening values at any location.

PCBs were not detected in the groundwater.

TPH DRO was detected in samples 70GW01, 70GW02, 70GW02D, 70GW03, and 70GW08. TPH GRO was detected in sample 70GW05. The DRO and GRO concentrations were well below the total TPH screening value of 50 mg/L.

Six total metals were detected in the groundwater samples, including:

- Barium
- Chromium
- Cobalt
- Copper
- Nickel
- Vanadium

Total barium and chromium were detected at various locations but did not exceed corresponding Regional tap water SLs, MCLs, background screening values, or ecological groundwater screening values at any location. Total cobalt was detected in one sample (70GW03) at a concentration exceeding the Regional tap water SL and ecological screening value. Total copper was detected in one sample (70GW02) at a concentration exceeding the ecological screening value. Nickel was detected in two samples at concentrations exceeding the ecological screening value. Vanadium was detected in five of nine samples at concentrations exceeding the ecological

screening value (70GW01, 70GW02, 70GW02D, 70GW07, and 70GW08). Vanadium also exceeded the Regional tap water SL in one sample (70GW02). However, none of these total metals were detected at concentrations in excess of the NAPR basewide background screening value for groundwater.

It should be noted that the positive results for total arsenic in samples 70GW01 through 70GW04 were qualified as nondetect (U) as a result of laboratory method blank contamination (refer to Appendix D, SDG NAPR44027-1, for more detail). However, these qualified total arsenic concentrations were similar to the dissolved arsenic concentrations, which are provided in Table 6-5 and discussed below. While this introduces uncertainty in the sample results, similar concentrations present in the dissolved fraction indicates that the presence of total arsenic in those samples was likely.

Six dissolved metals were detected in the groundwater samples, including:

- Arsenic
- Barium
- Cobalt
- Copper
- Nickel
- Vanadium

Dissolved arsenic was detected in groundwater in five of nine samples (70GW01, 70GW02, 70GW02D, 70GW03, and 70GW04) at concentrations exceeding the Regional tap water SL. Dissolved arsenic also exceeded the MCL in four samples (70GW01, 70GW02, 70GW02D, and 70GW04) and background in three samples (70GW01, 70GW02D, and 70GW04). One arsenic concentration (44 µg/L) in sample 70GW01 exceeded the Regional tap water SL, the MCL, ecological screening value, and background.

Dissolved cobalt, copper, and nickel exceeded corresponding ecological screening values at one or more locations but not background. Dissolved cobalt also exceeded the Regional tap water SL. Dissolved vanadium exceeded its ecological screening value in four samples (70GW01, 70GW02, 70GW02D, and 70GW08). It also exceeded the NAPR background and Regional tap water SL in two samples, 70GW02 and the duplicate sample 70GW02D. Dissolved barium exceeded only the NAPR basewide background screening value in 70GW02 and the duplicate 70GW02D but did not exceed any other listed screening criteria in any of the samples.

Based on the exceedances of dissolved arsenic and/or vanadium in sample locations 70SB01, 70SB02, and 70SB04, the extent of potential groundwater contamination has not been fully defined in the northern portion of the SWMU.

6.7 Laboratory Data Validation Summary

A discussion of the compounds detected in the field QA/QC samples is presented in Section 6.7.1. A summary of the data validation findings is provided in Section 6.7.2. Data validation reports are included in Appendix D. In addition, the Puerto Rican Chemist Certification for each SDG is presented in Appendix D.

6.7.1 Summary of Detected Compounds in Field QA/QC Samples

Field generated QA/QC samples consisted of trip blanks, equipment rinsates, field blanks, and environmental duplicates. The blanks were analyzed for all fractions requested in this investigation. However, trip blanks were only analyzed for VOCs and TPH GRO. Table 6-6 presents the detected compounds found in the trip blanks, equipment rinsates, and field blanks.

Detections in the trip blanks included 2-butanone, acetone, and chloromethane. TPH GRO was not detected in any of the trip blanks.

Six equipment rinsate samples were collected as indicated in Table 4-2. Two VOCs (2-butanone and toluene); nine SVOCs (1,4-dioxane, acetophenone, benzyl alcohol, bis(2-ethylhexyl)phthalate, butyl benzyl phthalate, diethyl phthalate, di-n-butyl phthalate, naphthalene, and phenol); and six metals (antimony, arsenic, chromium, copper, nickel, and vanadium) were detected in one or more of the rinsate samples, as shown in Table 6-6. Also, TPH DRO was detected in five equipment rinsate samples.

Two field blank samples were collected as follows: JAN09-FB01, representing laboratory grade deionized water, and JAN09-FB02, representing NAPR potable water. Detections in the field blank included: four VOCs (2-butanone, chlorodibromomethane, chloroform, and dichlorobromomethane); four SVOCs (benzyl alcohol, butyl benzyl phthalate, di-n-butyl phthalate, and phenol); and eight metals (antimony, arsenic, chromium, cobalt, copper, lead, vanadium, and zinc).

Positive results in these QC blanks, which are associated with specific SDGs, represent potential blank contamination within those SDGs. It should be noted that the laboratory reported to the Method Detection Limit (MDL) for this project. Therefore, blank flagging actions were modified to take this into consideration. Positive results greater than the MDL but less than the CRQL are qualified as nondetect (U) at the reported concentrations when affected by blank contamination.

6.7.2 Validation Summary

Laboratory analyses were performed by Test America Laboratories (Savannah, Georgia). Validation services were provided by DataQual Environmental Services, LLC located in St. Louis, Missouri. Data was validated by the designated laboratory SDG. Data validation summaries for each SDG are provided in Appendix D. The validation indicated that all sample preparation and analysis was performed within Region II and/or method holding time requirements. However, some issues were identified and qualifiers added as described here. Groundwater sample 70GW05 (found in SDG NAPR44109-2) was not preserved at a pH below 2. Therefore, according to the Region II guidelines, the sample should be analyzed within seven days of collection. Analysis exceeded this holding time. As a result, all positive results were qualified as estimated and nondetected compounds were qualified as rejected. Groundwater samples 70GW02 and 70GW02D (found in SDG NAPR44027-1) were received at the laboratory with headspace; therefore, as in accordance with Region II guidelines, the positive results were qualified as estimated (J) and nondetected results were qualified as rejected (R). QA/QC sample JAN09-FB02 (found in SDG NAPR44077-3) exhibited noncompliant surrogate recovery and as a result, positive SVOC results were qualified as estimated (J) and nondetected results were qualified as rejected (R).

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 objectives of this Phase I RFI are to:

- Determine if contaminants are present at SWMU 70 from past activities, to the extent practical, from the completion of field activities (surface soil, subsurface soil, open water and estuarine sediment, and groundwater sampling) as described in the Final Phase I RFI Work Plan (Baker, 2007);
- Screen media for potential human health risks posed by the site; and
- Screen media for potential ecological risks posed by the site.

It is evident from the analyses of samples obtained during the Phase I RFI that surface soil, subsurface soil, estuarine sediment, and groundwater have been impacted from past activities that have occurred at SWMU 70.

Arsenic was detected in the surface soil at sample locations 70SB01, 70SB04, and 70SB05 at concentrations exceeding both residential and industrial soil Regional SLs and its NAPR background concentration. As shown on Figure 6-1, these sample locations are in the northern portion of the SWMU, which is the area where a large amount of debris was found.

Additionally, dissolved arsenic was detected in groundwater at sample locations 70SB01, 70SB02, and 70SB04 in the northern portion of the SWMU at concentrations exceeding its Regional tap water SL, USEPA MCL, and NAPR background concentration. Dissolved arsenic also exceeded its ecological screening value at 70SB01. Dissolved vanadium was also detected in groundwater at sample location 70SB02 (environmental sample plus duplicate) at concentrations exceeding its tap water Regional SL, ecological screening value, and NAPR background concentration. Vinyl chloride was also detected in one of eight locations at a concentration exceeding the Regional tap water SL.

The subsurface soil did not exhibit much contamination above background for metals that exceeded the human health or ecological screening criteria. Only nickel was detected at a concentration above its ecological screening value and NAPR background concentration in the subsurface soil at sample location 70SB02.

Exceedances of metals were identified in the estuarine sediment at one location (70SB07) in the southern portion of the SWMU. Chromium, nickel, and vanadium exceeded corresponding ecological screening values and NAPR background concentrations in sample 70SD07. Vanadium also exceeded its residential soil Regional SL in this sample. Acetone was also detected at concentrations exceeding its ecological screening value at all three locations (70SB06, 70SB07, and 70SB08). However, there were no detections of acetone in upgradient surface soil, subsurface soil, or groundwater samples. As such, there is no evidence that acetone is site-related. It is likely that the acetone is a result of laboratory contamination since it was detected at elevated concentrations in all sediment samples but no other media at the SWMU.

Acetone was also detected at all three open water sediment locations (70SD01, 70SD02, and 70SD03) at concentrations exceeding the ecological screening value. As noted above, acetone was not detected in upgradient media and is not considered site-related. Cobalt was also detected

in the open water sediment at sample locations 70SD02 and 70SD03 at concentrations exceeding its residential soil Regional SL and NAPR background concentration. Cobalt was detected in surface and subsurface soil at relatively low concentrations, with exceedances of only the residential soil Regional SL at two locations. Additionally, cobalt was detected in the estuarine sediment at concentrations exceeding the residential soil Regional SL and ecological screening value. However, all cobalt concentrations in upgradient media were less than associated background, indicating that any migration from SWMU 70 into the Ensenada Honda above what would be expected under background conditions is not occurring. While it is acknowledged that cobalt may be migrating from upgradient media to open water sediment, it does not appear that the presence of cobalt in the open water sediment is site-related or the result of a past release at SWMU 70 because cobalt was not identified as site-related in any other medium. Therefore, under the RCRA Corrective Action Process, no further investigation is warranted for cobalt in the open water sediment because its presence is not from a past release.

7.2 Recommendations

Based on the results of this Phase I RFI, minor impact to the environment appears to have occurred at SWMU 70. A Full RFI is recommended in order to delineate the site contamination above screening levels in surface soil, subsurface soil, estuarine sediment, and groundwater. The Full RFI should focus around Phase I RFI sample locations in the northern portion of the SWMU (70SB01, 70SB02, 70SB04, and 70SB05) and around sample location 70SB07 in the southern portion of the SWMU. The potential for human health and ecological risk should also be further evaluated. Specifically, the Full RFI should include further investigation of metals in the surface soil, subsurface soil, estuarine sediment, and VOCs and metals in groundwater; define the likely source area(s); and determine the potential for unacceptable risks to human health and/or the environment. Based on the recommendation that SWMU 70 move forward to a Full RFI, a statistical background analysis for inorganic chemicals exceeding one or more of the screening values (human health or ecological) was not included as part of this Phase I RFI (as stated in the work plan). The background statistical analysis may be included as part of the human health and ecological risk assessments conducted for the Full RFI.

8.0 REFERENCES

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TABLES

TABLE 4-1

**SUMMARY OF SAMPLING AND ANALYTICAL PROGRAM - ENVIRONMENTAL SAMPLES
SWMU 70 - DISPOSAL AREA NORTHWEST OF LANDFILL
PHASE I RFI REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO**

Sample Media	Site ID	Sample ID	Sample Depth (ft bgs)	Sample Date	Analysis Requested								Comment
					App IX VOCs	App IX SVOCs w/ LLPAHs	App IX PCBs	App IX Metals (Total)	App IX Metals (Dissolved)	TPH DRO	TPH GRO	TOC	
Surface Soil	70SB01	70SB01-00	0.0 - 1.0	01/14/09	X	X	X	X		X	X		
	70SB02	70SB02-00	0.0 - 1.0	01/14/09	X	X	X	X		X	X		
	70SB03	70SB03-00	0.0 - 1.0	01/14/09	X	X	X	X		X	X		
	70SB04	70SB04-00	0.0 - 1.0	01/15/09	X	X	X	X		X	X		
		70SB04-00D	0.0 - 1.0	01/15/09	X	X	X	X		X	X	Duplicate	
	70SB04-00MS/MSD	0.0 - 1.0	01/15/09	X	X	X	X		X	X		Matrix Spike/Matrix Spike Duplicate	
70SB05	70SB05-00	0.0 - 1.0	01/20/09	X	X	X	X		X	X			
Subsurface Soil	70SB01	70SB01-01	1.0-3.0	01/14/09	X	X	X	X		X	X		
	70SB02	70SB02-01	1.0-3.0	01/14/09	X	X	X	X		X	X		
	70SB03	70SB03-01	1.0-3.0	01/14/09	X	X	X	X		X	X		
	70SB04	70SB04-01	1.0-3.0	01/15/09	X	X	X	X		X	X		
		70SB04-01D	1.0-3.0	01/15/09	X	X	X	X		X	X	Duplicate	
	70SB04	70SB04-01MS/MSD	1.0-3.0	01/15/09	X	X	X	X		X	X		Matrix Spike/Matrix Spike Duplicate
		70SB05-01	1.0-3.0	01/20/09	X	X	X	X		X	X		
70SB05-01D	1.0-3.0	01/20/09	X	X	X	X		X	X		Duplicate		
Open Water Sediment	70SD01	70SD01	0.0-0.5	01/17/09	X	X	X	X		X	X		
	70SD02	70SD02	0.0-0.5	01/17/09	X	X	X	X		X	X		
	70SD03	70SD03	0.0-0.5	01/22/09	X	X	X	X		X	X		
		70SD03D	0.0-0.5	01/22/09	X	X	X	X		X	X	Duplicate	
Estuarine Sediment	70SB06	70SD06	0.0-0.5	01/15/09	X	X	X	X		X	X	X	
	70SB07	70SD07	0.0-0.5	01/15/09	X	X	X	X		X	X	X	
	70SB08	70SD08	0.0-0.5	01/15/09	X	X	X	X		X	X	X	

TABLE 4-1

**SUMMARY OF SAMPLING AND ANALYTICAL PROGRAM - ENVIRONMENTAL SAMPLES
SWMU 70 - DISPOSAL AREA NORTHWEST OF LANDFILL
PHASE I RFI REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO**

Sample Media	Site ID	Sample ID	Sample Depth (ft bgs)	Sample Date	Analysis Requested								Comment
					App IX VOCs	App IX SVOCs w/ LLPAHs	App IX PCBs	App IX Metals (Total)	App IX Metals (Dissolved)	TPH DRO	TPH GRO	TOC	
Groundwater	70SB01	70GW01	NA	01/16/09	X	X	X	X	X	X	X		
	70SB02	70GW02	NA	01/16/09	X	X	X	X	X	X	X		
		70GW02D	NA	01/16/09	X	X	X	X	X	X	X		Duplicate
		70GW02MS	NA	01/16/09	X	X	X	X	X	X	X		Matrix Spike
		70GW02MSD	NA	01/16/09	X	X	X	X	X	X	X		Matrix Spike Duplicate
	70SB03	70GW03	NA	01/16/09	X	X	X	X	X	X	X		
	70SB04	70GW04	NA	01/16/09	X	X	X	X	X	X	X		
	70SB05	70GW05	NA	01/20/09	X	X	X	X	X	X	X		Temporary well
	70SB06	70GW06	NA	01/17/09	X	X	X	X	X	X	X		Temporary well
	70SB07	70GW07	NA	01/17/09	X	X	X	X	X	X	X		Temporary well
70SB08	70GW08	NA	01/17/09	X	X	X	X	X	X	X		Temporary well	

Notes:

ft bgs - feet below ground surface.

NA - Not Applicable.

Low Level PAH's were included with SVOC analysis

TABLE 4-2

**SUMMARY OF SAMPLING AND ANALYTICAL PROGRAM - QA/QC SAMPLES
SWMU 70 - DISPOSAL AREA NORTHWEST OF LANDFILL
PHASE I RFI REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO**

Media	Sample ID	Sample Date	Analysis Requested						Comment
			App IX VOCs	App IX SVOCs w/ LL PAHs	App IX PCBs	App IX Metals	TPH GRO	TPH DRO	
Trip Blanks	JAN09-TB02	01/14/09	X					X	
	JAN09-TB03	01/14/09	X					X	
	JAN09-TB04	01/15/09	X					X	
	JAN09-TB06	01/17/09	X					X	
	JAN09-TB07	01/18/09	X					X	
	JAN09-TB09	01/20/09	X					X	
	JAN09-TB11	01/22/09	X					X	
Equipment Rinsate Blanks	JAN09-ER03	01/14/09	X	X	X	X	X	X	Macro Core Liner
	JAN09-ER04	01/15/09	X	X		X	X	X	Polyethylene and Silicon Tubing
	JAN09-ER05	01/16/09	X	X		X	X	X	Stainless Steel Spoon
	JAN09-ER06	01/17/09	X	X	X	X	X	X	Stainless Steel Spoon
	JAN09-ER08	01/20/09	X	X			X	X	Polyethylene and Silicon Tubing
	JAN09-ER10	01/22/09	X	X			X	X	Polyethylene and Silicon Tubing
Field Blanks	JAN09-FB01	01/14/09	X	X	X	X	X	X	Lab Grade Deionized Water
	JAN09-FB02	01/20/09	X	X	X	X	X	X	NAPR Potable Water

Notes:

Low Level PAH's were included with SVOC analysis

Since multiple SWMUs were investigated at the same time as SWMU 70, the QA/QC samples collected may be applicable to more than one SWMU. Pesticides were analyzed in the equipment rinsate and field blank samples listed on this table; however, pesticides results are not applicable to the investigation at SWMU 70. Therefore, pesticides will not be included on this table or in the QA/QC discussion for SWMU 70.

TABLE 4-3

**PARAMETER LISTS AND CONTRACT REQUIRED QUANTITATION LIMITS (CRQL)
SWMU 70 - DISPOSAL AREA NORTHWEST OF LANDFILL
PHASE I RFI REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO**

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

TABLE 4-3

**PARAMETER LISTS AND CONTRACT REQUIRED QUANTITATION LIMITS (CRQL)
SWMU 70 - DISPOSAL AREA NORTHWEST OF LANDFILL
PHASE I RFI REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO**

Appendix IX - VOCs (cont.)	Quantitation Limits*		Method Number (Description)
	Water (µg/L)	Low Soil (µg/kg)	
1,1,1-Trichloroethane	1.0	5.0	8260B (5030) (low level)
1,1,2-Trichloroethane	1.0	5.0	8260B (5030) (low level)
Trichloroethene	1.0	5.0	8260B (5030) (low level)
Trichlorofluoromethane	1.0	5.0	8260B (5030) (low level)
1,2,3-Trichloropropane	1.0	5.0	8260B (5030) (low level)
Vinyl Acetate	2.0	10	8260B (5030) (low level)
Vinyl Chloride	1.0	10	8260B (5030) (low level)
Xylene	2.0	10	8260B (5030) (low level)
Appendix IX - SVOCs	Quantitation Limits*		Method Number (Description)
	Water (µg/L)	Low Soil (µg/kg)	
<i>Acenaphthene</i>	<i>0.2</i>	<i>6.7</i>	<i>8270C</i>
<i>Acenaphthylene</i>	<i>0.2</i>	<i>6.7</i>	<i>8270C</i>
Acetophenone	10	330	8270C
2-Acetylaminofluorene	10	330	8270C
4-Aminobiphenyl	20	330	8270C
Aniline	20	660	8270C
<i>Anthracene</i>	<i>0.2</i>	<i>6.7</i>	<i>8270C</i>
Aramite	10	330	8270C
<i>Benzo(a)anthracene</i>	<i>0.2</i>	<i>6.7</i>	<i>8270C</i>
<i>Benzo(b)fluoranthene</i>	<i>0.2</i>	<i>6.7</i>	<i>8270C</i>
<i>Benzo(k)fluoranthene</i>	<i>0.2</i>	<i>6.7</i>	<i>8270C</i>
<i>Benzo(g,h,i)perylene</i>	<i>0.2</i>	<i>6.7</i>	<i>8270C</i>
<i>Benzo(a)pyrene</i>	<i>0.2</i>	<i>6.7</i>	<i>8270C</i>
Benzyl alcohol	10	330	8270C
Bis(2-chloroethoxyl)methane	10	330	8270C
Bis(2-chloroethyl)ether	10	330	8270C
Bis(2-ethylhexyl)phthalate	10	330	8270C
4-Bromophenyl phenyl ether	10	330	8270C
Butylbenzylphthalate	10	330	8270C
4-Chloroaniline	20	660	8270C
4-Chloro-3-methylphenol	10	330	8270C
2-Chloronaphthalene	10	330	8270C
2-Chlorophenol	10	330	8270C
4-Chlorophenyl phenyl ether	10	330	8270C
<i>Chrysene</i>	<i>0.2</i>	<i>6.7</i>	<i>8270C</i>
3&4 Methylphenol	10	330	8270C
2-Methylphenol	10	330	8270C
Diallate	10	330	8270C
Dibenzofuran	10	330	8270C
Di-n-butyl phthalate	10	330	8270C
<i>Dibenzo(a,h)anthracene</i>	<i>0.2</i>	<i>6.7</i>	<i>8270C</i>
o-Dichlorobenzene	10	330	8270C
m-Dichlorobenzene	10	330	8270C
p-Dichlorobenzene	10	330	8270C
3,3'-Dichlorobenzidine	20	660	8270C

TABLE 4-3

**PARAMETER LISTS AND CONTRACT REQUIRED QUANTITATION LIMITS (CRQL)
SWMU 70 - DISPOSAL AREA NORTHWEST OF LANDFILL
PHASE I RFI REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO**

Appendix IX - SVOCs (Cont.)	Quantitation Limits*		Method Number (Description)
	Water (µg/L)	Low Soil (µg/kg)	
2,4-Dichlorophenol	10	330	8270C
2,6-Dichlorophenol	10	330	8270C
Diethylphthalate	10	330	8270C
p-(Dimethylamino)azobenzene	10	330	8270C
7,12-Dimethyl benz(a)anthracene	10	330	8270C
3,3-Dimethyl benzidine	20	1,700	8270C
2,4-Dimethylphenol	10	330	8270C
alpha, alpha-Dimethylphenethylamine	2,000	67,000	8270C
Dimethyl phthalate	10	330	8270C
m-Dinitrobenzene	10	330	8270C
4,6-Dinitro-2-methylphenol	50	1,700	8270C
2,4-Dinitrophenol	50	1,700	8270C
2,4-Dinitrotoluene	10	330	8270C
2,6-Dinitrotoluene	10	330	8270C
Di-n-octylphthalate	10	330	8270C
1,4-Dioxane	10	330	8270C
Dinoseb	10	330	8270C
Ethylmethanesulfonate	10	330	8270C
Fluoranthene	0.2	6.7	8270C
Fluorene	0.2	6.7	8270C
Hexachlorobenzene	10	330	8270C
Hexachlorobutadiene	10	330	8270C
Hexachlorocyclopentadiene	10	330	8270C
Hexachloroethane	10	330	8270C
Hexachlorophene	5,000	170,000	8270C
Hexachloropropene	10	330	8270C
Indeno(1,2,3-cd)pyrene	0.2	6.7	8270C
Isophorone	10	330	8270C
Isosafrole	10	330	8270C
Methapyrilene	2,000	67,000	8270C
3-Methylcholanthrene	10	330	8270C
Methyl methanesulfonate	10	330	8270C
1-Methylnaphthalene	0.2	6.7	8270C
2-Methylnaphthalene	0.2	6.7	8270C
Naphthalene	0.2	6.7	8270C
1,4-Naphthoquinone	10	330	8270C
1-Naphthylamine	10	330	8270C
2-Naphthylamine	10	330	8270C
2-Nitroaniline	50	1,700	8270C
3-Nitroaniline	50	1,700	8270C
4-Nitroaniline	50	1,700	8270C
Nitrobenzene	10	330	8270C
2-Nitrophenol	10	330	8270C
4-Nitrophenol	50	1,700	8270C
4-Nitroquinoline-1-oxide	20	3,300	8270C
n-Nitrosodi-n-butylamine	10	330	8270C

TABLE 4-3

**PARAMETER LISTS AND CONTRACT REQUIRED QUANTITATION LIMITS (CRQL)
SWMU 70 - DISPOSAL AREA NORTHWEST OF LANDFILL
PHASE I RFI REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO**

Appendix IX - SVOCs (Cont.)	Quantitation Limits*		Method Number (Description)
	Water (µg/L)	Low Soil (µg/kg)	
n-Nitrosodiethylamine	10	330	8270C
n-Nitrosodimethylamine	10	330	8270C
n-Nitrosomethylethylamine	10	330	8270C
n-Nitrosomorpholine	10	330	8270C
n-Nitrosopiperidine	10	330	8270C
n-Nitrosopyrrolidine	10	330	8270C
5-Nitro-o-toluidine	10	330	8270C
bis-(2-chloroisopropyl)ether	10	330	8270C
Pentachlorobenzene	10	330	8270C
Pentachloronitrobenzene	10	330	8270C
Pentachlorophenol	50	1,700	8270C
Phenacetin	10	330	8270C
<i>Phenanthrene</i>	<i>0.2</i>	<i>6.7</i>	<i>8270C</i>
Phenol	10	330	8270C
1,4-Phenylenediamine	2,000	1,700	8270C
2-Picolin	10	330	8270C
Pronamide	10	330	8270C
<i>Pyrene</i>	<i>0.2</i>	<i>6.7</i>	<i>8270C</i>
Pyridine	50	330	8270C
Safrole	10	330	8270C
1,2,4,5-Tetrachlorobenzene	10	330	8270C
2,3,4,6-Tetrachlorophenol	10	330	8270C
o-Toluidine	20	330	8270C
1,2,4-Trichlorobenzene	10	330	8270C
2,4,5-Trichlorophenol	10	330	8270C
2,4,6-Trichlorophenol	10	330	8270C
1,3,5-Trinitrobenzene	10	330	8270C
Appendix IX - PCBs	Water (µg/L)	Low Soil (µg/kg)	Method Number (Description)
Aroclor-1016	1.0	33	8082
Aroclor-1221	2.0	67	8082
Aroclor-1232	1.0	33	8082
Aroclor-1242	1.0	33	8082
Aroclor-1248	1.0	33	8082
Aroclor-1254	1.0	33	8082
Aroclor-1260	1.0	33	8082

TABLE 4-3

**PARAMETER LISTS AND CONTRACT REQUIRED QUANTITATION LIMITS (CRQL)
SWMU 70 - DISPOSAL AREA NORTHWEST OF LANDFILL
PHASE I RFI REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO**

Appendix IX - Metals (Total and Dissolved)	Quantitation Limits*		Method Number (Description)
	Water (µg/L)	Low Soil (mg/kg)	
Antimony	20	2.0	6010 (Inductively Coupled Plasma)
Arsenic	10	1.0	6010 (Inductively Coupled Plasma)
Barium	10	1.0	6010 (Inductively Coupled Plasma)
Beryllium	4.0	0.4	6010 (Inductively Coupled Plasma)
Cadmium	5.0	0.5	6010 (Inductively Coupled Plasma)
Chromium	10	1.0	6010 (Inductively Coupled Plasma)
Cobalt	10	1.0	6010 (Inductively Coupled Plasma)
Copper	20	2.0	6010 (Inductively Coupled Plasma)
Lead	5.0	0.5	6010 (Inductively Coupled Plasma)
Mercury	0.2	0.02	7470/7471 (Cold Vapor AA)
Nickel	40	4.0	6010 (Inductively Coupled Plasma)
Selenium	10	2.5	6010 (Inductively Coupled Plasma)
Silver	10	1.0	6010 (Inductively Coupled Plasma)
Thallium	25	2.5	6010 (Inductively Coupled Plasma)
Tin	50	10.0	6010 (Inductively Coupled Plasma)
Vanadium	10	1.0	6010 (Inductively Coupled Plasma)
Zinc	20	2.0	6010 (Inductively Coupled Plasma)
Total Petroleum Hydrocarbons	Reporting Limits*		Method Number
	Water (µg/L)	Low Soil (µg/kg)	
TPH DRO	100	3300	8015B
TPH GRO	50	250	8015B
Miscellaneous			
Total Organic Carbon	1	1.0	Lloyd Kahn

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

Denotes LLPAH's included with SVOC analysis

TABLE 4-4

**GROUNDWATER ELEVATION SUMMARY
SWMU 70 - DISPOSAL AREA NORTHWEST OF LANDFILL
PHASE I RFI REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO**

Well Identification	Northing	Eastings	Total Well Depth (ft bgs)	Ground Surface Elevation (ft)⁽¹⁾	Screen Interval (ft bgs)	Elevation Top of PVC Casing (ft)⁽¹⁾	Depth to Groundwater on 01/23/2009 (ft)⁽²⁾	Groundwater Elevation (ft)^(1,3)
70SB01	799164.0	941409.7	14.0	108.2	4.0 to 14.0	110.81	8.17	102.64
70SB02	798865.5	941552.6	14.0	104.2	4.0 to 14.0	106.50	4.54	101.96
70SB03	798847.9	941353.9	14.0	104.5	4.0 to 14.0	107.33	5.18	102.15
70SB04	798820.9	940800.9	14.0	104.6	4.0 to 14.0	107.11	9.10	98.01
70SB05 ⁽⁴⁾	798458.8	941297.4	5.0	-	0.0 to 5.0	-		
70SB06 ⁽⁴⁾	798208.4	940576.5	2.0	-	0.0 to 2.0	-		
70SB07 ⁽⁴⁾	797786.0	940809.1	3.5	-	0.0 to 3.5	-		
70SB08 ⁽⁴⁾	797225.5	941289.9	3.5	-	0.0 to 3.5	-		

Notes:

- ⁽¹⁾ Datum: Mean Sea Level plus 100 feet
 - ⁽²⁾ Measured from top of PVC
 - ⁽³⁾ Groundwater Elevation = Elevation of top of PVC - Depth to Groundwater
 - ⁽⁴⁾ Hand Auger Location; elevation not surveyed
- ft = feet
bgs = below ground surface

TABLE 6-1

**SUMMARY OF DETECTED LABORATORY RESULTS - SURFACE SOIL
SWMU 70 - DISPOSAL AREA NORTHWEST OF LANDFILL
PHASE I RFI REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO**

Site ID Sample ID Date Depth Range (ft bgs)	Regional Screening Levels Residential	<i>Regional Screening Levels Industrial</i>	Selected Ecological Soil Screening Values	<u>NAPR</u> <u>Basewide</u> <u>Background</u> ⁽¹⁾	70SB01 70SB01-00 1/14/2009 0.0-1.0	70SB02 70SB02-00 1/14/2009 0.0-1.0	70SB03 70SB03-00 1/14/2009 0.0-1.0	70SB04 70SB04-00 1/15/2009 0.0-1.0	70SB04 70SB04-00D 1/15/2009 0.0-1.0	70SB05 70SB05-00 1/20/2009 0.0-1.0
Volatile Organic Compounds (ug/kg)										
Benzene	1,100	5,600	101 ⁽⁷⁾	NE	0.81 U	1.1 U	0.93 U	1.1 U	1 U	1.6 J
Carbon disulfide	67,000 ⁽²⁾	300,000 ⁽²⁾	NE	NE	1.2 U	2.4 J	1.4 U	1.6 U	1.6 U	1.7 U
Semivolatile Organic Compounds (ug/kg)										
2-Methylnaphthalene	31,000 ⁽²⁾	410,000 ⁽²⁾	NE	NE	6.6 J	7.2 J	38	84 J	4.6 J	2 U
Benzo[a]anthracene	150	2,100	NE	NE	1.8 U	2.6 U	2.4 U	2.1 U	2.2 U	6.2 J
Benzo[a]pyrene	15	210	NE	NE	1.8 U	2.6 U	2.4 U	2.1 U	2.2 U	8.7
Benzo[b]fluoranthene	150	2,100	NE	NE	1.8 U	2.6 UJ	2.4 UJ	2.1 U	2.2 U	9.1
Benzo[g,h,i]perylene	170,000 ⁽²⁾⁽³⁾	1,700,000 ⁽²⁾⁽³⁾	NE	NE	1.8 UJ	2.6 U	2.4 U	2.1 UJ	2.2 UJ	6.7 J
Benzo[k]fluoranthene	1,500	21,000	NE	NE	1.8 U	2.6 U	2.4 U	2.1 U	2.2 U	9.3
Chrysene	15,000	210,000	NE	NE	1.8 U	2.6 U	2.4 U	2.1 U	2.2 U	7.3 J
Dibenz(a,h)anthracene	15	210	NE	NE	0.6 UJ	0.86 U	0.8 U	0.71 UJ	0.75 UJ	2.7 J
Fluoranthene	230,000 ⁽²⁾	2,200,000 ⁽²⁾	NE	NE	0.4 U	0.57 U	0.86 J	0.77 J	0.5 U	4.1 J
Indeno[1,2,3-cd]pyrene	150	2,100	NE	NE	3.5 UJ	5 U	4.6 U	4.1 UJ	4.3 UJ	4 J
Naphthalene	3,900	20,000	NE	NE	1.8 U	2.6 U	2.7 J	4.2 J	2.2 U	2 U
Pyrene	170,000 ⁽²⁾	1,700,000 ⁽²⁾	NE	NE	1.8 U	2.6 U	2.4 U	2.1 U	2.2 U	4.8 J
PAHs (ug/kg)										
Low molecular weight PAHs	NE	NE	29,000 ⁽⁵⁾	NE	17.8	23.37	53.56	99.47	18.3	18.1
High molecular weight PAHs	NE	NE	18,000 ⁽⁶⁾	NE	16.7	24.06	22.2	19.51	20.45	58.8
PCBs (ug/kg)										
<i>None Detected</i>										
Metals (mg/kg)										
Arsenic	0.39	1.6	18 ⁽⁸⁾	2.65	<u>4.2</u>	1.9 U	<u>2.2</u> J	<u>4.4</u>	<u>6</u>	<u>7</u>
Barium	1,500 ⁽²⁾	19,000 ⁽²⁾	330 ⁽⁹⁾	199	7.9 J	8.2 J	9.4 J	11 J	12 J	30
Beryllium	16 ⁽²⁾	200 ⁽²⁾	40 ⁽⁹⁾	0.59	0.08 U	0.13 U	0.12 U	0.11 U	0.11 U	0.041 J

TABLE 6-1

**SUMMARY OF DETECTED LABORATORY RESULTS - SURFACE SOIL
SWMU 70 - DISPOSAL AREA NORTHWEST OF LANDFILL
PHASE I RFI REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO**

Site ID Sample ID Date Depth Range (ft bgs)	Regional Screening Levels Residential	<i>Regional Screening Levels Industrial</i>	Selected Ecological Soil Screening	<u>NAPR Basewide Background</u> ⁽¹⁾	70SB01 70SB01-00 1/14/2009 0.0-1.0	70SB02 70SB02-00 1/14/2009 0.0-1.0	70SB03 70SB03-00 1/14/2009 0.0-1.0	70SB04 70SB04-00 1/15/2009 0.0-1.0	70SB04 70SB04-00D 1/15/2009 0.0-1.0	70SB05 70SB05-00 1/20/2009 0.0-1.0
Metals (mg/kg)										
Cadmium	7 ⁽²⁾	81 ⁽²⁾	32 ⁽⁸⁾	1.02	0.14 U	0.22 U	0.21 U	0.19 U	0.19 U	0.043 J
Chromium	280	1,400	57 ⁽¹⁰⁾	49.8	5.7 J	7.8 J	6.4 U	4.4 U	3.8 U	13
Cobalt	2.3 ⁽²⁾	30 ⁽²⁾	13 ⁽⁸⁾	46.2	1.1 J	0.94 J	1.1 J	0.73 J	0.67 J	3.4
Copper	310 ⁽²⁾	4,100 ⁽²⁾	70 ⁽⁸⁾	168	4.4 J	5.3 J	5.1 J	3 UJ	3.1 UJ	12
Lead	400 ⁽⁴⁾	800 ⁽⁴⁾	120 ⁽⁸⁾	22	0.43 J	0.63 UJ	0.61 UJ	0.53 UJ	0.55 UJ	0.58
Mercury	2.3 ⁽²⁾	31 ⁽²⁾	0.1 ⁽¹¹⁾	0.109	0.004 U	0.005 U	0.0048 U	0.0048 U	0.0048 U	0.0066 J
Nickel	160 ⁽²⁾	2,000 ⁽²⁾	38 ⁽⁸⁾	20.7	2.6 J	3.2 J	2.4 J	1.9 J	1.6 J	4.4
Vanadium	55 ⁽²⁾	720 ⁽²⁾	10 ⁽¹²⁾	259	11 J	8.5 J	8 J	7.5 J	4.4 UJ	27
Zinc	2,300 ⁽²⁾	31,000 ⁽²⁾	120 ⁽⁹⁾	115	4.2 UJ	6.2 UJ	6.7 UJ	3.9 UJ	4 UJ	5.5
TPH DRO and GRO (mg/kg)										
Diesel Range Organics	NE	NE	NE	NE	0.81 U	1.9 U	12	2.6 U	1.9 U	30
Gasoline Range Organics	NE	NE	NE	NE	0.067 U	0.079 U	0.19 U	0.087 U	0.086 U	0.098 J
Total TPH	100 ⁽¹³⁾	NE	NE	NE	0.88	1.98	12	2.69	1.99	30.1

TABLE 6-1

**SUMMARY OF DETECTED LABORATORY RESULTS - SURFACE SOIL
SWMU 70 - DISPOSAL AREA NORTHWEST OF LANDFILL
PHASE I RFI REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO**

Table References:

Baker Environmental, Inc. (2008). Revised Final II Summary Report for Environmental Background Concentrations of Inorganic Compounds, Naval Activity Puerto Rico, Ceiba, Puerto Rico. February 29, 2008.

Efroymson, R.A., M.E. Will, and G.W. Suter II. 1997a. Toxicological Benchmarks for Screening Contaminants of Potential Concern for Effects on Soil and Litter Invertebrates and Heterotrophic Process: 1997 Revisions. Oak Ridge National Laboratory, Oak Ridge, TN. ES/ER/TM-126/R2.

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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.

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

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

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

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

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

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

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

TABLE 6-1

**SUMMARY OF DETECTED LABORATORY RESULTS - SURFACE SOIL
SWMU 70 - DISPOSAL AREA NORTHWEST OF LANDFILL
PHASE I RFI REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO**

Notes/Qualifiers:

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

U - Undetected at the Method Detection Limit

UJ - Reported quantitation limit is qualified as estimated

ft bgs - feet below ground surface

ug/kg - micrograms per kilogram

mg/kg - miligrams per kilogram

NE - Not Established

NAPR - Naval Activity Puerto Rico

USEPA - United States Environmental Protection Agency

⁽¹⁾ NAPR basewide background surface soil screening value (upper limit of the means concentration [mean plus two standard deviations]) (Baker, 2008)

⁽²⁾ Noncarcinogenic Regional Screening Levels based on a target hazard quotient of 0.1 for conservative screening purposes

⁽³⁾ Pyrene used as a surrogate for screening purposes for benzo[g,h,i] perylene

⁽⁴⁾ USEPA Action Level for lead in soils

⁽⁵⁾ 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 analyzed for in SWMU 70 soil were 2-methylnaphthalene, acenaphthene, acenaphthylene, anthracene, fluoranthene, fluorene, naphthalene, and phenanthrene. Maximum method detection limit was used if there were no detections.

⁽⁶⁾ 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 analyzed for in SWMU 70 soil were 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. Maximum method detection limits were used for non-detected PAHs.

⁽⁷⁾ The screening value shown is an average of the target and intervention soil standards. The value is based on a default organic carbon content of 0.02 (2 percent), which represents a minimum value (adjustment range is 2 to 30 percent).

⁽⁸⁾ Plant-based ecological soil screening level (USEPA, 2005a [arsenic]; USEPA, 2005b [cadmium]; USEPA, 2005c [cobalt]; USEPA, 2005d [lead]; USEPA, 2007b [copper]; USEPA, 2007c [nickel])

⁽⁹⁾ Invertebrate-based ecological soil screening level (USEPA, 2005e[barium]; USEPA, 2005f [beryllium]; USEPA, 2007d [zinc])

⁽¹⁰⁾ Reproduction-based MATC for *Eisenia andrei* (earthworm)

⁽¹¹⁾ Toxicological threshold for earthworms (Efroymson et al., 1997a)

⁽¹²⁾ Growth-based LOAEC for *Brassica oleracea* (broccoli) with a safety factor of 10 (USEPA, 2005g)

⁽¹³⁾ Total TPH value represents the Puerto Rico Environmental Quality Board recommended screening value for soils

TABLE 6-2

**SUMMARY OF DETECTED LABORATORY RESULTS - SUBSURFACE SOIL
SWMU 70 - DISPOSAL AREA NORTHWEST OF LANDFILL
PHASE I RFI REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO**

Site ID	Regional	<i>Regional</i>	Selected Ecological Soil Screening Values	<u>NAPR</u>	70SB01	70SB02	70SB03	70SB04	70SB04	70SB05	70SB05
Sample ID	Screening	<i>Screening</i>		<u>Basewide</u>	70SB01-01	70SB02-01	70SB03-01	70SB04-01	70SB04-01D	70SB05-01	70SB05-01D
Date	Levels	<i>Levels</i>		<u>Background</u> ⁽¹⁾	1/14/2009	1/14/2009	1/14/2009	1/15/2009	1/15/2009	1/20/2009	1/20/2009
Depth Range (ft bgs)	Residential	<i>Industrial</i>			1.0-3.0	1.0-3.0	1.0-3.0	1.0-3.0	1.0-3.0	1.0-3.0	1.0-3.0
Volatile Organic Compounds (ug/kg)											
Benzene	1,100	5,600	101 ⁽³⁾	NE	1 U	1.3 U	1 U	1.1 U	1.1 U	1.5 J	1.2 U
Carbon disulfide	67,000 ⁽²⁾	300,000 ⁽²⁾	NE	NE	1.5 U	2 U	1.6 U	1.7 U	1.7 U	2 J	2.3 J
Semivolatile Organic Compounds (ug/kg)											
2-Methylnaphthalene	31,000 ⁽²⁾	410,000 ⁽²⁾	NE	NE	2.2 U	12	3 J	2.5 U	2.4 U	2.4 U	2.4 U
PAHs (ug/kg)											
Low molecular weight PAHs	NE	NE	29,000 ⁽⁴⁾	NE	13.7	27.7	15.5	15.6	15.0	17.3	17.3
High molecular weight PAHs	NE	NE	18,000 ⁽⁵⁾	NE	20.4	27.8	22.3	23.2	22.3	22.2	22.2
PCBs (ug/kg)											
<i>None Detected</i>											
Metals (mg/kg)											
Arsenic	0.39	1.6	18 ⁽⁶⁾	6.66	3.8	6.1	3.9	5.6	4.8	4.8	4.7
Barium	1,500 ⁽²⁾	19,000 ⁽²⁾	330 ⁽⁷⁾	207	8.8 J	12 J	10 J	8.6 J	9 J	10	11
Beryllium	16 ⁽²⁾	200 ⁽²⁾	40 ⁽⁷⁾	0.933	0.11 U	0.13 U	0.11 U	0.11 U	0.11 U	0.021 U	0.025 J
Chromium	280	1,400	57 ⁽⁸⁾	47.9	3.6 UJ	21 J	8.8 J	3 U	2.6 U	7.3	9
Cobalt	2.3 ⁽²⁾	30 ⁽²⁾	13 ⁽⁶⁾	63.1	0.74 J	4.3 J	1.1 J	0.66 J	0.71 J	1.7 J	3.7 J
Copper	310 ⁽²⁾	4,100 ⁽²⁾	70 ⁽⁶⁾	120	3 UJ	23 J	5.7 U	3.1 UJ	3.2 UJ	5.5 R	14 R
Mercury	2.3 ⁽²⁾	31 ⁽²⁾	0.1 ⁽⁹⁾	0.067	0.0051 U	0.0065 U	0.049	0.0056 U	0.0053 U	0.005 U	0.0052 U
Nickel	160 ⁽²⁾	2,000 ⁽²⁾	38 ⁽⁶⁾	26.5	1.9 J	64 J	3 J	1.6 J	1.7 J	2.3 J	4 J
Vanadium	55 ⁽²⁾	720 ⁽²⁾	10 ⁽¹⁰⁾	256	5.9 UJ	25 J	11 J	4.5 UJ	4 UJ	21 J	35 J
TPH DRO and GRO (mg/kg)											
Gasoline Range Organics	NE	NE	NE	NE	0.084 U	0.092 U	0.083 U	0.084 U	0.076 U	0.085 R	0.16 J
Diesel Range Organics	NE	NE	NE	NE	1.4 U	1.9 U	1.5 U	1.3 U	0.94 U	1.2 U	2.3 U
Total TPH	100 ⁽¹¹⁾	NE	NE	NE	1.48	1.99	1.58	1.38	1.02	1.29	0.16 J

TABLE 6-2

**SUMMARY OF DETECTED LABORATORY RESULTS - SUBSURFACE SOIL
SWMU 70 - DISPOSAL AREA NORTHWEST OF LANDFILL
PHASE I RFI REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO**

Notes/Qualifiers:

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

U - Undetected at the Method Detection Limit

UJ - Reported quantitation limit is qualified as estimated

R - Data is rejected and not usable

ft bgs - feet below ground surface

ug/kg - micrograms per kilogram

mg/kg - miligrams per kilogram

NE - Not Established

NAPR - Naval Activity Puerto Rico

USEPA - United States Environmental Protection Agency

- (1) NAPR basewide background soil screening value (upper limit of the means concentration [mean plus two standard deviations]) for Subsurface Soil Background Fine Sand/Silt Table 3-7 (Baker, 2008)
- (2) Noncarcinogenic RSLs based on a target hazard quotient of 0.1 for conservative screening purposes
- (3) The screening value shown is an average of the target and intervention soil standards. The value is based on a default organic carbon content of 0.02 (2 percent), which represents a minimum value (adjustment range is 2 to 30 percent).
- (4) 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 analyzed for in SWMU 70 soil were 2-methylnaphthalene, acenaphthene, acenaphthylene, anthracene, fluoranthene, fluorene, naphthalene, and phenanthrene. Maximum method detection limit was used if there were no detections. Rejected data was not used. Acenaphthylene was rejected in all the subsurface samples except 70SB05-01 and its duplicate sample.
- (5) 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 analyzed for in SWMU 70 soil were 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. Maximum method detection limits were used for non-detected PAHs.
- (6) Plant-based ecological soil screening level (USEPA, 2005a [arsenic]; USEPA, 2008 [cadmium]; USEPA, 2005b [cobalt]; USEPA, 2007b [copper]; USEPA, 2007c [nickel])
- (7) Invertebrate-based ecological soil screening level (USEPA, 2005c [barium]; USEPA, 2005d [beryllium])
- (8) Reproduction-based MATC for *Eisenia andrei* (earthworm)
- (9) Toxicological threshold for earthworms (Efroymson et al., 1997a)
- (10) Growth-based LOAEC for *Brassica oleracea* (broccoli) with a safety factor of 10 (USEPA, 2005g)
- (11) Total TPH value represents the Puerto Rico Environmental Quality Board recommended screening value for soils

TABLE 6-2

**SUMMARY OF DETECTED LABORATORY RESULTS - SUBSURFACE SOIL
SWMU 70 - DISPOSAL AREA NORTHWEST OF LANDFILL
PHASE I RFI REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO**

Table References:

- Baker Environmental, Inc. (2008). Revised Final II Summary Report for Environmental Background Concentrations of Inorganic Compounds, Naval Activity Puerto Rico, Ceiba, Puerto Rico. February 29, 2008.
- Efroymson, R.A., M.E. Will, and G.W. Suter II. 1997a. Toxicological Benchmarks for Screening Contaminants of Potential Concern for Effects on Soil and Litter Invertebrates and Heterotrophic Process: 1997 Revisions. Oak Ridge National Laboratory, Oak Ridge, TN. ES/ER/TM-126/R2.
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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. 2005a. Ecological Soil Screening Levels for Arsenic (Interim Final). Office of Solid Waste and Emergency Response, Washington, D.C.
- USEPA. 2005b. Ecological Soil Screening Levels for Cobalt (Interim Final). Office of Solid Waste and Emergency Response, Washington, D.C. OSWER Directive 9285.7-67
- 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.

TABLE 6-3

**SUMMARY OF DETECTED LABORATORY RESULTS - OPEN WATER SEDIMENT
SWMU 70 - DISPOSAL AREA NORTHWEST OF LANDFILL
PHASE I RFI REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO**

Site ID Sample ID Date Depth Range (ft bgs)	Regional Screening Levels Residential	<i>Regional Screening Levels Industrial</i>	Selected Ecological Sediment Screening Values	<u>NAPR</u> <u>Basewide</u> <u>Background</u> ⁽¹⁾	70SD01 70SD01 1/17/2009 0.0-0.5	70SD02 70SD02 1/17/2009 0.0-0.5	70SD03 70SD03 1/22/2009 0.0-0.5	70SD03 70SD03D 1/22/2009 0.0-0.5
Volatile Organic Compounds (ug/kg)								
Acetone	6,100,000 ⁽²⁾	61,000,000 ⁽²⁾	5.81 ⁽⁴⁾	NE	140 J	300 J	140 J	240 J
Benzene	1,100	5,600	135 ⁽⁴⁾	NE	1.1 U	1.2 U	1.6 J	1.4 UJ
Carbon disulfide	67,000 ⁽²⁾	300,000 ⁽²⁾	13.9 ⁽⁴⁾	NE	8.5	17	5.7 J	5.9 J
Methylene Chloride	11,000	54,000	434 ⁽⁴⁾	NE	2.5 J	3.2 J	1.9 UJ	1.7 UJ
Semivolatile Organic Compounds (ug/kg)								
3 & 4 Methylphenol	NE	NE	100 ^{(5) (6)}	NE	12 U	94	17 UJ	15 UJ
Benzo[a]anthracene	150	2,100	74.8 ⁽⁷⁾	NE	9.9 J	2.9 U	4 UJ	3.4 UJ
Benzo[a]pyrene	15	210	88.8 ⁽⁷⁾	NE	7.4 J	2.9 U	4 UJ	3.4 UJ
Benzo[b]fluoranthene	150	2,100	1,800 ⁽⁸⁾	NE	8.2 J	4.1 J	4 UJ	3.4 UJ
Benzo[k]fluoranthene	1,500	21,000	1,800 ⁽⁸⁾	NE	6.6 J	2.9 U	4 UJ	3.4 UJ
Bis(2-ethylhexyl) phthalate	35,000	120,000	182 ⁽⁷⁾	NE	20 U	21 U	19 J	25 J
Chrysene	15,000	210,000	108 ⁽⁷⁾	NE	6.8 J	2.9 U	4 UJ	3.4 UJ
Fluoranthene	230,000 ⁽²⁾	2,200,000 ⁽²⁾	113 ⁽⁷⁾	NE	13	0.64 U	5.2 J	4 J
Phenanthrene	NE	NE	86.7 ⁽⁷⁾	NE	3 J	2.9 U	4 UJ	3.4 UJ
Pyrene	170,000 ⁽²⁾	1,700,000 ⁽²⁾	153 ⁽⁷⁾	NE	14	2.9 U	5.5 J	4.2 J
PCBs (ug/kg)								
<i>None Detected</i>								
Metals (mg/kg)								
Arsenic	0.39	1.6	7.24 ⁽⁷⁾	10.5	2	4.4	5.6 J	5.3 J
Barium	1,500 ⁽²⁾	19,000 ⁽²⁾	48 ⁽⁹⁾	11.82	7	12	13 J	13 J
Beryllium	16 ⁽²⁾	200 ⁽²⁾	NE	0.304	0.026 U	0.057 J	0.098 J	0.075 J
Chromium	280	1,400	52.3 ⁽⁷⁾	17.6	2.9	21	18 J	16 J
Cobalt	2.3 ⁽²⁾	30 ⁽²⁾	10 ⁽¹⁰⁾	3.9	0.85	6.4	4.9 J	4.3 J

TABLE 6-3

**SUMMARY OF DETECTED LABORATORY RESULTS - OPEN WATER SEDIMENT
SWMU 70 - DISPOSAL AREA NORTHWEST OF LANDFILL
PHASE I RFI REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO**

Site ID	Regional	<i>Regional</i>	Selected	<u>NAPR</u>	70SD01	70SD02	70SD03	70SD03
Sample ID	Screening	<i>Screening</i>	Ecological	<u>Basewide</u>	70SD01	70SD02	70SD03	70SD03D
Date	Levels	<i>Levels</i>	Sediment	<u>Background</u> ⁽¹⁾	1/17/2009	1/17/2009	1/22/2009	1/22/2009
Depth Range (ft bgs)	Residential	<i>Industrial</i>	Screening Values		0.0-0.5	0.0-0.5	0.0-0.5	0.0-0.5
Metals (mg/kg)								
Copper	310 ⁽²⁾	4,100 ⁽²⁾	18.7 ⁽⁷⁾	29	1.8 J	21	29 J	25 J
Lead	400 ⁽³⁾	800 ⁽³⁾	30.2 ⁽⁷⁾	5.4	0.51	1.3	2 J	1.9 J
Mercury	2.3 ⁽²⁾	31 ⁽²⁾	0.13 ⁽⁷⁾	0.056	0.0057 U	0.015 J	0.015 J	0.014 J
Nickel	160 ⁽²⁾	2,000 ⁽²⁾	15.9 ⁽⁷⁾	6.7	0.83	8.7	7.1 J	6.3 J
Selenium	39 ⁽²⁾	510 ⁽²⁾	1.0 ⁽⁹⁾	1.08	0.17 U	0.2 J	0.3 UJ	0.33 UJ
Vanadium	55 ⁽²⁾	720 ⁽²⁾	57 ⁽¹⁰⁾	47	4.3	35	45 J	37 J
Zinc	2,300 ⁽²⁾	31,000 ⁽²⁾	124 ⁽⁷⁾	32	3.1 U	17	23 J	20 J
TPH DRO and GRO (mg/kg)								
Diesel Range Organics	NE	NE	NE	NE	1.2 U	1 U	29 J	13 UJ
Gasoline Range Organics	NE	NE	NE	NE	0.1 U	0.1 U	0.14 J	0.16 J
Total TPH	100 ⁽¹¹⁾	NE	NE	NE	1.3	1.1	29.1	0.16 J

TABLE 6-3

**SUMMARY OF DETECTED LABORATORY RESULTS - OPEN WATER SEDIMENT
SWMU 70 - DISPOSAL AREA NORTHWEST OF LANDFILL
PHASE I RFI REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO**

Notes/Qualifiers:

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

U - Undetected at the Method Detection Limit

UJ - Reported quantitation limit is qualified as estimated

ft bgs - feet below ground surface

ug/kg - micrograms per kilogram

mg/kg - miligrams per kilogram

NE - Not Established

NAPR - Naval Activity Puerto Rico

USEPA - United States Environmental Protection Agency

(1) NAPR basewide background sediment screening value (upper limit of the means concentration [mean plus two standard deviations]) (Baker, 2008)

(2) Noncarcinogenic RSLs based on a target hazard quotient of 0.1 for conservative screening purposes

(3) USEPA Action Level for lead in soils

(4) EcP-based screening value

(5) Minimum Apparent Effects Threshold (bivalve)

(6) The value shown is for 4-methylphenol.

(7) Threshold Effect Level

(8) Minimum Apparent Effects Threshold (Echinoderm larvae and infaunal community impacts)

(9) Minimum Apparent Effects Threshold (amphipod)

(10) Minimum Apparent Effects Threshold (Neanthes bioassays)

(11) Total TPH value represents the Puerto Rico Environmental Quality Board recommended screening value for soils

References:

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TABLE 6-4

**SUMMARY OF DETECTED LABORATORY RESULTS - ESTUARINE SEDIMENT
SWMU 70 - DISPOSAL AREA NORTHWEST OF LANDFILL
PHASE I RFI REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO**

Site ID Sample ID Date Depth Range (ft bgs)	Regional Screening Levels Residential	<i>Regional Screening Levels Industrial</i>	Selected Ecological Sediment Screening Values	<u>NAPR</u> <u>Basewide</u> <u>Background</u> ⁽¹⁾	70SB06 70SD06 1/15/2009 0.0-0.5	70SB07 70SD07 1/15/2009 0.0-0.5	70SB08 70SD08 1/15/2009 0.0-0.5
Volatile Organic Compounds (ug/kg)							
Acetone	6,100,000 ⁽²⁾	61,000,000 ⁽²⁾	5.81 ⁽⁴⁾	NE	48 J	7.6 J	25 J
Carbon disulfide	67,000 ⁽²⁾	300,000 ⁽²⁾	13.9 ⁽⁴⁾	NE	1.4 U	1.5 U	6.6 J
Methylene Chloride	11,000	54,000	434 ⁽⁴⁾	NE	1.5 J	1.3 J	2.5 J
Semivolatile Organic Compounds (ug/kg)							
Fluoranthene	230,000 ⁽²⁾	2,200,000 ⁽²⁾	113 ⁽⁵⁾	NE	0.56 J	1.8 J	1.1 J
Pyrene	170,000 ⁽²⁾	1,700,000 ⁽²⁾	153 ⁽⁵⁾	NE	2.4 U	2.7 J	2.5 U
PCBs (ug/kg)							
<i>None Detected</i>							
Metals (mg/kg)							
Arsenic	0.39	1.6	7.24 ⁽⁵⁾	7.0	3.5	3 U	5.5
Barium	1,500 ⁽²⁾	19,000 ⁽²⁾	48 ⁽⁶⁾	24.93	42 J	18 J	11 J
Chromium	280	1,400	52.3 ⁽⁷⁾	50.05	10 J	54 J	31 J
Cobalt	2.3 ⁽²⁾	30 ⁽²⁾	10 ⁽⁷⁾	22.35	9.4 J	22 J	8 J
Copper	310 ⁽²⁾	4,100 ⁽²⁾	18.7 ⁽⁵⁾	132.44	53 J	80 J	20 J
Lead	400 ⁽³⁾	800 ⁽³⁾	30.2 ⁽⁵⁾	25.4	4.8 J	1.1 UJ	1.3 UJ
Mercury	2.3 ⁽²⁾	31 ⁽²⁾	0.13 ⁽⁵⁾	0.17	0.005 U	0.0081 J	0.012 J
Nickel	160 ⁽²⁾	2,000 ⁽²⁾	15.9 ⁽⁵⁾	17.31	7.2 J	24 J	9.8 J
Vanadium	55 ⁽²⁾	720 ⁽²⁾	57 ⁽⁷⁾	230.43	67 J	290 J	63 J
Zinc	2,300 ⁽²⁾	31,000 ⁽²⁾	124 ⁽⁵⁾	96.9	47 J	39 J	15 UJ
TPH DRO and GRO (mg/kg)							
<i>Not Detected</i>							
Total Organic Carbon (mg/kg)							
Total Organic Carbon	NE	NE	NE	NE	30,000	5,400	36,000

TABLE 6-4

**SUMMARY OF DETECTED LABORATORY RESULTS - ESTUARINE SEDIMENT
SWMU 70 - DISPOSAL AREA NORTHWEST OF LANDFILL
PHASE I RFI REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO**

Notes/Qualifiers:

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

U - Undetected at the Method Detection Limit

UJ - Reported quantitation limit is qualified as estimated

ft bgs - feet below ground surface

ug/kg - micrograms per kilogram

mg/kg - milligrams per kilogram

NE - Not Established

NAPR - Naval Activity Puerto Rico

USEPA - United States Environmental Protection Agency

(1) NAPR basewide background sediment screening value (upper limit of the means concentration [mean plus two standard deviations]) (Baker, 2008)

(2) Noncarcinogenic RSLs based on a target hazard quotient of 0.1 for conservative screening purposes

(3) USEPA Action Level for lead in soils

(4) EqP-based screening value

(5) Threshold Effect Level

(6) Minimum Apparent Effects Threshold (amphipod)

(7) Minimum Apparent Effects Threshold (Neanthes bioassays)

References:

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 6-5

**SUMMARY OF DETECTED LABORATORY RESULTS - GROUNDWATER
SWMU 70 - DISPOSAL AREA NORTHWEST OF LANDFILL
PHASE I RFI REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO**

Site ID Sample ID Date Depth Range	Regional Tap Water Screening Levels	USEPA MCLs	Ecological Groundwater Screening Values	<u>NAPR</u> <u>Basewide</u> <u>Background</u> ⁽¹⁾	70SB01 70GW01 1/17/2009	70SB02 70GW02 1/17/2009	70SB02 70GW02D 1/17/2009	70SB03 70GW03 1/17/2009	70SB04 70GW04 1/17/2009	70SB05 70 GW05 1/20/2009
Volatile Organic Compounds (ug/L)										
Acetone	2,200 ⁽²⁾	NE	1,000 ⁽³⁾	NE	5.5 J	5 R	6.4 J	5 U	5 U	14 J
Carbon disulfide	100 ⁽²⁾	NE	15 ⁽⁴⁾	NE	1.3 U	0.6 R	0.73 R	0.6 U	0.6 U	0.86 J
Vinyl chloride	0.016	2	930 ⁽⁴⁾	NE	0.2 U	0.62 R	0.62 R	0.2 U	0.23 J	0.62 R
Semivolatile Organic Compounds (ug/L)										
1,3-Dichlorobenzene	NE	NE	28.5 ⁽⁵⁾	NE	0.12 U	0.12 U	0.12 U	0.12 U	0.12 U	0.21 J
2-Methylnaphthalene	15 ⁽²⁾	NE	6 ⁽⁶⁾	NE	0.023 U	0.023 U	0.023 U	0.022 U	0.022 U	0.027 J
3 & 4 Methylphenol	NE	NE	25 ⁽⁷⁾	NE	0.4 J	0.73 J	0.49 J	0.15 U	0.26 J	0.15 UJ
Anthracene	1,100 ⁽²⁾	NE	5.35 ⁽⁸⁾	NE	0.027 U	0.027 U	0.025 U	0.025 U	0.025 U	0.026 U
Bis(2-ethylhexyl) phthalate	4.8	6	360 ⁽⁹⁾	NE	0.36 UJ	0.49 J	1.8 J	0.35 J	0.4 J	0.35 U
Naphthalene	0.14	NE	23.5 ⁽⁵⁾	NE	0.027 U	0.027 U	0.025 U	0.025 U	0.029 J	0.12 J
Phenanthrene	NE	NE	8.3 ⁽¹⁰⁾	NE	0.032 U	0.032 U	0.03 U	0.03 U	0.03 U	0.039 J
PCBs (ug/L)										
<i>None Detected</i>										
Total Metals (ug/L)										
Barium	730 ⁽²⁾	2,000	16,667 ⁽¹¹⁾	686	40 U	390	390	95 J	40 U	80 U
Chromium	NE	NE	50.4 ⁽¹²⁾	162.41	12 U	21 J	12 U	12 U	12 U	24 U
Cobalt	1.1 ⁽²⁾	NE	45 ⁽¹³⁾	633.21	1.1 U	2.4 U	2.9 U	67	2.2 U	3.7 U
Copper	150 ⁽²⁾	1300	3.73 ⁽¹²⁾	324	24 U	25 J	24 U	24 U	24 U	48 U
Nickel	73 ⁽²⁾	NE	8.28 ⁽¹²⁾	95.74	6.4 U	12 J	6.4 U	35	6.4 U	13 U
Vanadium	26 ⁽²⁾	NE	12 ⁽¹⁴⁾	484.66	19 J	34 J	24 J	16 U	16 U	32 U

TABLE 6-5

**SUMMARY OF DETECTED LABORATORY RESULTS - GROUNDWATER
SWMU 70 - DISPOSAL AREA NORTHWEST OF LANDFILL
PHASE I RFI REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO**

Site ID Sample ID Date Depth Range	Regional Tap Water Screening Levels	<i>USEPA</i> <i>MCLs</i>	Ecological Groundwater Screening Values	<u>NAPR</u> <u>Basewide</u> <u>Background</u> ⁽¹⁾	70SB01 70GW01 1/17/2009	70SB02 70GW02 1/17/2009	70SB02 70GW02D 1/17/2009	70SB03 70GW03 1/17/2009	70SB04 70GW04 1/17/2009	70SB05 70 GW05 1/20/2009
Dissolved Metals (ug/L)										
Arsenic	0.045	10	36 ⁽¹⁵⁾	14.03	44 J	13 J	16 J	9.4 J	33 J	15 U
Barium	730 ⁽²⁾	2,000	16,667 ⁽¹¹⁾	260	40 U	<u>400</u>	<u>390</u>	93 J	40 U	80 U
Cobalt	1.1 ⁽²⁾	NE	45 ⁽¹³⁾	580.5	2.5 U	3.4 U	2.1 U	66	2.3 U	4.3 U
Copper	150 ⁽²⁾	1,300	3.73 ⁽¹²⁾	29	24 UJ	28 J	24 UJ	24 UJ	24 UJ	48 U
Nickel	73 ⁽²⁾	NE	8.28 ⁽¹²⁾	84.1	6.4 U	6.4 U	6.4 U	31	11 J	13 U
Vanadium	26 ⁽²⁾	NE	12 ⁽¹⁴⁾	20.96	17 J	32 J	31 J	16 U	16 U	32 U
TPH DRO and GRO (mg/L)										
Diesel Range Organics	NE	NE	NE	NE	1.5	0.65	0.5	0.64	0.12 U	0.2 U
Gasoline Range Organics	NE	NE	NE	NE	0.012 U	0.012 R	0.012 R	0.012 U	0.012 U	0.013 J
Total TPH	50 ⁽¹⁶⁾	NE	NE	NE	1.5	0.65	0.5	0.64	0.132	0.013 J

TABLE 6-5

**SUMMARY OF DETECTED LABORATORY RESULTS - GROUNDWATER
SWMU 70 - DISPOSAL AREA NORTHWEST OF LANDFILL
PHASE I RFI REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO**

Site ID	Regional	USEPA	Ecological	NAPR	70SB06	70SB07	70SB08
Sample ID	Tap Water	MCLs	Groundwater	Basewide	70GW06	70GW07	70GW08
Date	Screening		Screening	Background ⁽¹⁾	1/17/2009	1/17/2009	1/17/2009
Depth Range	Levels		Values				
Volatile Organic Compounds (ug/L)							
Acetone	2,200 ⁽²⁾	NE	1,000 ⁽³⁾	NE	5 U	5 U	5 U
Carbon disulfide	100 ⁽²⁾	NE	15 ⁽⁴⁾	NE	0.6 U	0.6 U	0.6 U
Vinyl chloride	0.016	2	930 ⁽⁴⁾	NE	0.2 U	0.2 U	0.2 U
Semivolatile Organic Compounds (ug/L)							
1,3-Dichlorobenzene	NE	NE	28.5 ⁽⁵⁾	NE	0.12 U	0.12 U	0.12 U
2-Methylnaphthalene	15 ⁽²⁾	NE	6 ⁽⁶⁾	NE	0.023 U	0.022 U	0.022 U
3 & 4 Methylphenol	NE	NE	25 ⁽⁷⁾	NE	0.15 U	0.15 U	0.15 U
Anthracene	1,100 ⁽²⁾	NE	5.35 ⁽⁸⁾	NE	0.025 U	0.025 U	0.039 J
Bis(2-ethylhexyl) phthalate	4.8	6	360 ⁽⁹⁾	NE	0.91 J	0.37 J	0.36 J
Naphthalene	0.14	NE	23.5 ⁽⁵⁾	NE	0.025 U	0.025 U	0.025 U
Phenanthrene	NE	NE	8.3 ⁽¹⁰⁾	NE	0.03 U	0.03 U	0.03 U
PCBs (ug/L)							
<i>None Detected</i>							
Total Metals (ug/L)							
Barium	730 ⁽²⁾	2,000	16,667 ⁽¹¹⁾	686	70 J	55 J	77 J
Chromium	NE	NE	50.4 ⁽¹²⁾	162.41	12 U	12 U	12 U
Cobalt	1.1 ⁽²⁾	NE	45 ⁽¹³⁾	633.21	1.4 U	6.7 U	2.1 U
Copper	150 ⁽²⁾	1300	3.73 ⁽¹²⁾	324	24 U	24 U	24 U
Nickel	73 ⁽²⁾	NE	8.28 ⁽¹²⁾	95.74	6.4 U	6.4 U	6.4 U
Vanadium	26 ⁽²⁾	NE	12 ⁽¹⁴⁾	484.66	16 U	16 J	17 J

TABLE 6-5

**SUMMARY OF DETECTED LABORATORY RESULTS - GROUNDWATER
SWMU 70 - DISPOSAL AREA NORTHWEST OF LANDFILL
PHASE I RFI REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO**

Site ID	Regional	<i>USEPA</i>	Ecological	<u>NAPR</u>	70SB06	70SB07	70SB08
Sample ID	Tap Water	<i>MCLs</i>	Groundwater	<u>Basewide</u>	70GW06	70GW07	70GW08
Date	Screening		Screening	<u>Background</u> ⁽¹⁾	1/17/2009	1/17/2009	1/17/2009
Depth Range	Levels		Values				
Dissolved Metals (ug/L)							
Arsenic	0.045	10	36 ⁽¹⁵⁾	14.03	5.6 U	5.6 U	5.6 U
Barium	730 ⁽²⁾	2,000	16,667 ⁽¹¹⁾	260	72 J	56 J	80 J
Cobalt	1.1 ⁽²⁾	NE	45 ⁽¹³⁾	580.5	1.4 U	6.9 U	2.9 U
Copper	150 ⁽²⁾	1,300	3.73 ⁽¹²⁾	29	24 UJ	24 UJ	24 UJ
Nickel	73 ⁽²⁾	NE	8.28 ⁽¹²⁾	84.1	6.4 U	6.4 U	6.4 U
Vanadium	26 ⁽²⁾	NE	12 ⁽¹⁴⁾	20.96	16 U	16 U	17 J
TPH DRO and GRO (mg/L)							
Diesel Range Organics	NE	NE	NE	NE	0.12 U	0.078 U	0.45
Gasoline Range Organics	NE	NE	NE	NE	0.012 U	0.012 U	0.012 U
Total TPH	50 ⁽¹⁶⁾	NE	NE	NE	0.132	0.09	0.45

TABLE 6-5

**SUMMARY OF DETECTED LABORATORY RESULTS - GROUNDWATER
SWMU 70 - DISPOSAL AREA NORTHWEST OF LANDFILL
PHASE I RFI REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO**

Notes:

U - Not detected at the Method Detection Limit
J - Analyte present - Reported value is estimated
UJ - Reported quantitation limit is qualified as estimated
R - Data is rejected and not usable
NE - Not Established
mg/l - micrograms per liter
ug/l - micrograms per liter
NAPR - Naval Activity Puerto Rico
USEPA - United States Environmental Protection Agency

- (1) NAPR basewide background groundwater screening value (upper limit of the means concentration [mean plus two standard deviations]) (Baker, 2008)
- (2) Noncarcinogenic RSLs based on a target hazard quotient of 0.1 for conservative screening purposes
- (3) Minimum acute value (96-hr LC₅₀ for *Lumbriculus variegatus* [Oligochaete]) with a safety factor of 100
- (4) USEPA Region 5 ecological screening level
- (5) USEPA Region 4 chronic screening value
- (6) Minimum acute value (96-hr LC₅₀ for *Penaeus aztecus* [brown shrimp]) with a safety factor of 100
- (7) USEPA Region 5 ecological screening level (the value shown is for 4-methylphenol)
- (8) Minimum acute value (48-hr LC₅₀ for *Americamysis bahia* [opossum shrimp]) with a safety factor of 100
- (9) Proposed Criteria Continuous Concentration
- (10) Final Chronic Value
- (11) Minimum acute value (96-hr NOEC for *Cyprinodon variegatus* [sheepshead minnow]) with a safety factor of 30
- (12) Total recoverable Criteria Continuous Concentration for hexavalent chromium
- (13) Minimum acute value (96-hr LC₅₀ for *Nitocra spinipes* [Harpacticoid copepod]) with a safety factor of 100
- (14) USEPA Region 5 ecological screening level
- (15) Total recoverable Criteria Continuous Concentration for trivalent arsenic
- (16) Total TPH value represents the Puerto Rico Environmental Quality Board recommended screening value for groundwater

TABLE 6-5

**SUMMARY OF DETECTED LABORATORY RESULTS - GROUNDWATER
SWMU 70 - DISPOSAL AREA NORTHWEST OF LANDFILL
PHASE I RFI REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO**

References:

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.

United States Environmental Protection Agency (USEPA). 2007a. ECOTOX User Guide: Ecotoxicology Database System. Version 4.0. <http://www.epa.gov/ecotox/>. Accessed May 14, 2003, July 2, 2008, January 8, 2009, and April 1, 2009.

USEPA. 2006. National Recommended Water Quality Criteria. Office of Water and Office of Science and Technology, Washington, D.C.

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 6-6

**SUMMARY OF DETECTED LABORATORY RESULTS - QUALITY ASSURANCE/QUALITY CONTROL
SWMU 70 - DISPOSAL AREA NORTHWEST OF LANDFILL
PHASE I RFI REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO**

Sample ID	Trip Blank Samples						
	JAN09-TB02 Date 1/14/2009	JAN09-TB03 1/14/2009	JAN09-TB04 1/15/2009	JAN09-TB06 1/17/2009	JAN09-TB07 1/18/2009	JAN09-TB09 1/20/2009	JAN09-TB11 1/22/2009
Volatile Organic Compounds (ug/L)							
2-Butanone (MEK)	0.74 J	0.6 U					
Acetone	9.8 J	5 U	5 U	5 U	5 U	5 U	5 U
Chlorodibromomethane	NA	0.3 U					
Chloroethane	NA	1 U	1 U	1 U	1 UJ	1 UJ	1 U
Chloroform	NA	0.29 U					
Chloromethane	NA	0.28 U	0.28 U	0.28 U	0.28 U	0.33 J	0.28 U
Dichlorobromomethane	NA	0.34 U					
Toluene	NA	0.31 U					
Semivolatile Organic Compounds (ug/L)							
1,4-Dioxane	NA	NA	NA	NA	NA	NA	NA
Acetophenone	NA	NA	NA	NA	NA	NA	NA
Benzyl alcohol	NA	NA	NA	NA	NA	NA	NA
Bis(2-ethylhexyl) phthalate	NA	NA	NA	NA	NA	NA	NA
Butyl benzyl phthalate	NA	NA	NA	NA	NA	NA	NA
Diethyl phthalate	NA	NA	NA	NA	NA	NA	NA
Di-n-butyl phthalate	NA	NA	NA	NA	NA	NA	NA
Naphthalene	NA	NA	NA	NA	NA	NA	NA
Phenol	NA	NA	NA	NA	NA	NA	NA
Total Metals (ug/L)							
Antimony	NA	NA	NA	NA	NA	NA	NA
Arsenic	NA	NA	NA	NA	NA	NA	NA
Chromium	NA	NA	NA	NA	NA	NA	NA
Cobalt	NA	NA	NA	NA	NA	NA	NA
Copper	NA	NA	NA	NA	NA	NA	NA
Lead	NA	NA	NA	NA	NA	NA	NA
Nickel	NA	NA	NA	NA	NA	NA	NA
Vanadium	NA	NA	NA	NA	NA	NA	NA
Zinc	NA	NA	NA	NA	NA	NA	NA
TPH DRO and GRO (mg/L)							
Diesel Range Organics	NA	NA	NA	NA	NA	NA	NA
Gasoline Range Organics	NA	NA	0.012 U				

TABLE 6-6

**SUMMARY OF DETECTED LABORATORY RESULTS - QUALITY ASSURANCE/QUALITY CONTROL
SWMU 70 - DISPOSAL AREA NORTHWEST OF LANDFILL
PHASE I RFI REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO**

Sample ID	Equipment Rinsate Samples						Field Blank Samples	
	JAN09-ER03 Date	JAN09-ER04	JAN09-ER05	JAN09-ER06	JAN09-ER08	JAN09-ER10	JAN09-FB01	JAN09-FB02
	1/14/2009	1/15/2009	1/17/2009	1/17/2009	1/20/2009	1/22/2009	1/14/2009	1/20/2009
Volatile Organic Compounds (ug/L)								
2-Butanone (MEK)	1 J	0.6 U	0.75 J	0.6 U				
Acetone	5 U	5 U	5 U	5 U	5 U	6.3 J	5 U	5 U
Chlorodibromomethane	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	4.1
Chloroethane	1 U	1 U	1 U	1 UJ	1 U	1 U	1 U	1 U
Chloroform	0.29 U	0.29 U	0.29 U	0.29 U	0.29 U	0.29 U	0.29 U	53
Chloromethane	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U
Dichlorobromomethane	0.34 U	0.34 U	0.34 U	0.34 U	0.34 U	0.34 U	0.34 U	13
Toluene	0.31 U	1.2	0.99 J	0.45 J	0.31 U	0.31 U	0.31 U	0.31 U
Semivolatile Organic Compounds (ug/L)								
1,4-Dioxane	0.49 U	0.49 U	0.47 U	0.49 U	2.9 J	NA	0.49 U	0.49 R
Acetophenone	1.2	0.19 U	0.19 UJ	0.21 J	0.45 J	NA	0.19 U	0.19 R
Benzyl alcohol	6.7	0.65 J	1	1.6	1.8 J	NA	3.6	0.16 R
Bis(2-ethylhexyl) phthalate	0.34 U	0.34 UJ	0.33 UJ	0.43 J	0.56 J	NA	0.34 U	0.34 R
Butyl benzyl phthalate	1.5	0.17 U	0.16 U	0.17 J	0.91 J	NA	1	0.17 R
Diethyl phthalate	5	0.18 U	0.18 U	0.18 U	2.3 J	NA	0.18 U	0.17 R
Di-n-butyl phthalate	3	0.11 UJ	0.15 J	0.21 J	2.2 J	NA	3.5	0.11 R
Naphthalene	0.025 U	0.025 U	0.035 J	0.025 U	0.025 UJ	0.025 U	0.025 U	0.025 R
Phenol	0.8 J	0.14 U	0.13 U	0.14 UJ	0.14 UJ	NA	0.5 J	0.14 R
Total Metals (ug/L)								
Antimony	1.4 J	1.1 J	0.61 J	0.51 J	NA	NA	1.2 J	1.1 J
Arsenic	0.55 J	0.7 J	0.28 U	0.29 J	NA	NA	0.54 J	0.74 J
Chromium	1.4 J	0.86 J	0.6 U	0.6 U	NA	NA	0.94 J	0.79 J
Cobalt	0.029 U	0.029 U	0.029 U	0.029 U	NA	NA	0.029 U	0.034 J
Copper	1.2 U	1.2 U	5.2	1.2 U	NA	NA	1.2 U	18
Lead	0.15 U	0.15 U	0.15 U	0.15 U	NA	NA	0.15 U	0.6 J
Nickel	0.4 J	0.33 J	0.32 U	0.32 U	NA	NA	0.32 U	0.32 U
Vanadium	1 J	0.99 J	0.8 U	0.8 U	NA	NA	1.1 J	2.7 J
Zinc	6.5 U	6.5 U	6.5 U	6.5 U	NA	NA	7.2 J	30
TPH DRO and GRO (mg/L)								
Diesel Range Organics	0.26	0.028 U	0.24	0.038 J	0.32	0.27	0.25	0.028 U
Gasoline Range Organics	0.012 U	0.012 U	0.012 U	0.012 U	0.012 U	0.012 R	0.012 U	0.016 J

TABLE 6-6

**SUMMARY OF DETECTED LABORATORY RESULTS - QUALITY ASSURANCE/QUALITY CONTROL
SWMU 70 - DISPOSAL AREA NORTHWEST OF LANDFILL
PHASE I RFI REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO**

Notes/Qualifiers:

- J - Estimated: The analyte was positively identified; the quantitation is an estimation
- U - Undetected at the Method Detection Limit
- UJ - Reported quantitation limit is qualified as estimated
- R - Data is rejected and not usable
- mg/L - micrograms per liter
- ug/L - micrograms per liter
- NA - Not Analyzed

There were no pesticides or PCBs detected in the equipment rinsate or the field blank samples

FIGURES



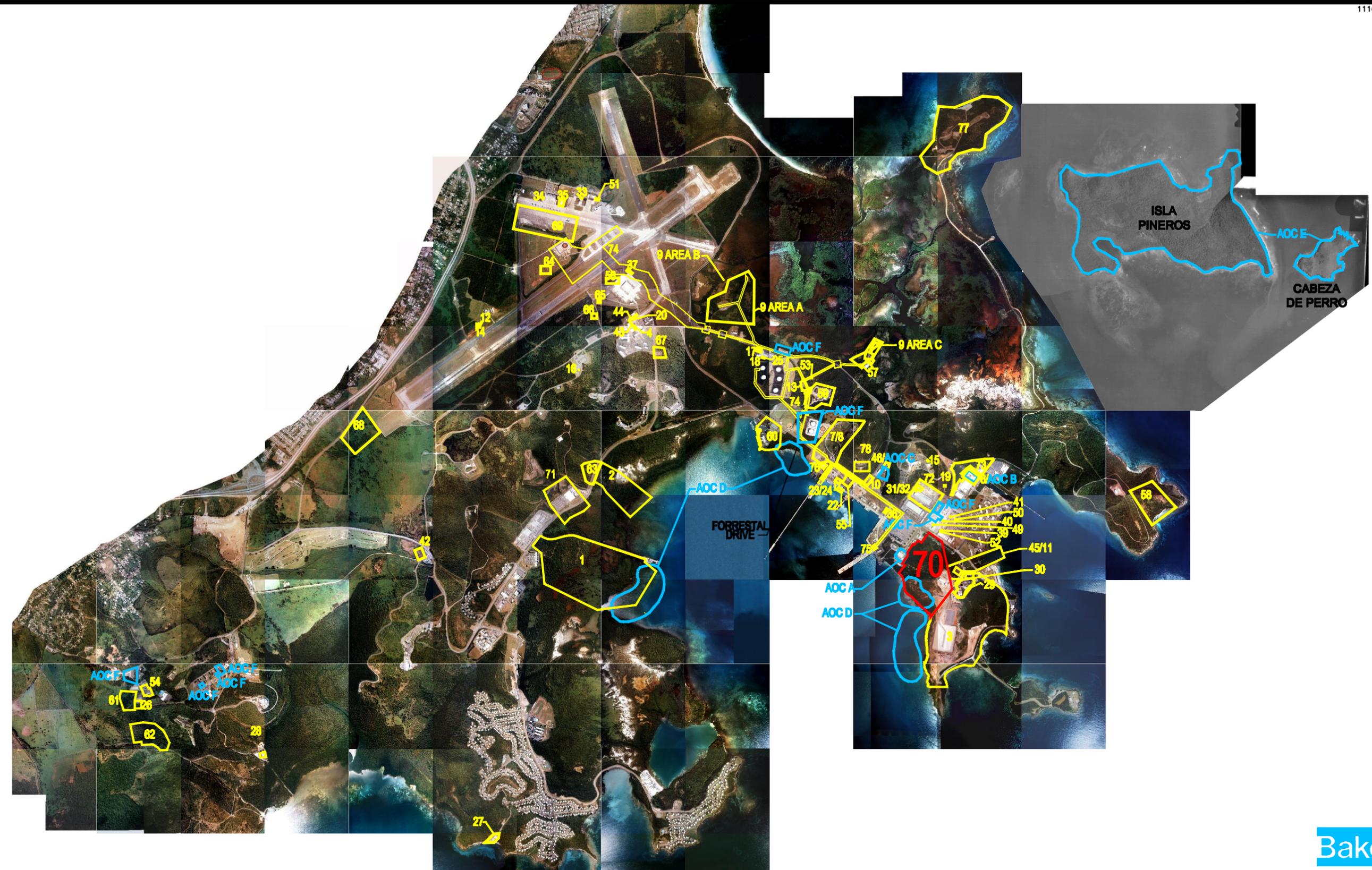
1 inch = 4 miles

Baker

FIGURE 2-1
 REGIONAL LOCATION MAP
 SWMU 70-DISPOSAL AREA NORTHWEST OF LANDFILL
 PHASE I RFI REPORT

SOURCE: METRODATA, INC., 1999.

NAVAL ACTIVITY PUERTO RICO



Baker

LEGEND

- SWMUs

70 - AREA TO WHICH THIS INVESTIGATION PERTAINS

- AOCs

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

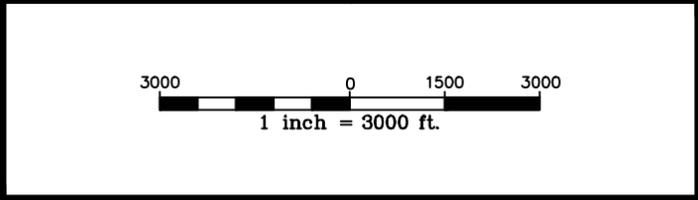
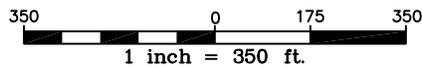
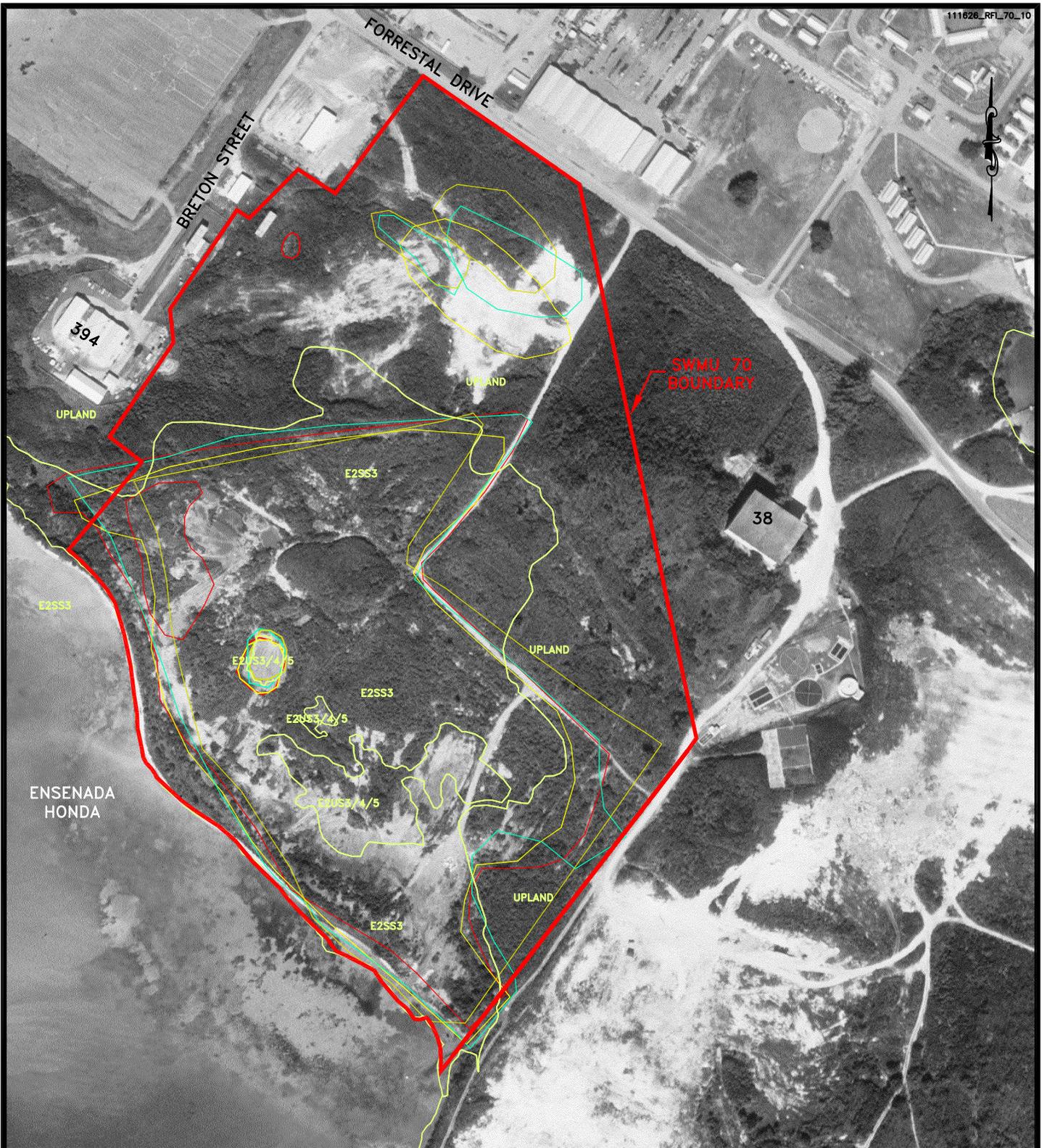


FIGURE 2-2
 SWMU/AOC LOCATION MAP
 SWMU 70-DISPOSAL AREA NORTHWEST OF LANDFILL
 PHASE I RFI REPORT
 NAVAL ACTIVITY PUERTO RICO



SOURCE: GEO-MARINE, INC., HISTORIC 1976.

- | | |
|-----------------------------------|-----------------------|
| -1976 POLYGON FEATURE | -1985 POLYGON FEATURE |
| -1977 POLYGON FEATURE | -1995 POLYGON FEATURE |
| -ESTUARINE WETLAND BOUNDARY | |
| -ESTUARINE WETLAND IDENTIFICATION | |
| - SWMU BOUNDARY | |

FIGURE 2-3
 1976 AERIAL PHOTOGRAPH
 SWMU 70-DISPOSAL AREA
 NORTHWEST OF LANDFILL
 PHASE I RFI REPORT

NAVAL ACTIVITY PUERTO RICO

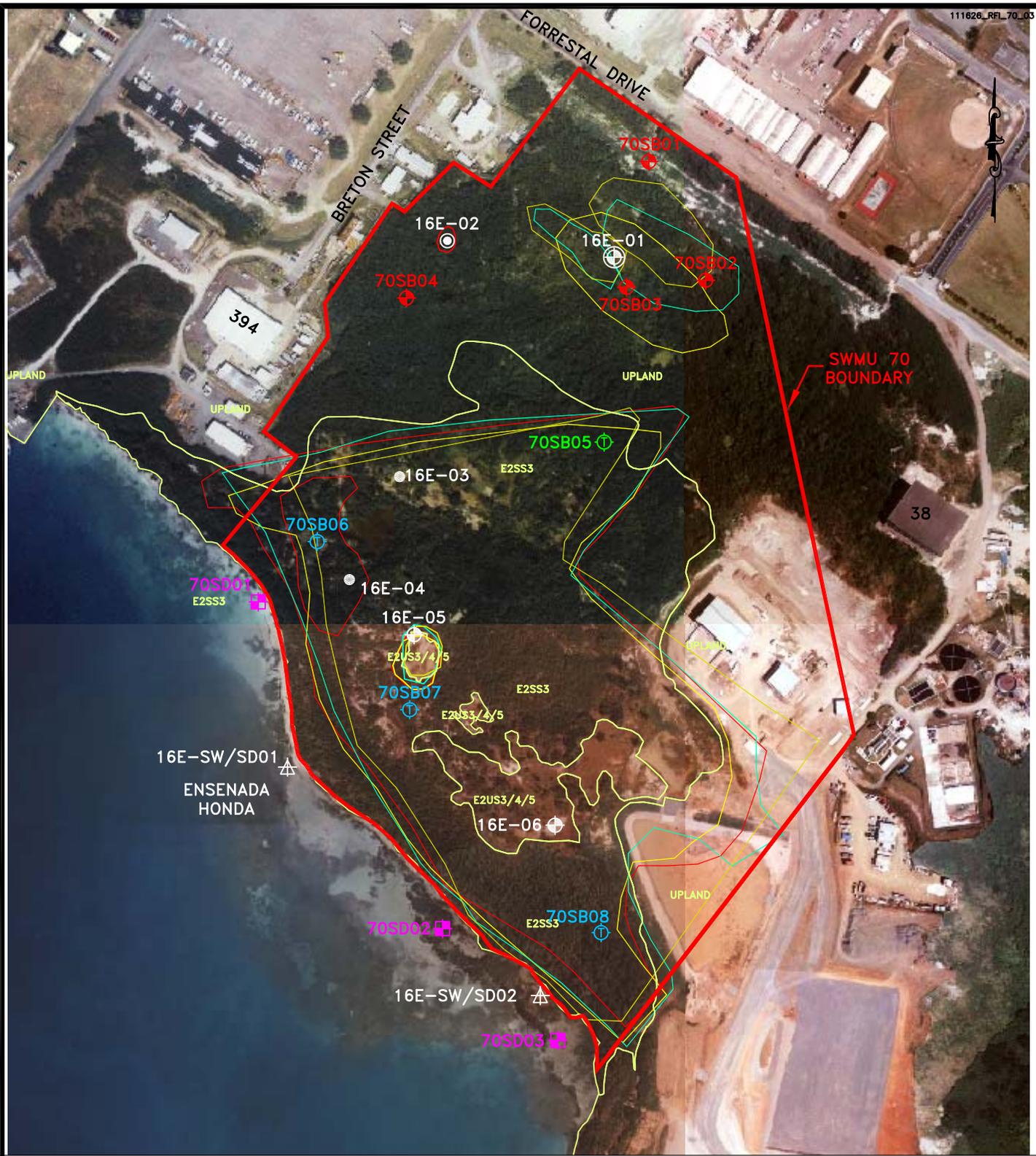


SOURCE: GEO-MARINE, INC., SEPTEMBER 6, 2000.

- LEGEND**
- ◊ - SWMU BOUNDARY
 - ▭ (red) - 1976 POLYGON FEATURE
 - ▭ (yellow) - 1977 POLYGON FEATURE
 - ▭ (green) - 1985 POLYGON FEATURE
 - ▭ (cyan) - 1995 POLYGON FEATURE
 - (green) - ESTUARINE WETLAND BOUNDARY
 - (green) - ESTUARINE WETLAND IDENTIFICATION
 - (white) - SURFACE SOIL SAMPLE LOCATION (PHASE II ECP 2004)
 - ⊙ (black) - SURFACE AND SUBSURFACE SOIL SAMPLE LOCATION (PHASE II ECP 2004)
 - △ (white) - SURFACE WATER AND SEDIMENT SAMPLE LOCATION (PHASE II ECP 2004)
 - △ (black) - SURFACE SOIL AND GROUNDWATER SAMPLE LOCATION (PHASE II ECP 2004)
 - ⊗ (red) - SURFACE SOIL, SUBSURFACE SOIL, AND GROUNDWATER SAMPLE LOCATION (PHASE II ECP 2004)

FIGURE 2-4
 SITE LAYOUT AND ECP SAMPLE LOCATION
 MAP WITH 2000 AERIAL PHOTOGRAPH
 SWMU 70-DISPOSAL AREA NORTHWEST
 OF LANDFILL
 PHASE I RFI REPORT

NAVAL ACTIVITY PUERTO RICO



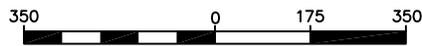
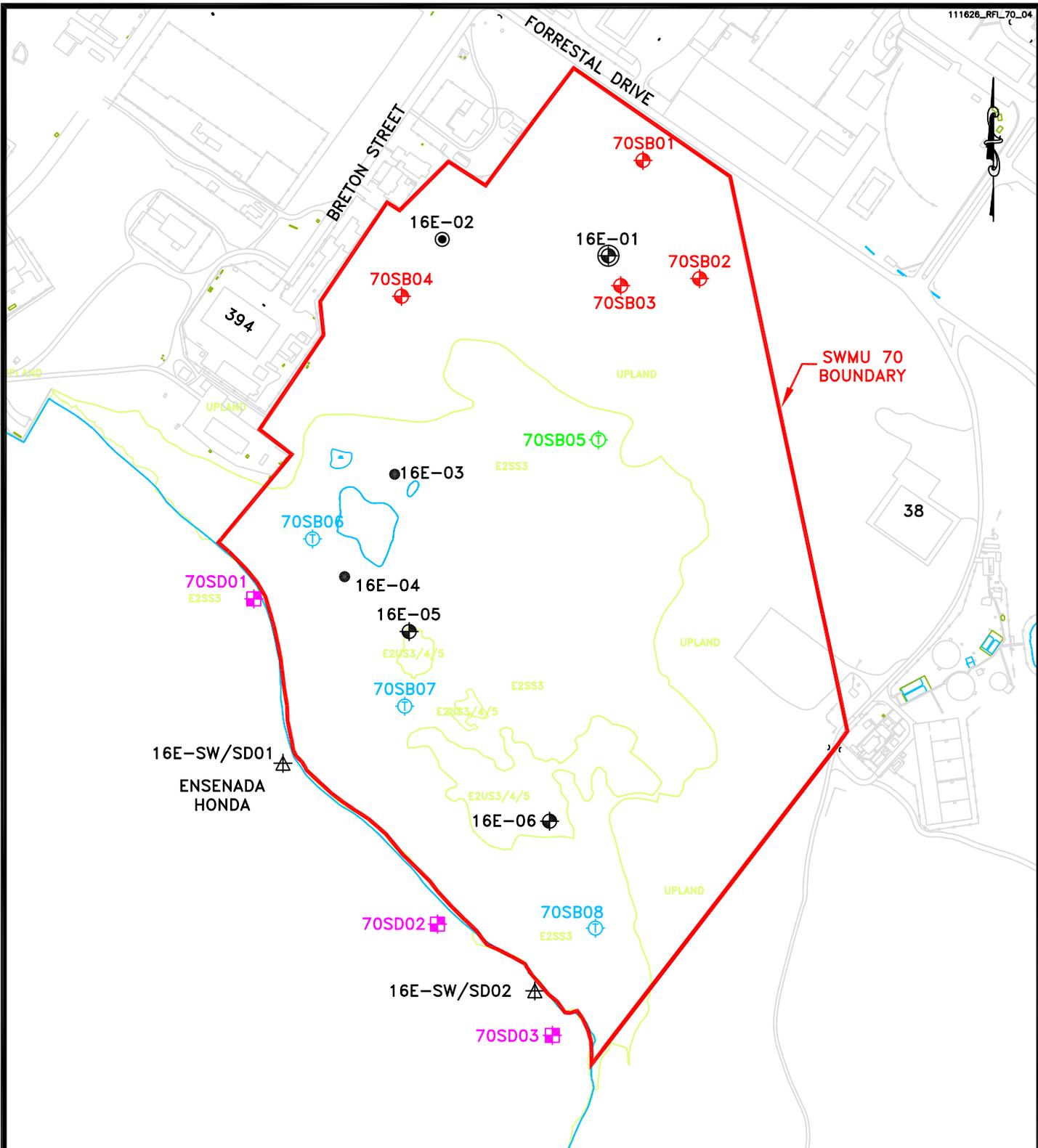
SOURCE: GEO-MARINE, INC., SEPTEMBER 6, 2000.

1 inch = 350 ft.



- 1976 POLYGON FEATURE
- 1977 POLYGON FEATURE
- 1985 POLYGON FEATURE
- 1995 POLYGON FEATURE
- ESTUARINE WETLAND BOUNDARY
- SWMU BOUNDARY
- SURFACE SOIL SAMPLE LOCATION (PHASE II ECP 2004)
- ⊙ SURFACE AND SUBSURFACE SOIL SAMPLE LOCATION (PHASE II ECP 2004)
- △ SURFACE WATER AND SEDIMENT SAMPLE LOCATION (PHASE II ECP 2004)
- ⊕ SURFACE SOIL AND GROUNDWATER SAMPLE LOCATION (PHASE II ECP 2004)
- ⊕ SURFACE SOIL, SUBSURFACE SOIL, AND GROUNDWATER SAMPLE LOCATION (PHASE II ECP 2004)
- ⊕ SURFACE SOIL, SUBSURFACE SOIL AND GROUNDWATER SAMPLE LOCATION
- ⊕ SURFACE SOIL, SUBSURFACE SOIL AND GROUNDWATER (TEMPORARY) SAMPLE LOCATION
- ⊕ ESTUARINE SEDIMENT AND GROUNDWATER (TEMPORARY) SAMPLE LOCATION
- ⊕ OPEN WATER SEDIMENT SAMPLE LOCATION
- E2SS3 ESTUARINE WETLAND IDENTIFICATION
- E2US3/4/5 ESTUARINE WETLAND IDENTIFICATION

FIGURE 4-1
 SAMPLE LOCATION MAP
 WITH 2000 AERIAL PHOTOGRAPH
 SWMU 70-DISPOSAL AREA
 NORTHWEST OF LANDFILL
 PHASE I RFI REPORT
 NAVAL ACTIVITY PUERTO RICO

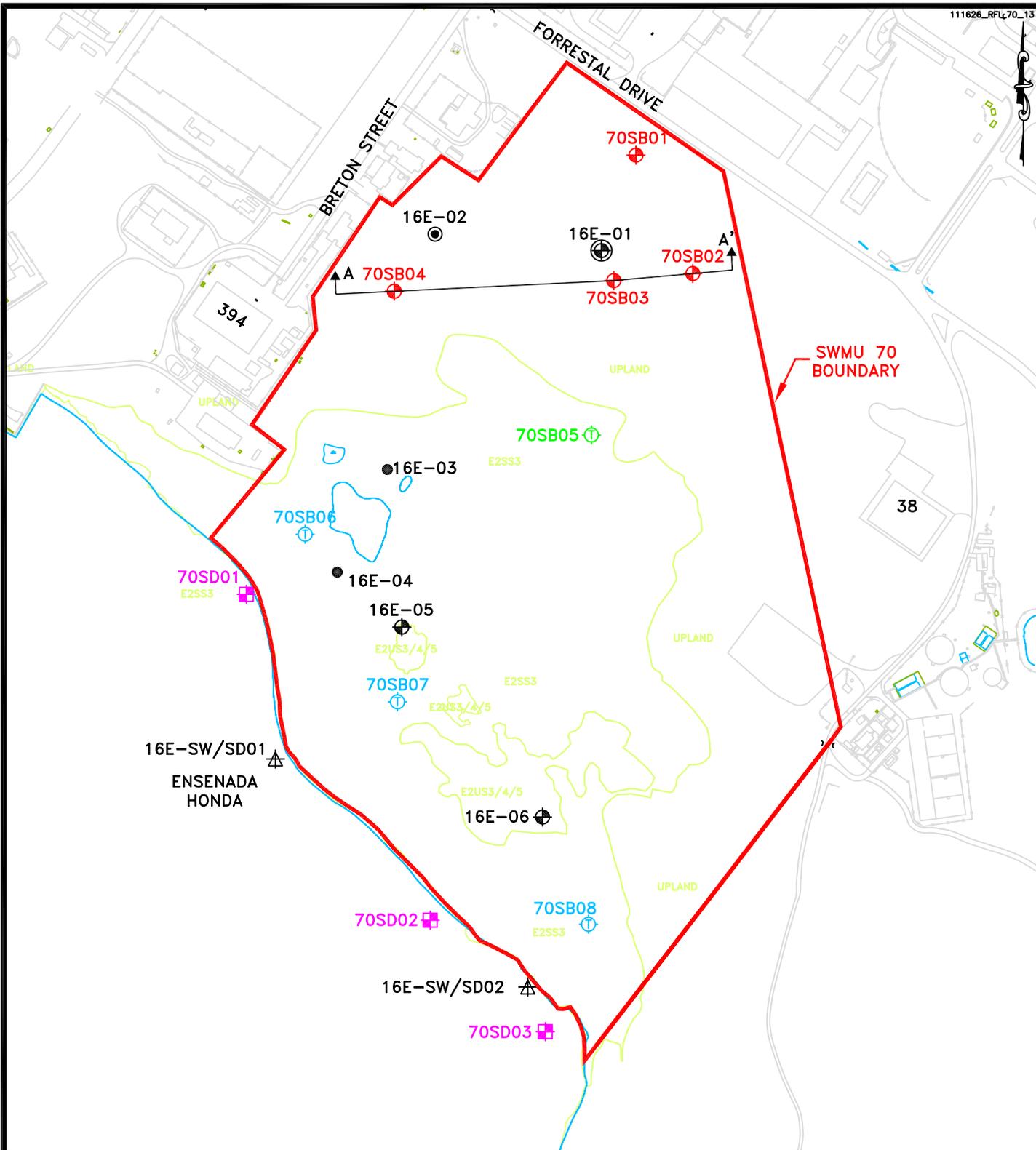


SOURCE: GEO-MARINE, INC., SEPTEMBER 6, 2000.

LEGEND	
	WATER BOUNDARY
	SWMU BOUNDARY
	ESTUARINE WETLAND BOUNDARY
	E2SS3 - ESTUARINE WETLAND IDENTIFICATION
	SURFACE SOIL SAMPLE LOCATION (PHASE II ECP 2004)
	SURFACE AND SUBSURFACE SOIL SAMPLE LOCATION (PHASE II ECP 2004)
	SURFACE WATER AND SEDIMENT SAMPLE LOCATION (PHASE II ECP 2004)
	SURFACE SOIL AND GROUNDWATER SAMPLE LOCATION (PHASE II ECP 2004)
	SURFACE SOIL, SUBSURFACE SOIL, AND GROUNDWATER SAMPLE LOCATION (PHASE II ECP 2004)
	SURFACE SOIL, SUBSURFACE SOIL AND GROUNDWATER SAMPLE LOCATION
	SURFACE SOIL, SUBSURFACE SOIL AND GROUNDWATER (TEMPORARY) SAMPLE LOCATION
	ESTUARINE SEDIMENT AND GROUNDWATER (TEMPORARY) SAMPLE LOCATION
	OPEN WATER SEDIMENT SAMPLE LOCATION

FIGURE 4-2
 SAMPLE LOCATION MAP
 SWMU 70-DISPOSAL AREA
 NORTHWEST OF LANDFILL
 PHASE I RFI REPORT

NAVAL ACTIVITY PUERTO RICO



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

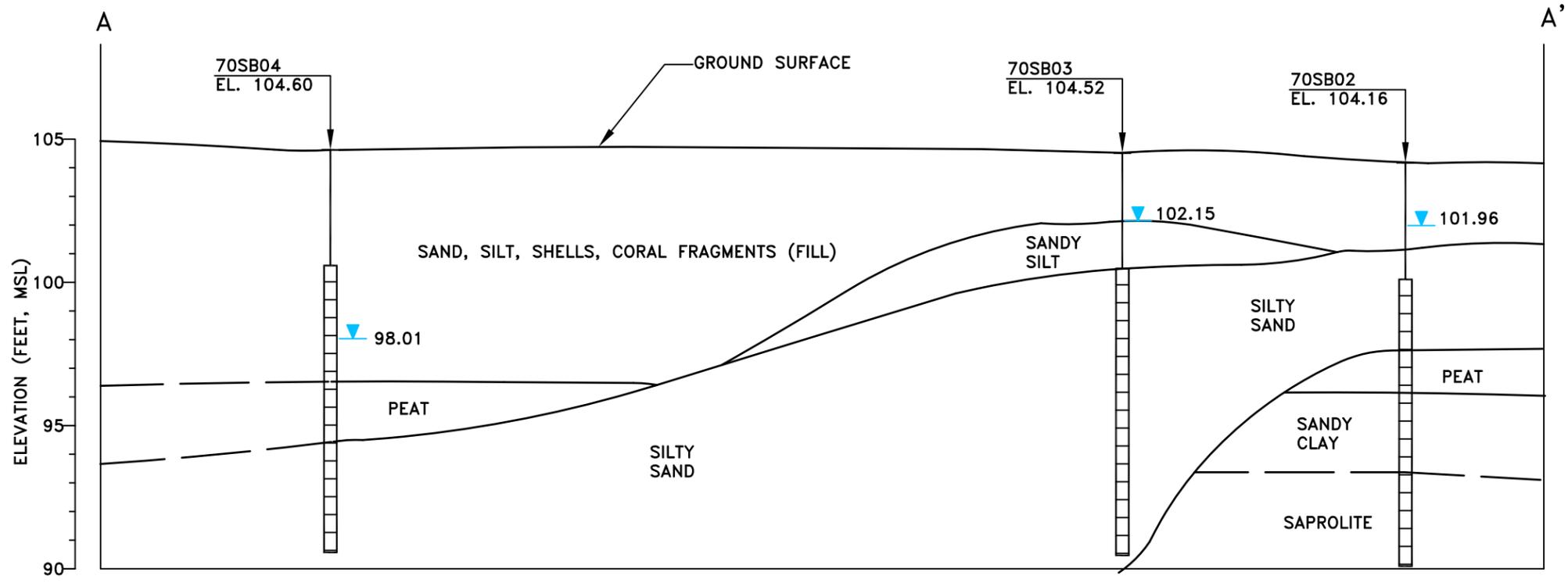
1 inch = 350 ft.



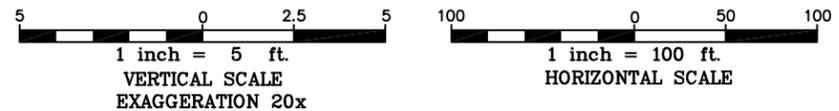
LEGEND	
	WATER BOUNDARY
	SWMU BOUNDARY
	ESTUARINE WETLAND BOUNDARY
	E2SS3 - ESTUARINE WETLAND IDENTIFICATION
	SURFACE SOIL SAMPLE LOCATION (PHASE II ECP 2004)
	SURFACE AND SUBSURFACE SOIL SAMPLE LOCATION (PHASE II ECP 2004)
	SURFACE WATER AND SEDIMENT SAMPLE LOCATION (PHASE II ECP 2004)
	SURFACE SOIL AND GROUNDWATER SAMPLE LOCATION (PHASE II ECP 2004)
	SURFACE SOIL, SUBSURFACE SOIL, AND GROUNDWATER SAMPLE LOCATION (PHASE II ECP 2004)
	SURFACE SOIL, SUBSURFACE SOIL AND GROUNDWATER SAMPLE LOCATION
	SURFACE SOIL, SUBSURFACE SOIL AND GROUNDWATER (TEMPORARY) SAMPLE LOCATION
	ESTUARINE SEDIMENT AND GROUNDWATER (TEMPORARY) SAMPLE LOCATION
	OPEN WATER SEDIMENT SAMPLE LOCATION
	GEOLOGIC CROSS SECTION LOCATION

FIGURE 5-1
GEOLOGIC CROSS SECTION LOCATION
SWMU 70-DISPOSAL AREA
NORTHWEST OF LANDFILL
PHASE I RFI REPORT

NAVAL ACTIVITY PUERTO RICO



GEOLGIC CROSS-SECTION A-A'
LOOKING NORTH

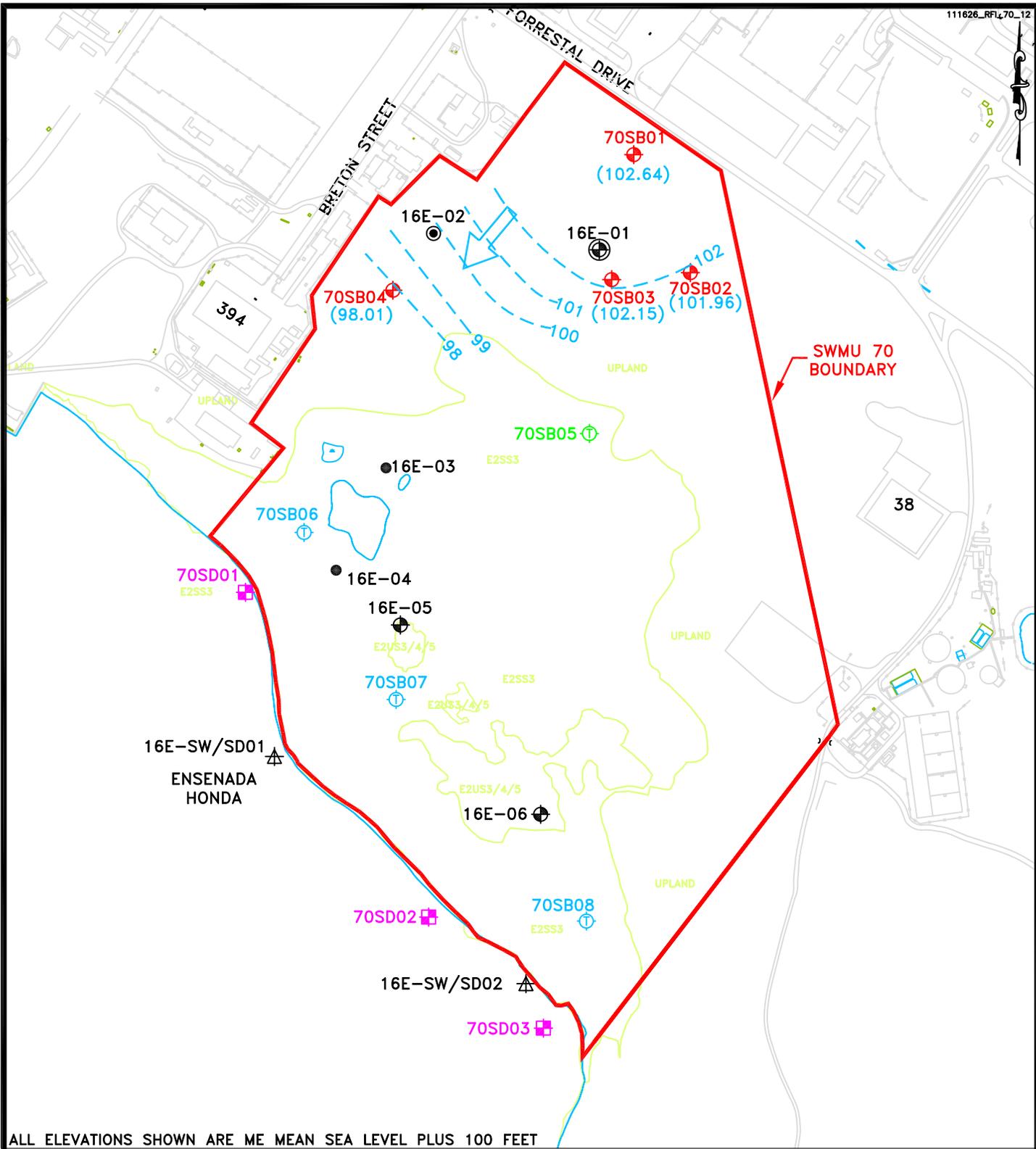


LEGEND	
ft.	FEET
MSL	MEAN SEA LEVEL
---	ESTIMATED
E.L.	GROUND SURFACE, ft. msl
▼	GROUNDWATER ELEVATION ft. msl 01/23/09
I	WELL RISER
▨	WELL SCREEN INTERVAL
---	PROJECTED

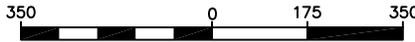
THE SOIL BORING INFORMATION IS CONSIDERED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT THE RESPECTIVE BORING LOCATIONS. SUBSURFACE CONDITIONS INTERPOLATED BETWEEN BORINGS ARE ESTIMATED BASED ON ACCEPTED SOIL ENGINEERING PRINCIPLES AND GEOLOGIC JUDGEMENT.

FIGURE 5-2
GEOLGIC CROSS-SECTION A-A'
SWMU 70-DISPOSAL AREA
NORTHWEST OF LANDFILL
PHASE I RFI REPORT
NAVAL ACTIVITY PUERTO RICO

ALL ELEVATIONS SHOWN ARE MEAN SEA LEVEL PLUS 100 FEET



ALL ELEVATIONS SHOWN ARE MEAN SEA LEVEL PLUS 100 FEET



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

LEGEND	
	SWMU BOUNDARY
	WATER BOUNDARY
	ESTUARINE WETLAND BOUNDARY
	SURFACE SOIL SAMPLE LOCATION (PHASE II ECP 2004)
	SURFACE AND SUBSURFACE SOIL SAMPLE LOCATION (PHASE II ECP 2004)
	SURFACE WATER AND SEDIMENT SAMPLE LOCATION (PHASE II ECP 2004)
	SURFACE SOIL AND GROUNDWATER SAMPLE LOCATION (PHASE II ECP 2004)
	SURFACE SOIL, SUBSURFACE SOIL, AND GROUNDWATER SAMPLE LOCATION (PHASE II ECP 2004)
	SURFACE SOIL, SUBSURFACE SOIL AND GROUNDWATER SAMPLE LOCATION
	SURFACE SOIL, SUBSURFACE SOIL AND GROUNDWATER (TEMPORARY) SAMPLE LOCATION
	ESTUARINE SEDIMENT AND GROUNDWATER (TEMPORARY) SAMPLE LOCATION
	OPEN WATER SEDIMENT SAMPLE LOCATION
	ESTIMATED GROUNDWATER ELEVATION CONTOUR
	GROUNDWATER FLOW DIRECTION

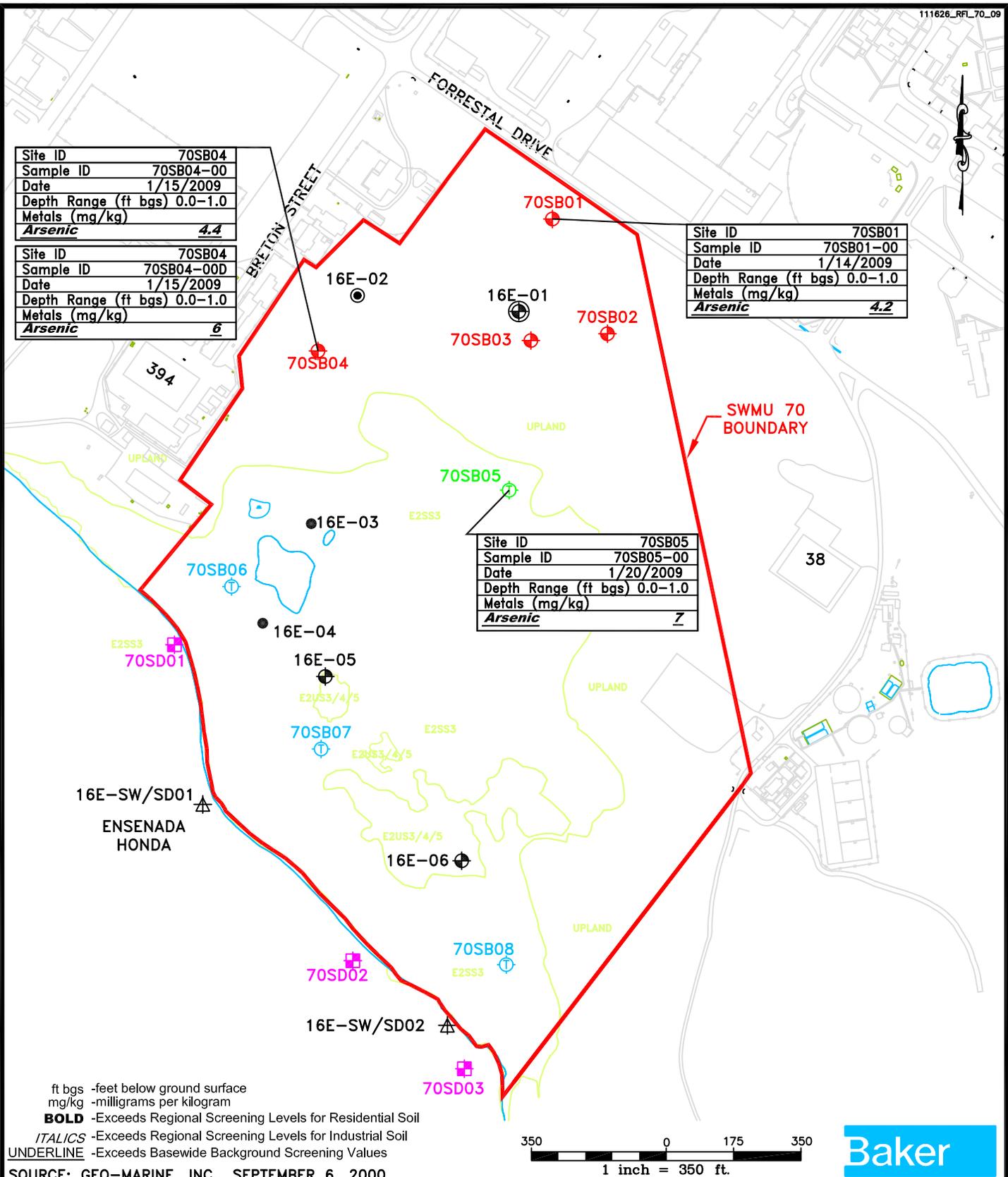
FIGURE 5-3
 GROUNDWATER ELEVATION MAP
 SWMU 70-DISPOSAL AREA
 NORTHWEST OF LANDFILL
 PHASE I RFI REPORT
 NAVAL ACTIVITY PUERTO RICO

Site ID	70SB04
Sample ID	70SB04-00
Date	1/15/2009
Depth Range (ft bgs)	0.0-1.0
Metals (mg/kg)	
Arsenic	4.4

Site ID	70SB04
Sample ID	70SB04-00D
Date	1/15/2009
Depth Range (ft bgs)	0.0-1.0
Metals (mg/kg)	
Arsenic	6

Site ID	70SB01
Sample ID	70SB01-00
Date	1/14/2009
Depth Range (ft bgs)	0.0-1.0
Metals (mg/kg)	
Arsenic	4.2

Site ID	70SB05
Sample ID	70SB05-00
Date	1/20/2009
Depth Range (ft bgs)	0.0-1.0
Metals (mg/kg)	
Arsenic	7



ft bgs -feet below ground surface
 mg/kg -milligrams per kilogram
BOLD -Exceeds Regional Screening Levels for Residential Soil
ITALICS -Exceeds Regional Screening Levels for Industrial Soil
UNDERLINE -Exceeds Basewide Background Screening Values

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

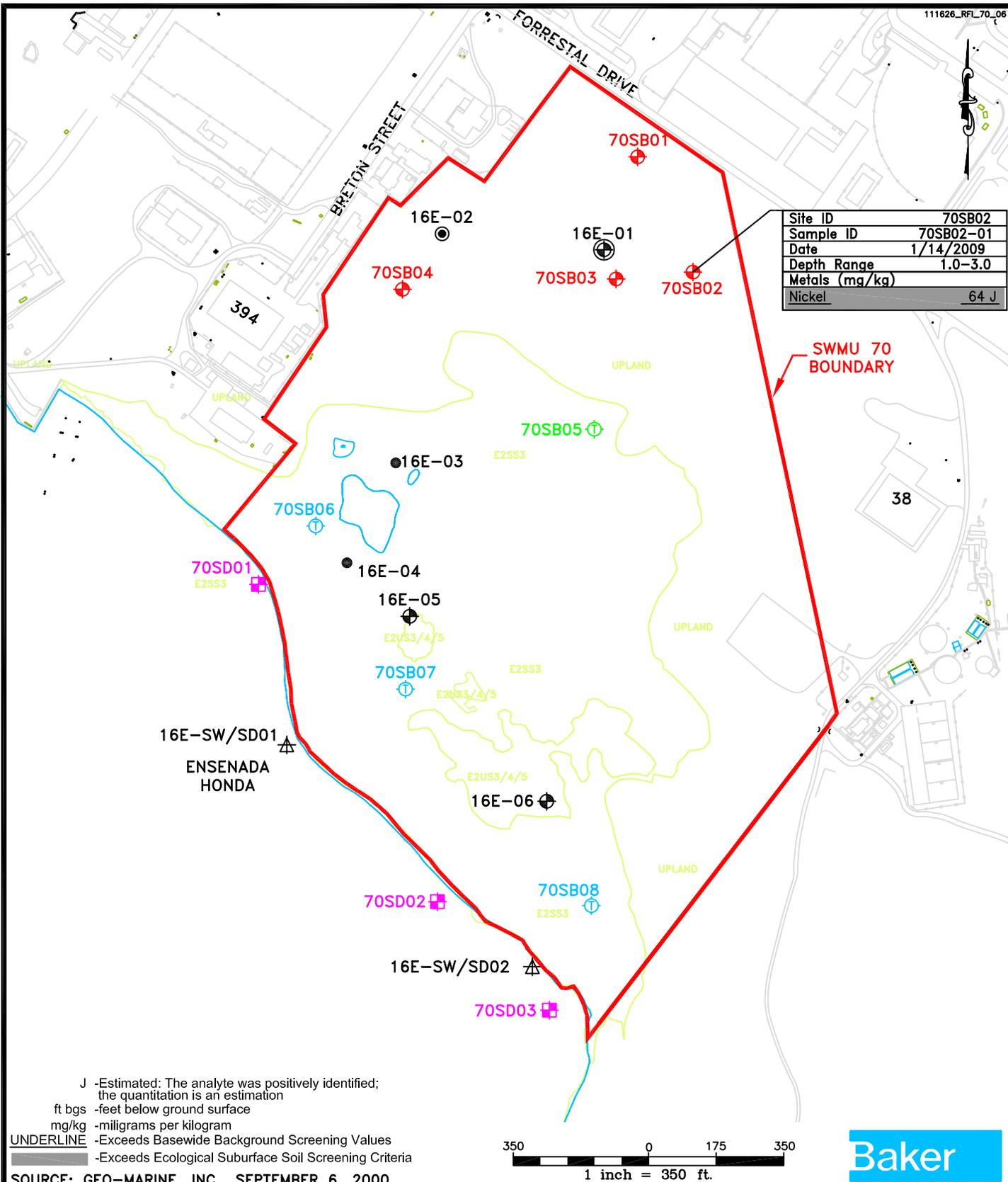
LEGEND

- WATER BOUNDARY
- SWMU BOUNDARY
- ESTUARINE WETLAND BOUNDARY
- SURFACE SOIL SAMPLE LOCATION (PHASE II ECP 2004)
- SURFACE AND SUBSURFACE SOIL SAMPLE LOCATION (PHASE II ECP 2004)
- SURFACE WATER AND SEDIMENT SAMPLE LOCATION (PHASE II ECP 2004)
- SURFACE SOIL AND GROUNDWATER SAMPLE LOCATION (PHASE II ECP 2004)
- SURFACE SOIL, SUBSURFACE SOIL, AND GROUNDWATER SAMPLE LOCATION (PHASE II ECP 2004)
- SURFACE SOIL, SUBSURFACE SOIL AND GROUNDWATER SAMPLE LOCATION
- SURFACE SOIL, SUBSURFACE SOIL AND GROUNDWATER (TEMPORARY) SAMPLE LOCATION
- ESTUARINE SEDIMENT AND GROUNDWATER (TEMPORARY) SAMPLE LOCATION
- OPEN WATER SEDIMENT SAMPLE LOCATION

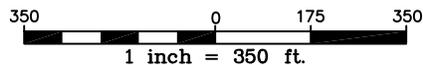
350 0 175 350
 1 inch = 350 ft.



FIGURE 6-1
 SURFACE SOIL EXCEEDANCES OF HUMAN HEALTH SCREENING CRITERIA AND BACKGROUND
 SWMU 70-DISPOSAL AREA NORTHWEST OF LANDFILL
 PHASE I RFI REPORT
 NAVAL ACTIVITY PUERTO RICO



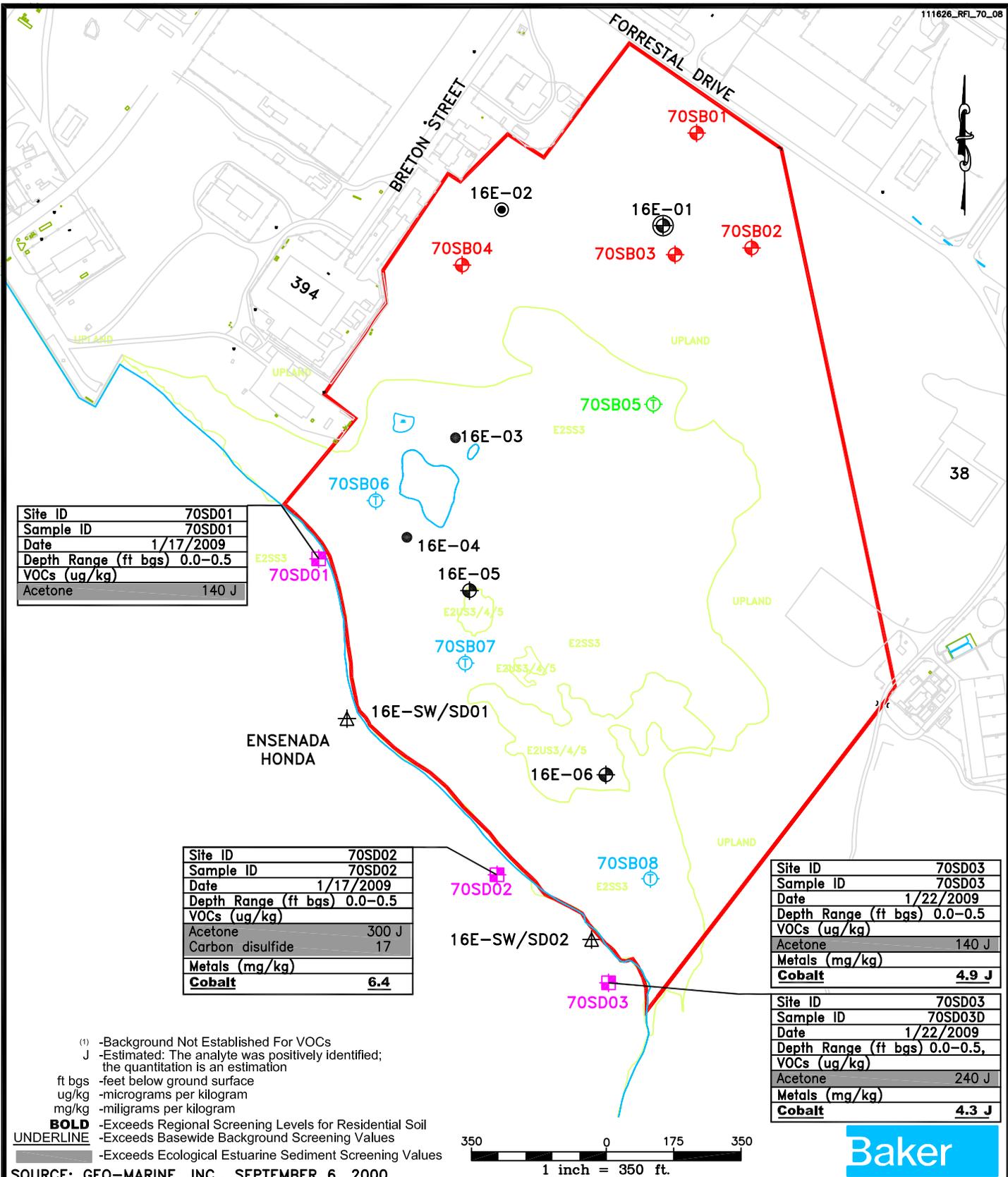
J -Estimated: The analyte was positively identified; the quantitation is an estimation
 ft bgs -feet below ground surface
 mg/kg -miligrams per kilogram
UNDERLINE -Exceeds Basewide Background Screening Values
 -Exceeds Ecological Subsurface Soil Screening Criteria



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

- LEGEND**
- WATER BOUNDARY
 - SWMU BOUNDARY
 - ESTUARINE WETLAND BOUNDARY
 - ESTUARINE WETLAND IDENTIFICATION
 - SURFACE SOIL SAMPLE LOCATION (PHASE II ECP 2004)
 - SURFACE AND SUBSURFACE SOIL SAMPLE LOCATION (PHASE II ECP 2004)
 - SURFACE WATER AND SEDIMENT SAMPLE LOCATION (PHASE II ECP 2004)
 - SURFACE SOIL AND GROUNDWATER SAMPLE LOCATION (PHASE II ECP 2004)
 - SURFACE SOIL, SUBSURFACE SOIL, AND GROUNDWATER SAMPLE LOCATION (PHASE II ECP 2004)
 - SURFACE SOIL, SUBSURFACE SOIL AND GROUNDWATER SAMPLE LOCATION
 - SURFACE SOIL, SUBSURFACE SOIL AND GROUNDWATER (TEMPORARY) SAMPLE LOCATION
 - ESTUARINE SEDIMENT AND GROUNDWATER (TEMPORARY) SAMPLE LOCATION
 - OPEN WATER SEDIMENT SAMPLE LOCATION

FIGURE 6-2
 SUBSURFACE SOIL EXCEEDANCES OF
 ECOLOGICAL SCREENING CRITERIA AND
 BACKGROUND
 SWMU 70-DISPOSAL AREA NORTHWEST OF
 LANDFILL
 PHASE I RFI REPORT
 NAVAL ACTIVITY PUERTO RICO



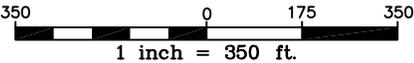
Site ID	70SD01
Sample ID	70SD01
Date	1/17/2009
Depth Range (ft bgs)	0.0-0.5
VOCs (ug/kg)	
Acetone	140 J

Site ID	70SD02
Sample ID	70SD02
Date	1/17/2009
Depth Range (ft bgs)	0.0-0.5
VOCs (ug/kg)	
Acetone	300 J
Carbon disulfide	17
Metals (mg/kg)	
Cobalt	6.4

Site ID	70SD03
Sample ID	70SD03
Date	1/22/2009
Depth Range (ft bgs)	0.0-0.5
VOCs (ug/kg)	
Acetone	140 J
Metals (mg/kg)	
Cobalt	4.9 J

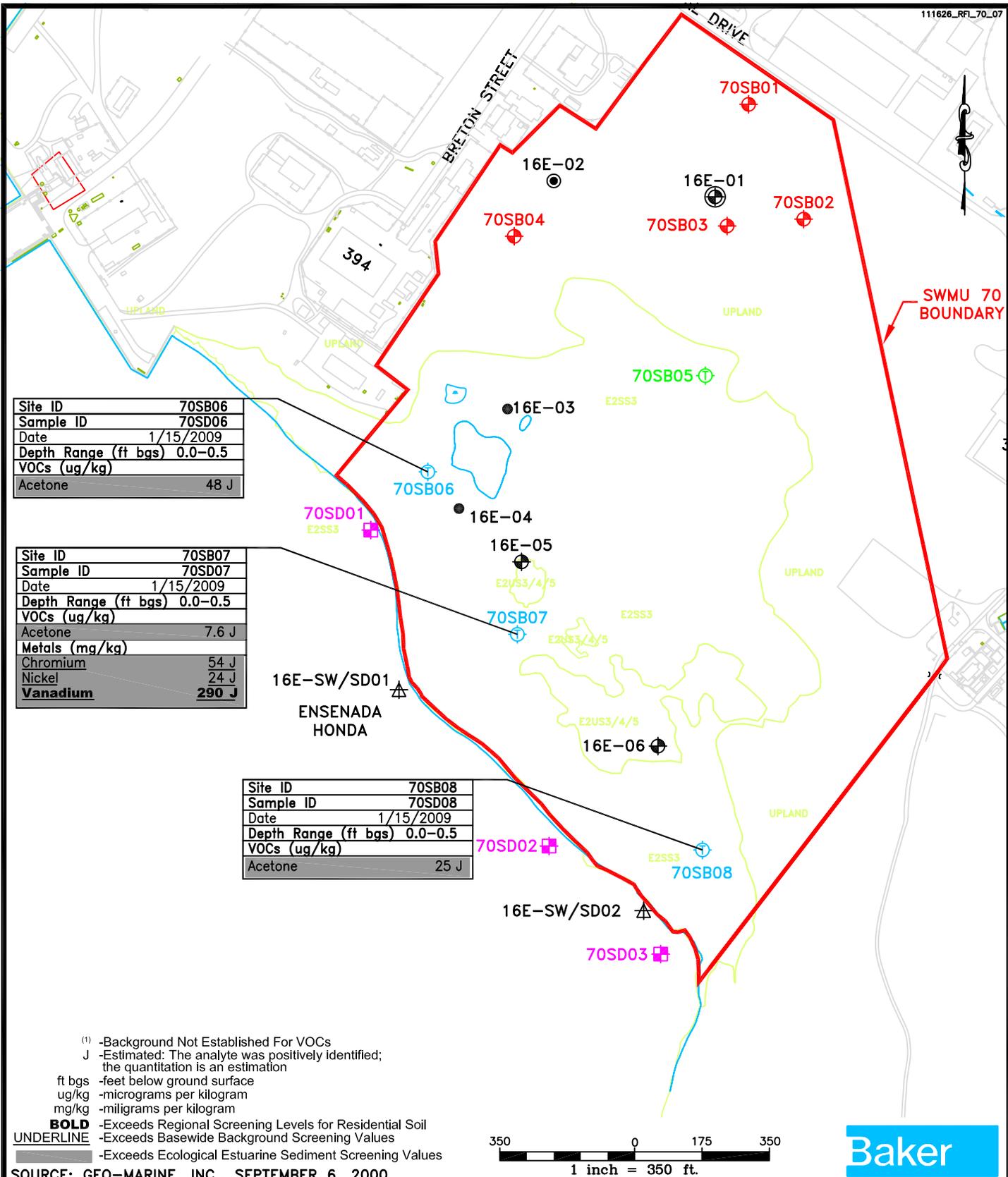
Site ID	70SD03
Sample ID	70SD03D
Date	1/22/2009
Depth Range (ft bgs)	0.0-0.5
VOCs (ug/kg)	
Acetone	240 J
Metals (mg/kg)	
Cobalt	4.3 J

(1) -Background Not Established For VOCs
 J -Estimated: The analyte was positively identified; the quantitation is an estimation
 ft bgs -feet below ground surface
 ug/kg -micrograms per kilogram
 mg/kg -miligrams per kilogram
BOLD -Exceeds Regional Screening Levels for Residential Soil
UNDERLINE -Exceeds Basewide Background Screening Values
 -Exceeds Ecological Estuarine Sediment Screening Values



- LEGEND**
- WATER BOUNDARY
 - SWMU BOUNDARY
 - ESTUARINE WETLAND BOUNDARY E2SS3 -ESTUARINE WETLAND IDENTIFICATION
 - SURFACE SOIL SAMPLE LOCATION (PHASE II ECP 2004)
 - SURFACE AND SUBSURFACE SOIL SAMPLE LOCATION (PHASE II ECP 2004)
 - SURFACE WATER AND SEDIMENT SAMPLE LOCATION (PHASE II ECP 2004)
 - SURFACE SOIL AND GROUNDWATER SAMPLE LOCATION (PHASE II ECP 2004)
 - SURFACE SOIL, SUBSURFACE SOIL, AND GROUNDWATER SAMPLE LOCATION (PHASE II ECP 2004)
 - SURFACE SOIL, SUBSURFACE SOIL AND GROUNDWATER SAMPLE LOCATION
 - SURFACE SOIL, SUBSURFACE SOIL AND GROUNDWATER (TEMPORARY) SAMPLE LOCATION
 - ESTUARINE SEDIMENT AND GROUNDWATER (TEMPORARY) SAMPLE LOCATION
 - OPEN WATER SEDIMENT SAMPLE LOCATION

FIGURE 6-3
OPEN WATER SEDIMENT EXCEEDANCES
OF HUMAN HEALTH OR ECOLOGICAL
SCREENING CRITERIA AND BACKGROUND⁽¹⁾
SWMU 70-DISPOSAL AREA NORTHWEST OF
LANDFILL
PHASE I RFI REPORT
NAVAL ACTIVITY PUERTO RICO

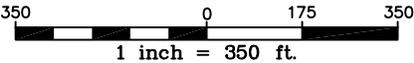


Site ID	70SB06
Sample ID	70SD06
Date	1/15/2009
Depth Range (ft bgs)	0.0-0.5
VOCs (ug/kg)	
Acetone	48 J

Site ID	70SB07
Sample ID	70SD07
Date	1/15/2009
Depth Range (ft bgs)	0.0-0.5
VOCs (ug/kg)	
Acetone	7.6 J
Metals (mg/kg)	
Chromium	54 J
Nickel	24 J
Vanadium	290 J

Site ID	70SB08
Sample ID	70SD08
Date	1/15/2009
Depth Range (ft bgs)	0.0-0.5
VOCs (ug/kg)	
Acetone	25 J

(1) -Background Not Established For VOCs
 J -Estimated: The analyte was positively identified; the quantitation is an estimation
 ft bgs -feet below ground surface
 ug/kg -micrograms per kilogram
 mg/kg -miligrams per kilogram
BOLD -Exceeds Regional Screening Levels for Residential Soil
UNDERLINE -Exceeds Basewide Background Screening Values
 -Exceeds Ecological Estuarine Sediment Screening Values



LEGEND

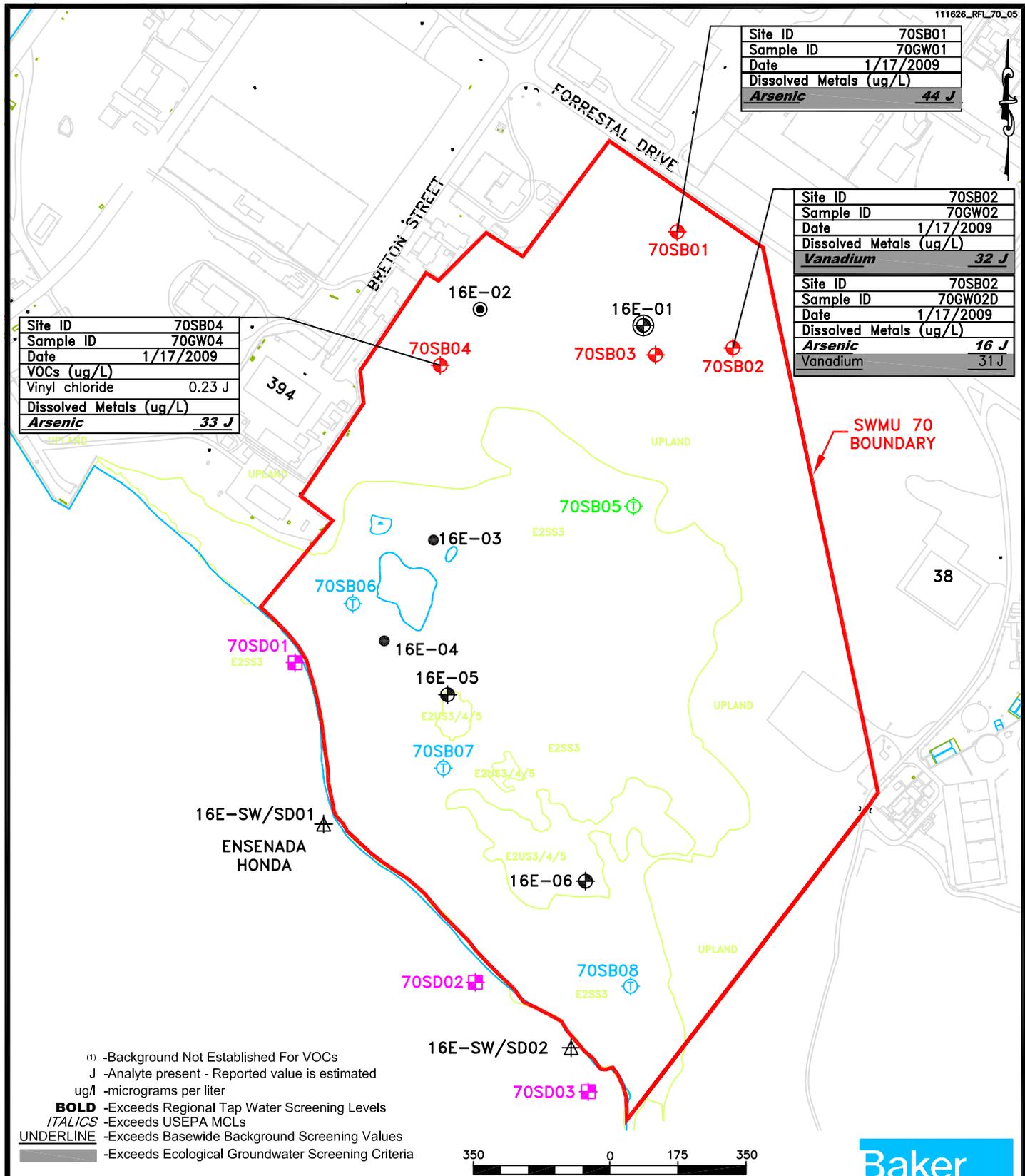
- WATER BOUNDARY
- SWMU BOUNDARY
- ESTUARINE WETLAND BOUNDARY
- E2SS3 ESTUARINE WETLAND IDENTIFICATION
- SURFACE SOIL SAMPLE LOCATION (PHASE II ECP 2004)
- SURFACE AND SUBSURFACE SOIL SAMPLE LOCATION (PHASE II ECP 2004)
- ▲ SURFACE WATER AND SEDIMENT SAMPLE LOCATION (PHASE II ECP 2004)
- SURFACE SOIL AND GROUNDWATER SAMPLE LOCATION (PHASE II ECP 2004)
- SURFACE SOIL, SUBSURFACE SOIL, AND GROUNDWATER SAMPLE LOCATION (PHASE II ECP 2004)
- SURFACE SOIL, SUBSURFACE SOIL AND GROUNDWATER SAMPLE LOCATION
- SURFACE SOIL, SUBSURFACE SOIL AND GROUNDWATER (TEMPORARY) SAMPLE LOCATION
- ESTUARINE SEDIMENT AND GROUNDWATER (TEMPORARY) SAMPLE LOCATION
- OPEN WATER SEDIMENT SAMPLE LOCATION

FIGURE 6-4
ESTUARINE SEDIMENT EXCEEDANCES OF HUMAN HEALTH OR ECOLOGICAL SCREENING CRITERIA AND BACKGROUND⁽¹⁾
SWMU 70-DISPOSAL AREA NORTHWEST OF LANDFILL
PHASE I RFI REPORT
NAVAL ACTIVITY PUERTO RICO

Site ID	70SB01
Sample ID	70GW01
Date	1/17/2009
Dissolved Metals (ug/L)	
Arsenic	44 J

Site ID	70SB02
Sample ID	70GW02
Date	1/17/2009
Dissolved Metals (ug/L)	
Vanadium	32 J
Site ID	70SB02
Sample ID	70GW02D
Date	1/17/2009
Dissolved Metals (ug/L)	
Arsenic	16 J
Vanadium	31 J

Site ID	70SB04
Sample ID	70GW04
Date	1/17/2009
VOCs (ug/L)	
Vinyl chloride	0.23 J
Dissolved Metals (ug/L)	
Arsenic	33 J



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

LEGEND	
	WATER BOUNDARY
	SWMU BOUNDARY
	ESTUARINE WETLAND BOUNDARY
	E2SS3 - ESTUARINE WETLAND IDENTIFICATION
	SURFACE SOIL SAMPLE LOCATION (PHASE II ECP 2004)
	SURFACE AND SUBSURFACE SOIL SAMPLE LOCATION (PHASE II ECP 2004)
	SURFACE WATER AND SEDIMENT SAMPLE LOCATION (PHASE II ECP 2004)
	SURFACE SOIL AND GROUNDWATER SAMPLE LOCATION (PHASE II ECP 2004)
	SURFACE SOIL, SUBSURFACE SOIL, AND GROUNDWATER SAMPLE LOCATION (PHASE II ECP 2004)
	SURFACE SOIL, SUBSURFACE SOIL AND GROUNDWATER SAMPLE LOCATION
	SURFACE SOIL, SUBSURFACE SOIL AND GROUNDWATER (TEMPORARY) SAMPLE LOCATION
	ESTUARINE SEDIMENT AND GROUNDWATER (TEMPORARY) SAMPLE LOCATION
	OPEN WATER SEDIMENT SAMPLE LOCATION

FIGURE 6-5
 GROUNDWATER EXCEEDANCES OF HUMAN HEALTH OR ECOLOGICAL GROUNDWATER SCREENING CRITERIA AND BACKGROUND⁽¹⁾ SWMU 70-DISPOSAL AREA NORTHWEST OF LANDFILL
 PHASE I RFI REPORT
 NAVAL ACTIVITY PUERTO RICO

APPENDIX A
2009 FIELD ACTIVITIES

SITE PHOTOGRAPHS



Photo 1. Debris piles in the southernmost portion of SWMU 70.



Photo 2. Southwestern limits of SWMU 70 and Ensenada Honda looking northwest.



Photo 3. Groundwater monitoring well 70GW03.



Photo 4. Unknown structure identified in the northern portion of the site.

FIELD LOG BOOK NOTES

Environmental Geologist – Joe Burawa

Joe Burawa

Site Investigations

sumus 60, 70, 9-A

January 2009

[11 to 24]

Michael Baker Jr., Inc.
100 Arside Drive
Moon Township, PA 15108.

②

aword 30.
erortogheval of 10
A. 0 07 00 2000
9000 100000
US 2 10
... of ...
...
8021 49

1/11/09 ③

Travel to Puerto Rico

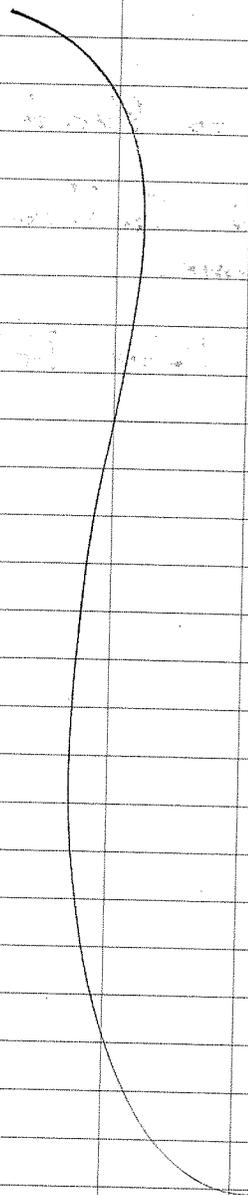
Arrive in San Juan @ 540
local time.

Drive to Palmas Del MAR

JHB

④

10/11



1/12/09 ⑤

on-site 7:00am
meet with Millie and Victor look
for keys, determine command has
them.

Walk 60 and 70, C.I.
get keys @ 9:15am
open equipment and bottles
GPS 60 locations
receive sand for JFA
Mingo and Edwin on-site @
11:15 unload supplies.

Coordinate water delivery from
Fire station for DECON water.
Calibrate PID
Mingo and Edwin get cement and
sand for concrete, stick ups, bollards

Coordinate with Right-Way to use
backfill to clear path for GOSB01
GOSB02

Drill GOSB01 & GOSB02

JHB

Note: Pages 6-19 of the field log book are not included because they pertain to another SWMU included in the January 2009 multi-site investigation.

(20)

[Faint, illegible handwritten notes on a grid background]

JHB

1/14/09 (21)

On-site 700am

Direct Right-Way to summit 70
and attempt to clear a path to
ZOSB04. Canopy was too thick
to push over with backhoe.

Mobilize JFA to summit 70
and set up on ZOSB01

Calibrate PID

Begin drilling @ 9:05

JHB

22 11/14/09

705B01

0-4' Grayish white sand, fine to
2.3' Rec med-grained, loose, dry
0 ppm - broken coral and shell frags
becomes damp @ 2'

4-8' Becomes wet @ 4.1'
1.8' Rec light gray silty sand, fine
0 ppm - grained sand, very soft
well sorted.

8-12' peat, brown, weathered
1.0' Rec wood 8-10'
10 ppm

12-16' Poor recovery, what was recovered
1.2' Rec had an odor, no staining,
32 ppm Max silty sand, light to medium gray
wet

JHB

1/14/09 23

Soil Samples collected

0-1' 705B01-00 915

1-3' 705B01-01 940

Overdrill with 3 1/4" Augers

Install well to 14' Bgs

10' 2"-DIA Screen 0.010"-slot

sand to 2.5'

Bentonite to 0.5'

Install stick-up Pro cover

w/ Bollards

Well Install complete @ 1030

JHB

(24) 1/14/09

70SB02

0-4' Silt with some fine grained
2.2' Rec sand, tan, damp, soft
1' Oppm well sorted
2' Oppm wet at 2.5'
3.0 becomes silty sand
light gray, wet, very
soft, well-sorted
4-8' fine grained sand
2.8' Rec @ 6.5 Peat, dark brown
odor, soft, moist to wet
Oppm-1
Oppm-2
360 ppm₂₈
8-12' @ 8' becomes greenish gray
sandy clay with gravel
3.1' Rec. throughout damp to moist
Oppm- saprotic structure @ 10.5'

JHB

1/14/09 (25)

Soil Samples Collected

70SB02-00 11:15

70SB02-01 11:30

Overdrill with 3/4" Augers
Install well to - 14 Bgs
10' 2"-DIA 0.010"-slot Screen
Sand to 2'
Bentonite to 1'
Install Stick-up Protective
Cover w/Bollards

Well Install complete @ 12:15

JHB

(26)

1/14/09

70SB03

0-4' Silt, light gray, soft
2.5' some shells, damp

1 Oppm

2 Oppm @ 2.5' Sandy Silt, light

3 Oppm gray, wet, very soft

4-8'

1.0' Rec silty sand @ 4' brownish
Oppm gray, No peat, wet
very soft

8-12'

1.2' soft

Oppm cobble @ 10' very hard

JHB

1/14/09 (27)

Soil Samples Collected

70SB03 - 00 1420

70SB03 - 01 1445

Overdrill with 3/4" Auger
Install well @ 14' Bgs
10' 2" DIA Screen 0.010" slot
Sand to 2'

Bentonite to 1'

Install Stick-up Protective Casings
and bollards

Well Installation complete @ 1600

JFA offsite @ 5:00pm

Attempt to locate 70SB04 &
70SB05

JHB offsite 6:00pm

JHB

(28)

JHB

1/15/09 (29)

On-site 630

JFA on-site 645

Calibrate PID

Prepare for sampling, mobilize to
705B04, clear brush

Begin drilling @ 820

Travel into Mangrove and sample
605B08, 605B07, and 605B06
place 2" screen in hand auger
holes to sample groundwater
Since conditions are indicative
of an estuarine wetland to
surface sample will be evaluated
as a sediment rather than a
soil.

JHB

30

1/15/09

70SB04

0-4' Browns, plant matter to 0.3'
2.3' Rec soft, damp
Oppm - then light tan, fine-grained
sand, some silt, damp to
moist, well sorted, coral
frags

4-8' wet @ 3'

1.6' Rec

Oppm -

8-12' silty sand, light gray
2.7' Rec soft wet

Oppm -

JHB

1/15/09 (31)

Soil Samples Collected

70SB04-00 8:45

70SB04-00D

70SB04-00MS

70SB04-00MS/MSD

70SB04-01

70SB04-01D 9:15

70SB04-01MS

70SB04-01MS/MSD

Install 2" well @ 14'
sand to 2'

Benckite to 1'

Install Protective casing and
Ballards

Well Install Complete @
10:15 am

JHB

32

9/15/09

[Faint, mostly illegible handwritten notes on the left page, possibly describing a site or collection details.]

JHB

1/15/09

33

Collect 705B08 [1230]
 3 pictures - 0-1'
 Sample location with Black Mangroves, red mangroves, surface water approx. 30' west numerous crab holes throughout water @ ~ 8"
 Sandy silty soil wet to saturated collected as sediment
 2" well screen installed and approx. 3.5'

Collect 705B07 [1300]
 3 pictures 0-1'

Sample area with shells, coral frags, Black Mangrove, Top root mark gw @ 2'
 Estuarine wetland area.
 2" well screen installed to 3.5'
 Sand and shell soil matrix

JHB

(34)

10/21

[faded handwritten notes, possibly describing field observations or data collection]

JHB
8/1

1/15/09 (35)

Collected
 70SB06 @ 1520
 Collected as sediment sample
 Estuarine Wetland
 Black Mangroves, shell frags
 moist to saturated to 1 foot
 crab holes throughout
 Hydric Soils - Sandy, shell frags
 throughout.
 Installed 2" PVC Screen to 2'
 BGS, Water @ approx 6"

off-side 1700

JHB

**Note: Pages 36-80 of the field log book are not included
because they pertain to another SWMU
included in the January 2009 multi-site investigation.**

1/20/09

(81)

9SB38

0-4' Sandy loam, dark brown,
2.5' Rec mod soft, damp to 0.3'
1 0 5 0 Sandy clay, med brown,
2 0 damp to moist, mod soft
3 0 to soft
4 0 becomes wet/saturated @ 2.2'
4-8' gray silty sand and clay,
very soft, wet
3.2' Rec
1 0 5 0 greenish gray sandy clay at
2 0 6 0 5.8 to 6.2
3 0 7 0 then light brown, sand
4 0 well sorted, moist to wet,
soft
No hydrocarbon odor

JHB

1/20/09

(82)

Soil Sample Collected

9SB38-00 1705

Assist Mike Crowley augering boring @
SWMU 70, 70SB05. Hand Auger.

Sandy Silt, light gray, soft, damp
to moist to 1 foot
then Sand, brownish gray, shell
fragments, medium-grained sand

wet @ 3'

Terminated boring @ Approx. 5'
Placed 2" Screen in open boring to
grab groundwater sample.

JHB

**Note: Pages 83-92 of the field log book are not included
because they pertain to another SWMU
included in the January 2009 multi-site investigation.**

(93)

Start Slug Test @ 9PW54
Rising Head @ 1350.

Collect Equipment Rinse for
groundwater tube

Set up RTK survey equipment
and survey all permanent wells
and most temporary wells
at SUMMs 9, 60, and 70.

Survey some of the MNA wells.

off-site 6:30 [18:30]

JHB

1/23/08

(94)

On-site 800

Resample 70SD03, 70SD03D
70SD03MS, 70SD03MSD
[Sample Collected 1/22/08 @ 1630]

Start Slug Test @ 9PW53
1010 Falling Head.
I 13.27 from TPVC

Rising Head Test @ 11:30

- Collect water levels from all wells at SUMM 9, 60 and 70.
- Slug Test @ 9PW 44 I 9.47'
- Pack up equipment to ship back to office, return RTK, and slug testing equipment.

Leave the Base at 16:45 drive to EXOlock in Fajardo. Attempt to get key made.

JHB

(95)

Water levels 1/23/09

70GW01	8.17	TPUC
70GW02	4.54	↓
70GW03	5.18	
70GW04	9.10	

60GW02	5.62	TPUC
60GW04	2.53	↓
60GW05	2.52	

13GW05	20.45	TPUC
9φPW54	21.99	TPUC
9φPW52	21.19	}
9φPW53	13.27	
9φPW44	9.47	
9φPW41	10.90	
9φPW47	11.58	
9φTW39	17.92	
9φTW37	7.96	
9φTW40	7.98	
9φTW48	5.58	
9φTW50	14.70	
9φTW42	17.97	

JAB

1/24/09

(96)

Travel Day

Return to Pittsburgh

JAB

Field Scientist – Michael Cromley

(12)

1/12/09 0705 Arrived on base
0710 Examined SWMU 70, 60
0830 ↓
0835 Got key for Room and
began organizing
1040 LEFT with AG to SWMU 60
to mark locations
1150 Lunch
1235 Went to SWMU 70
with AG to Clear site
Only 70SB01, 70SB02, and
70SB03 were cleared.
We will find other means
of clearing the remaining
site due to thick vegetation
1330 Returned to Security
Building. FedEx left
30+ coolers in hallway
so we moved them into
room and organized them
1815 Left Base

MRC

(13)

1/13/09
0700 ARRIVED ON BASE
0715 Began loading coolers
for JB @ SWMU 60
Helped with trip blanks
and organizing labels
0817 Went to SWMU 70
w/ AG to continue
with site clearing.
1035 Finished GPS of 4 locations
at SWMU 70 which included
misc. debris piles containing
tires, rope, utility poles,
concrete, steel, plastic, and
PVC Pipe. Photographed each
location.
1040 Drove back to security
building
1100 Went to grab some lunch
1130 Back to Security building
to begin packing coolers
1350 Went to Marina to
give JB ice for samples
1400 Continued to pack coolers
w/ AG

MRC

**Note: Pages 14-19 of the field log book are not included
because they pertain to another SWMU
included in the January 2009 multi-site investigation.**

(20) 1/15/09

- 0645 ARRIVE ON BASE
- 0655 Began collecting bottles and containers to use for sampling SWMU 60.
- 0755 Arrive @ SWMU 60 w/ DH
Begin setting up to develop 60SB05
- 1015 60SB05 is dry will try later in the day. Will help DH with sampling of 60SB04
- 1140 LUNCH
- 1240 Returned to Security Bldg. grabbed more VOA's & Filters
- 1300 Returned to Marina to help DH w/ sampling
- 1330 Back to security Bldg. to drop off samples and tape them
Helped AG w/ condensing coolers and cleaning up room
- 1400 Went w/ DH to examine if any wells from SWMU 70 could be finished and start and development. @ Could not start today Mingo was working on the casing
- ~ me

1/15/09

1 1030
2 1215
3 0400

(21)

- 1530 Went to SWMU 60 to develop a temporary well
Well was not in correct boring hole
- 1600 Left to SWMU 70 to 70SB01 to develop w/ DH
- ~~1725~~
~~1700~~ Finished development of well 70SB01 and went back to Security bldg.
- 1800 LEFT BASE

MRL

(22) 1/15/09

DTW: 4.79

Total Depth: 16.40

60SB05

WELL DEVELOPMENT

TIME	DTW	TEMP	SPCOND	DO	PH	ORP	TURB
0817							

START PURGE

- very muddy

0825 6.81 28.05 43.86 0.14 6.85 -263.9 NR

0830 7.81 27.38 41.55 0.08 6.89 -262.7 NR

0835 9.45 28.13 40.21 0.16 6.84 -281.4 NR

0840 10.37 28.37 41.36 0.10 6.96 -284.4 285

0845 11.34 28.71 42.67 0.11 6.87 -283.7 427

0850 12.71 29.07 41.97 0.09 6.89 -284.8 220

0855 14.17 28.81 41.64 0.11 6.87 -283.4 27

0900 15.89 28.91 42.41 0.07 6.88 -283.7 211

0905 - Dry will give 10 mins to recharge

0915 14.45 - well pumped dry again

0925 14.12 - well pumped dry again

0935 15.09 - well pumped dry again

0955 13.11 - well pump dry again. much clearer

will continue purging at 1000 1005

*1005 14.19 28.45 47.44 0.03 7.05 -344.4 41.7

1010 15.30 28.51 47.86 0.24 6.98 -339.7 700

1015 - Dry will try again later in the day

* Pump speed = 3/4
NR = No Reading

MRC

1/15/09

DTW: 8.04

(23)

70SB01

WELL DEVELOPMENT

TIME	DTW	TEMP	SPCOND	DO	PH	ORP	TURB
1616							

START PURGE

- Grayish brown color

- Sweet pungent smell

1622 9.33

1628 3 Gallons pumped - still grayish brown

- some smell - sulfur?

1640 6 Gallons pumped

1642 10.52 27.64 8.84 0.17 7.05 -369.7 NR

1650 9 Gallons pumped

1652 10.88 27.83 8.599 5.91 7.04 -382.2 341

1657 11.05 27.93 8.587 6.07 6.99 -382.5 244

1702 11.31 27.92 8.601 5.98 6.97 -383.4 223

1707 11.49 27.94 8.551 6.05 6.98 -387.1 188

1712 11.17 27.92 8.497 6.05 6.97 -386.5 149

1717 11.31 27.91 8.512 6.04 6.98 -387.1 104.3

1722 11.42 27.91 8.491 6.05 6.97 -386.7 98

Date Installed

1/14/09 @ 1030

MRC

NR - No Reading

(24) 1/16/09

0655 ARRIVE ON BASE

0700 Re ICE coolers w/ GWSamples
from yesterday. Found labels
and got bottles and equipment
to go sample 70SB01

~~0745~~ 0745 Left to SWMU 70

~~0750~~ 0750 Begin setup to sample 70SB01

~~0800~~ 0800 Begin Purging 70SB01

0945 Move to DH's location
70SB02

1005 Move to 70SB03 to begin
development

1200 ~~Went~~ Went to Security Bldg.
to gather bottles and
labels to sample 70SB02

1240 Arrived at 70SB02, setup
supplies

1255 Began purging & sampling

1340 SAMPLED 70SB02, 02MS, 02MS

1355 SAMPLED 70SB02.D

1625 MOVED BACK to Security
Bldg. to bring back
samples and ice them
down and tape the
outsides of the bottles

MRC

(25)

1650 - Went to pick up DH
from 70SB03

1710 - Back to Security Bldg to
ice down DH samples

1745 LEFT BASE

MRC

(28) 1/16/09 DTW: 8.57
70SBD1 PURGE & SAMPLE

TIME	DTW	TEMP	SECND	DO	PH	ORP	TURB
0800	8.57	BEGIN	PURGE				
0805	8.59	27.69	47.91	0.51	6.07	-195.1	92
0810	8.91	27.91	46.42	0.49	6.05	-194.4	31
0815	9.31	27.75	46.82	0.50	6.07	-193.7	11
0820	9.56	27.81	46.98	0.52	6.06	-195.9	9
0825	9.74	27.76	46.51	0.49	6.07	-197.1	11
0830	9.99	27.61	47.10	0.53	6.07	-196.4	9
0835	10.46	27.49	47.01	0.55	6.07	-197.9	7
0840	-	27.46	SAMPLE	TIME			

Very Strong reaction in
the VOA's

Date Installed 1/14/09 @ 1030
PUMP SPEED 1/2 speed

MRL

1/16/09 DTW: 5.12 (29)
70SBD2 PURGE & SAMPLE

TIME	DTW	TEMP	SECND	DO	PH	ORP	TURB
1255	BEGIN	PURGE					
1305	5.43	29.33	37.79	0.12	-4.67	336.1	100
1310	5.64	28.79	37.41	0.08	-4.91	335.4	50
1315	5.97	29.14	37.65	0.10	-4.81	336.9	3
1320	6.42	29.39	37.61	0.09	-4.79	335.1	4
1325	6.77	29.57	37.58	0.10	-4.91	334.7	5
1330	6.91	29.42	37.65	0.08	-4.85	335.9	4
1335	7.21	29.45	37.51	0.09	-4.93	335.1	5
1340	-	BEGIN	SAMPLES				

SAMPLE TIMES

1340 70SBD2, 02MS, 02MSD
1355 70SBD2 D

Very strong reaction in
the VOA's

Date Installed 1/14/09 @ 1215
PUMP SPEED 1/2 speed

MRL

**Note: Pages 30-37 of the field log book are not included
because they pertain to another SWMU
included in the January 2009 multi-site investigation.**

(38) 1/18/09

9PWS2 PURGE & SAMPLE

TIME	DTN	TEMP	SECNO	DO	PH	ORP	TURB
1539	23.84	31.38	3.93	1.24	-4.13	676.7	449
1544	24.09	29.96	3.79	0.06	-4.32	654.9	61
1549	24.20	29.74	3.68	0.50	-4.21	659.7	35
1554	24.20	29.70	3.57	0.60	-4.22	660.1	84
1559	24.37	29.84	3.67	0.49	-4.25	652.8	48
1604	24.57	29.91	3.61	0.55	-4.27	657.1	39
1609	24.79	29.87	3.69	0.51	-4.23	651.9	625
1614	24.95	29.81	3.71	0.52	-4.24	655.1	298

1619 ~~25.05~~ Due to rising turbidity we will
~~1624~~ let it recharge overnight and try
in the morning

Sampled by D. Hope on 1/19/09
can be found in his log book

MRL

1/19/09

(39)

- 0730 Arrive @ BASE
- 0800 Drive to SWMU 9 to
do QA/QL Samples on
Rea 9PWS4 because of its
great productivity
- 1030 Returned to Security Bldg
to get more PVC tubing, Unpreserved
bottles and drop off samples
- 1100 Arrive at SWMU 9
- 1115 Setup at 9TW37
- 1117 Begin Purge & Sampling of
9TW57
- 1240 SAMPLES 9TW37
- 1325 Move to 9TW39
- 1350 Stopped purge on 9TW39 - Dry
~~1400~~ ~~1400~~
- 1410 Went to SWMU 70 to
locate 70SB05
- 1610 Located 70SB05 w/ GPS now
heading back to SWMU 9
to check water level of
9TW39
- 1620 Arrived at SWMU 9 will
check water levels and
install tubing into wells

MRL

**Note: Pages 40-49 of the field log book are not included
because they pertain to another SWMU
included in the January 2009 multi-site investigation.**

(50) 1/20/09 TD: 5.37 DTW: 4.50
705805

TIME	DTW	TEMP	SPOND	DO	PH	ORP	TURB
1610	4.50		Begin Purge			1/2 speed	
1615	5.00	26.69	39.25	0.85	-4.90	7437	NR
1620	DRY		- 5 min Recharge				
1625	4.88	26.71	39.35	0.79	-4.84	7457	NR
1630	DRY		- Will give 10 minute recharge then sample				
1640			- SAMPLE TIME				

NR - No Reading

MRC

1/21/09

1/21/09

(51)

~~0700~~ ARRIVE ON BASE
0700 Collect bottles for sampling at SWMU 9
0730 Head to SWMU 70 to finish filling up sample bottles
0845 Done w/ bottles heading to SWMU 9
0855 Arrive at SWMU 9
0915 Set up at 9TW50
0925 9TW50 has no water will move to 9TW
0940 9TW has no water either need to run back to Security Bldg. to ice down samples and get keys to unlock permanent wells @ SWMU 9
1050 Back to SWMU 9 will set up for purge & sampling of 9PW53 that DT developed yesterday
1055 Moved to 9PW47 instead to try and develop and then purge & sample

MRC

Field Scientist – Adam Gailey

⑥ January 14, 2009

Collection of Field Blank
JAN09-FB01 - Laboratory Grade
Deionized water

Time of Collection: 1625 by John
Malinowski, Jm

- 2 1 Liter Ambers: LL SVOC's
- 2 1 Liter Ambers: PCBs
- 2 1 Liter Ambers: Pesticides
- 2 1 Liter Ambers (HCL): DRO
- 3 40mL Vials (HCL): VOCs
- 3 40mL Vials (HCL): GRO
- 1 250mL Poly (HNO₃): Total Metals

Collection of Equipment Rinse Blank
Macro Core Liner

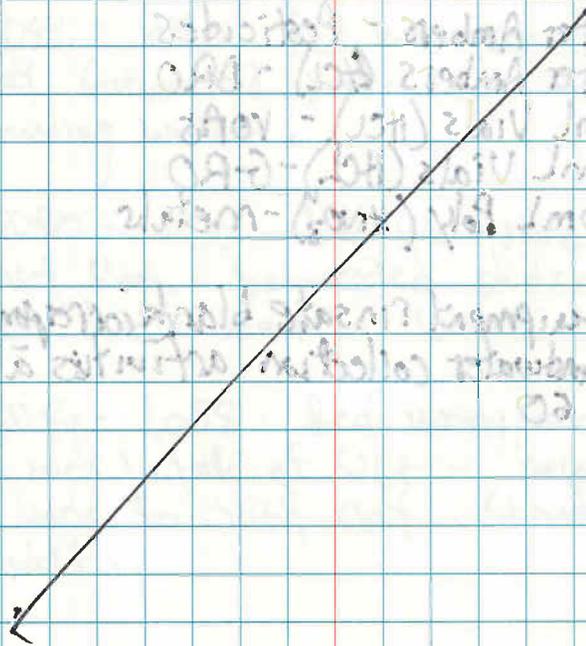
JAN09-ER03 - collected by passing
Laboratory Grade Deionized
water through an un-used
Macro Core Liner

This equipment rinse blank corresponds
to soil collection activities at sumus 60/70

⑦

Time of Collection: 1700 by John
Malinowski, Jm

- 2 1 Liter Ambers: LL SVOCs
- 2 1 Liter Ambers: PCBs
- 2 1 Liter Ambers: Pesticides
- 2 1 Liter Ambers (HCL): DRO
- 3 40mL Vials (HCL): VOCs
- 3 40mL Vials (HCL): GRO
- 1 250 mL Poly (HNO₃): Total Metals



⑧

January 15, 2008

Collection of Equipment Rinse Blank
 Jan09-ER04 - Collected by pumping
 laboratory grade water
 through tubing used
 for ground water collection.

Time of collection: 1635 on January
 15, 2008

Collected by: John Malinowski Jm

- 2 1 liter Ambers - LL SVOCs
- 2 1 liter Ambers - Pesticides
- 2 1 liter Ambers (HCL) - DRO
- 3 40ml Vials (HCL) - VOAs
- 3 40ml Vials (HCL) - GRO
- 1 250ml Poly (HNO₃) - metals

This equipment rinse blank corresponds
 to groundwater collection activities at
 SWMU 60.

January 16, 2008

⑨

SWMU 9 Sediment Collection
 John Malinowski
 Adam Gaillet

95092 - 1015 - Red mangroves
 and standing H₂O

95081 - 1025 - Red mangroves
 No standing water - Saturated
 sediments.

95084 - 1040 - Red mangrove. Silt
 clay. Saturated sediment and
 standing water.

95090 - 1050 - Red Mangrove
 Silt clay - saturated sediment
 and little standing water.

95096 - 1058 - Red mangrove
 2 inch layer of silt - below
 2" back to silt clay. Standing
 water.

(10)

1110

9SD85 - Red mangrove, just
going. Hydrophobic ground cover.
Sample point adjacent to water's
edge. Clay ~~sediment~~ sediment.

January 16, 2009

Equipment Rinsate Bank
JAN09 - EROS - Stainless
steel spoon.

Time of collection: 1645

Collected by: Adam Gailey

2 1L Ambers - LL PAM's

2 1L Ambers - DRO

3 40ml VIALS (HCL) - VOA's

3 40ml VIALS (HCL) - GRO

1 250 ml Poly(HNO₃) - Metals

This ER corresponds to sediment
samples collected at SUMM 9.

ADG

January 17, 2009

(11)

Red Sampling Cont'd

9SD45 - 0750. Standing Water
devoid of vegetation. Silty clay.

9SD47 - 0755. Silt first 2"
Silty clay 2-6". Devoid of
vegetation. Sandpipers feeding
in the vicinity.

9SD41 - 0805. Silty clay. Red
Mangroves (with Pneumatophores)
Little standing water.

9SD39 - 0810. Silty clay.
standing water. Pneumatophores
Red mangrove to our South.
D, MS, MSP also collected here.

Back to Security Building
to prepare for Esmeralda
Honda Sediment Sampling
at SUMM's Cont. To.
Also, collected ER 06 at 0900

SWMU's 60 + 70

(12)

Sediment Sampling:

John Malinowski and Adam Gurey

~~70SD03~~

70SD03

70SD03 D

70SD03 Ms

70SD03 MSD

70SD03 Ms/MSD

Collected at
1025. Mostly

Sand with

Turtle grass

Present. Water
Depth - 2 ft.

Weather Conditions: Rain

~~Some~~ Sometimes heavy.

70SD02 - 1050. Sand with
Turtle grass present. Water
Depth 24 Feet.

60SD02 - 1125. Depth at
Approx. 11 ft. Mostly ~~sandy~~
(Water Depth)
Silty Sand.

60SD03 - 1205. Depth of water
at approx. 8 ft. Sand with
little Turtle grass. In the
vicinity of boat ramp put - id.

SWMU's 60 and 70
Sediment Sampling:

(13)

- Security personnel assisted
by providing access by boat
to pre-determined sample locations.

- All sample locations were
navigated to using GPS.

- Continue to Sample
SWMU 60/70 Sediment

70SD01 - 1400. Sand.
Location adjacent to shore
where Red mangroves are
persistent.

60SD03 - 1430. Silty Sand
and organic Material abundant.
Depositional area. Red
Mangrove in water with
White Mangrove farther inland.

**Note: Pages 14-17 of the field log book are not included
because they pertain to another SWMU
included in the January 2009 multi-site investigation.**

(19)

Collect SEDIMENT Sample

SED 02

SED 02 D

SED 02 MS

SED 02 MSD

SED 02 MS/MSD

1/19/09 @ 1600.

Back To security Building
TO PAP for following Pap's
activities.

Report NARR @ 1730.

January 20, 2009

(19)

Continue With Sediment
Sampling SW of 9.

~~0800~~

95095 - 0800. Standing Water
Desert of Vegetation. Silt ^{1st}
inch then Silty clay below 1".
Zenaida doves ~~chirping~~ singing.

95097 - 0912. Saturated.
Desert of Vegetation. Silty clay.

95099 - 0817. saturated. Silt on
1" inch then Silty clay after. Area
desert of Vegetation.

95098 - 0825. Silt, then a Silty
clay after 1 inch. Decaying
veg (most likely Red mangrove).
Saturated.

95099. 0830. Silty clay. Saturated
Small Island Bush. Red mangrove
and pneumatophores.

(20)

QSD100. Silt 1st inch - Then a silty clay. Decaying leaf organic matter. Standing water beginning to get deeper 2"-3" on average. Also, decaying red mangroves becoming abundant at this location and beyond. Saturated.

QSD101, 0900. Standing Water. Approx 3". decaying red mangroves. Silt clay and organic matter.

QSD103. 0905 standing water approx 6". Silt followed by silty clay. Devoid of any vegetation. QSD103 D also collected here.

QSD102, 0910. Silt clay. decaying red mangrove. standing water approx 8".

QSD104. 0915. Silt clay. decaying red mangroves. standing water approx. 8".

(21)

Back to security Bldg. to collect ~~QSD~~ JANUO908 corresponds to GW sampling at SWMU 9. 0940

- 3 Vials - Voc's
- 3 Vials - GRO
- 2 1L Ambers - DRO
- 2 1L Ambers - CCPTH's.

Prep samples for Fed EX pick up.

Collect Field Bank JAN 09 - FBOA (NAPP Potable Water)

- 2 1 liter Ambers: SVO's
- 2 1 liter Ambers: PCBs / PEST
- 2 1 liter Ambers: DRO
- 3 40 ml Vials (HCL): Voc's
- 3 40 ml Vials (HCL): GRO
- 1 250 ml Puff (HCL): TOTAL Metals

APB

**Note: Pages 22-23 of the field log book are not included
because they pertain to another SWMU
included in the January 2009 multi-site investigation.**

(24)

~~scribbled out text~~

Collect ER 09 at 1030
corresponds to a Bucket
Angel used at Summit 9.

- 3 USA's - Voc's
- 3 USA's - GRO
- 2 IL Ambers - DRO
- 2 IL Ambers - LL PATT's
- 200 ml Poly - Mettler

Begin to prep FedEx.

GPS Sample Locations at
CABRAS ISLAND. 1500.

Depart NARR 1700.

176

January 22, 2009

(25)

Arrive at NARR 0730.

Begin to prepare for
Duf's events.

Collect ER 10 - Gut Tubing @ Summit 9 0900
Assemble samples for
boxed FedEx shipment.

RTK GPS Survey - North
Darius Monument set-up.
Permanent and temporary
wells surveyed at top of
PUC casing and ground
surface elevations.

Re-sampled 70 SD 03 ^D_{us}
at 1630. _{us/USD}

Mostly sand/sandy clay with
Turtle grass. Observed
small schools of fish
(unknown species) near the
sampling point. Schools of
fish coming from mangroves.
2 larger fish observed further
out (approx. 200 ft.) species
unknown.

26

January 23, 2008

Arrive AT NAPR 0730

Assemble last shipment of
samples for FEDEX:

Organize and pack equipment.

Inventory of remaining
supplies -

Depart NAPR

AD2

Field Scientist – Darrin Hupe

1/16/09

SWMU 70

Weather: Partly cloudy, breezy, ~80°F

70GWPZ - (Develop) * Temporary Well.

SWL = 4.48 @ 0825 Installed 1/14.

0830 - start

- very muddy for 1st gels. - Turb. off bottom

- continued very turbid for next 3 gels.

throughout upper areas of water column.

After 6 gels - Turb. = 88 @ 0908

After 7 gels - Turb. = 27

After 8 gels - Turb. = 72

SWL = 7.12

After 9 gels - Turb. = 243 → SWL = 7.20

" 11 gels. " = 136 - SWL = 7.22

" 12 gels. " = 132 @ 0937

" 14 gels. " = 81 - SWL = 7.25

" 15 gels. " = 52

" 16 gels. " = 51

" 17 gels " = 33 @ 0950

SWL = 7.28

- Med. gray/brown w/ strong organic odor.

- Pump Speed - Full

* Purge & Sample notes in M. Cranleys book.

4 DNH

1/16/09

SWMU 70

70GWO4 - (Develop) * Installed 1/15 @ 1005.

SWL = 5.95 @ 1211

1211 - start

- very sandy for 1st 1.5 gels. - Mostly from bottom. Continued very turbid for next 8 gels.

Time	Turb.	Vol. gels.	SWL
1306	over	10	6.83
1315	295	12	6.86
1326	238	14	6.88
1330	90	15	-
1331	34	<u>16</u>	6.89

- After development, water was clear of material but had a black coloring. Strong organic odor.

- Purge & Sample next pg.



5 DNH

1/16/09

SWMU 70

706W04 (Sample)

TD: 17.60

SWL: 5.98 @ 1425

gals.

Time	Vol.	Temp	Cond.	D.O.	pH	ORP	Turb.
------	------	------	-------	------	----	-----	-------

1427- Start

1432 0.8 27.28 19.68 0.18 6.57 -285 57

(SWL = 6.32)

1437 1.3 27.02 19.78 0.14 6.59 -311 48

(SWL = 6.35)

1442 1.7 26.97 19.68 0.12 6.60 -317 37

(SWL = 6.36)

1447 2.0 26.94 19.67 0.12 6.62 -312 36

(SWL = 6.34)

1452 2.3 26.92 19.50 0.11 6.61 -323 36

(SWL = 6.35)

*1457 3.0 26.81 16.49 0.13 6.73 -221 1.5

(SWL = 6.35)

* Prior to this reading, the sample tube was to raised ~ 1 ft. from previous location in well.

Now set at ~ 3-4 ft. from well bottom.

1502 3.5 26.76 16.39 0.14 6.73 -215 2.0

(SWL = 6.35)

Cont. →

6 DWH

1/16/09

706W04

Time	Vol.	Temp	Cond.	D.O.	pH	ORP	Turb.
------	------	------	-------	------	----	-----	-------

1507 3.9 26.85 16.72 0.14 6.68 -231 1.9

(SWL = 6.35)

1512 26.81 16.69 0.14 6.69 -224 1.9

(SWL = 6.35)

1530- Sampled

- Sample water clear of debris, sand, etc w/a dark black hue w/ strong organic odor.

- pump speed @ ~ 3/4.



7 DWH

1/16/09

SWMU 70

70GW03 (sample)

TD: 17.30

SWL: 6.09 @ 1633

Time	Vol.	Temp.	Cond.	D.O.	pH	ORP	Turb
1635							

1640	0.5	27.49	45.92	0.29	6.48	-47	22
------	-----	-------	-------	------	------	-----	----

(SWL = 6.18)

1645	1.2	27.48	45.47	0.18	6.46	-47	20
------	-----	-------	-------	------	------	-----	----

(SWL = 6.18)

1650	1.6	27.45	45.43	0.14	6.45	-48	12
------	-----	-------	-------	------	------	-----	----

(SWL = 6.18)

1655	2.0	27.44	45.40	0.14	6.46	-49	7
------	-----	-------	-------	------	------	-----	---

(SWL = 6.18)

1700	2.5	27.44	45.28	0.15	6.46	-49	6.3
------	-----	-------	-------	------	------	-----	-----

(SWL = 6.18)

1705	3.0	27.43	45.21	0.14	6.45	-49	6.0
------	-----	-------	-------	------	------	-----	-----

1715 - Sample Taken

- Sample clear w/ slight yellow tinge.

No odor.

- Pump speed @ 3/4.

X M. Crumely Developed this well

X Well installed 1/14.

B DNH

1/17/09

SWMU 70

Weather: Mostly cloudy, breezy in PM, ~80°F
- Rain showers late morning.

70GW07

(Develop)

* Temporary Well Head Augered.

SWL = 3.72

TD = 4.96

0824 - Start

0836 - Pumped (Dry @ 2.5 gals.) M. lky.

white, sandy. Will let re-charge + attempt to purge &/or sample. - Pump Speed - Full.

(Sample)

Time	Vol.	Temp.	Cond.	D.O.	pH	ORP	Turb.
0846	-	25.76	41.25	0.23	6.83	19.7	240

0851	0.3	26.38	41.29	0.45	6.80	-6	250
------	-----	-------	-------	------	------	----	-----

0856	0.8	26.46	41.26	0.42	6.78	-16	261
------	-----	-------	-------	------	------	-----	-----

0901	1.2	26.44	41.25	0.35	6.78	-22	126
------	-----	-------	-------	------	------	-----	-----

0906	1.6	26.47	41.21	0.34	6.78	-27	105
------	-----	-------	-------	------	------	-----	-----

0911	2.5	26.52	41.18	0.33	6.78	-29	102
------	-----	-------	-------	------	------	-----	-----

0916	3.0	26.49	41.25	0.32	6.77	-31	90
------	-----	-------	-------	------	------	-----	----

0921	3.5	26.54	41.16	0.31	6.77	-32	75
------	-----	-------	-------	------	------	-----	----

0926	4.0	26.54	41.14	0.28	6.77	-32	50
------	-----	-------	-------	------	------	-----	----

0931	4.5	26.53	41.12	0.27	6.77	-34	49
------	-----	-------	-------	------	------	-----	----

0936	5	26.53	41.11	0.26	6.76	-35	47
------	---	-------	-------	------	------	-----	----

							47
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							47
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							47
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							47
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							47
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Cont. →

DNH

1/17/09

SWMU 70

706107

0945 - Sample Taken.

- Sample clear w/ no odor.
- Pump Speed @ $\sim 2/3$.
- Ending Turb. = 57

~~706108~~ (Develop) 706108

SWL = 2.74

TD = 4.92

1038 - Start

* Temporary Well Hand Augered

1050 - Pumped 2.5 gals. Water Level

Stayed level @ 2.92 ft. Light brown, turbid water. Will raise tubing & attempt purge & sample.

(Sample)

Time.	Vol. ^{gals}	Temp.	Cond.	DO	PH	ORP	Turb.
1054	-	24.98	37.39	0.52	7.05	-15	123
1059	0.3	24.64	37.35	0.40	7.04	-50	102
(SWL = 2.83)							
1104	1.0	24.49	37.44	0.30	7.02	-70	80
1109	1.5	24.47	37.58	0.29	7.01	-79	51
1114	2.0	24.51	37.84	0.25	7.08	-87	31
(SWL = 2.83)							
1119	2.5	24.52	37.84	0.19	7.00	-89	24
1124	3.0	24.54	38.02	0.20	7.00	-92	18

10 DWT

Cont. →

1/17/09

SWMU 70

~~706108~~ 706108

Time.	Vol.	Temp.	Cond.	DO	PH	ORP	Turb.
1129	3.5	28.05 24.55	38.05	0.19	6.99	-95	10

1145 - Sample Taken.

- Sample clear w/ slight yellow tinge.
- Light organic odor.
- Pump Speed = $2/3$.
- Ending Turb. = 8.0

706106 (Develop)

* Temporary Well Hand Augered

SWL = 3.14 TD = 4.98

1325 - Start

1338 - Pumped 2 gals. Water Level

Stayed level @ 3.14 ft. Milky white, Sand, Will raise tubing & purge & sample.

11 DWT

1/17/09

SWMU70

706W02 (Sample)

Time	Vol.	Temp.	Cond.	P.O.	pH	ORP	Turb.
1342	-	26.92	29.01	0.33	6.74	60	over
1347	.75	25.77	33.91	0.21	6.83	-110.7	over
1352	1.00	25.82	32.96	0.21	6.84	-130.9	over
1357	1.50	25.68	32.84	0.23	6.74	-136.1	over
1402	1.75	25.78	32.78	0.20	6.84	-138.4	372
1407	2.00	25.86	33.10	0.14	6.79	-139.9	174
1412	2.50	25.74	32.40	0.25	6.88	-141.7	165
1417	2.75	25.69	33.18	0.31	6.82	-171.4	165
1422	- Had to retrieve & switch batteries for pump						
1427		25.71	33.50	0.20	6.82	-188	470
1432	3.2	25.73	29.29	0.22	6.92	-184	700
C SWL = 3.28							
1437	3.5	25.63	33.72	0.20	6.82	-188	206
1442	3.8	25.62	34.76	0.18	6.79	-198	80
1447	4.3	25.61	35.16	0.17	6.80	-205	33
C SWL = 3.28							
1452	4.7	25.59	35.47	0.16	6.79	-208	30
1457	5.2	25.57	35.48	0.16	6.78	-210	30

1500 - Sample Taken.

- Sample clear w/ very light yellow tinge, or very slight organic odor.

- Pump Speed @ 2/3.

- Ending Turb. = 28

was a little hard filling
w/ air due to fizziness
of water.

12
DNH

1/17/09

SWMU60

606W02 (Develop) * Temporary Well Installed

SWL = 5.65 TD = 10.41 1/12.

1645 - Start

1650 - Pumped 0.8 gals. before going
Dry. Very turbid, dark gray color. No odor.

- Pump Speed @ Full.

- Recharge Rate of 1A. in 9 min.

- Will attempt to purge & / or sample
tomorrow.

* M. Cromely sampled this well on 1/18.

1/18/09 SWMUS

- Processed Sediment Sample Terrachars

- Helped M. Cromely sample wells

13
DNH

SOIL BORING LOGS AND WELL CONSTRUCTION RECORDS

TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: Naval Activity Puerto Rico - SWMU 70
 PROJ. NO.: 111626
 COORDINATES: EAST: 941409.67
 ELEVATION: SURFACE: 108.21

BORING NO.: 70SB01
 NORTH: 799163.96
 TOP OF PVC CASING: 110.81

Rig: Geoprobe 66DT					Date	Progress (Ft.)	Weather	Depth to Water (Ft.)
MC Sampler	Casing	Augers	Core Barrel					
Size (ID)	2"	--	3 1/4"	--	1/14/2009	0.0 - 14.0	85° Sunny	4.1
Length	4'	--	5'	--				
Type	Acetate	--	HSA	--				
Hammer Wt.	--	--	--	--				
Fall	--	--	--	--				

Remarks:

SAMPLE TYPE						WELL INFORMATION			
S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Air Rotary C = Core D = Direct Push P = Piston N = No Sample						Type	Diam.	Top Depth (Ft.)	Bottom Depth (Ft.)
						Schedule 40 PVC Riser	2"	+2.5	4.0
						Schedule 40 PVC Screen	2"	4.0	14.0
Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab ID	PID (ppm)	Visual Description	Well Installation Detail		Elevation (Ft. MSL)
1				70SB01-00 (0-1')	<1	Sand, gray/white, fine-to-medium grained, loose, dry			
2	D-1	2.3 58%		70SB01-01 (1-3')	<1	broken coral and shell fragments at 2' becomes damp		105.71	
3									
4								104.21	
4.0						becomes wet at 4.1'			
5					<1				
5	D-2	1.8 45%			<1	Silty Sand, light gray, fine-grained, very soft, well sorted			
6									
7									
8									
8.0									
9	D-3	1.0 25%			10	Peat, brown, weathered wood, wet			
10									
						Silty Sand, light gray, wet			

DRILLING CO.: JFA Geological & Environmental Scientists
 DRILLER: Domingo Gonzalez - Rodriguez

BAKER REP.: Joe Burawa
 BORING NO.: 70SB01 SHEET 1 OF 2

TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: Naval Activity Puerto Rico - SWMU 70

SO NO.: 111626

BORING NO.: 70SB01

70SB01

SAMPLE TYPE						DEFINITIONS		
S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Air Rotary C = Core D = Direct Push P = Piston N = No Sample						SPT = Standard Penetration Test (ASTM D1586) PID = Photo Ionization Detector Measurement MSL = Mean Sea Level ps/bg = point source/background		
Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab ID	PID (ppm) ps/bg	Visual Description	Well Installation Detail	Elevation (Ft. MSL)
11						<i>Continued from Sheet 1</i>	<p>2" PVC Screen Sand 2.5 to 14'</p>	94.21
12	D-3	1.0 25%				Silty Sand, light gray, poor recovery		
13					32			
14	D-4	1.2 30%				Bottom of Well at 14'		
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								
27								
28								
29								
30								

DRILLING CO.: JFA Geological & Environmental Scientists

DRILLER: Domingo Gonzalez - Rodriguez

BAKER REP.: Joe Burawa

BORING NO.: 70SB01

SHEET 2 OF 2

TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: Naval Activity Puerto Rico - SWMU 70
 PROJ. NO.: 111626
 COORDINATES: EAST: 941552.64
 ELEVATION: SURFACE: 104.16

BORING NO.: 70SB02
 NORTH: 798865.53
 TOP OF PVC CASING: 106.50

Rig: Geoprobe 66DT					Date	Progress (Ft.)	Weather	Depth to Water (Ft.)
MC Sampler	Casing	Augers	Core Barrel					
Size (ID)	2"	--	3 1/4"	--	1/14/2009	0.0 - 14.0	85° Sunny	2.5
Length	4'	--	5'	--				
Type	Acetate	--	HSA	--				
Hammer Wt.	--	--	--	--				
Fall	--	--	--	--				

Remarks:

SAMPLE TYPE						WELL INFORMATION			
S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Air Rotary C = Core D = Direct Push P = Piston N = No Sample						Type	Diam.	Top Depth (Ft.)	Bottom Depth (Ft.)
						Schedule 40 PVC Riser	2"	+2.5	4.0
						Schedule 40 PVC Screen	2"	4.0	14.0
Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab ID	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)	
1				70SB02-00 (0-1')	<1	Silt, tan, fine-grained sand, damp, soft, well sorted		103.16	
2	D-1	2.2 55%		70SB02-01 (1-3')	<1	becomes wet at 2.5'		102.16	
3									
4		4.0				Silty Sand, light gray, wet, very soft, well sorted, fine-grained sand		100.16	
5					<1				
6	D-2	2.8 70%			<1				
7						Peat, dark brown, soft, moist to wet			
8		8.0							
9	D-3	3.1 78%			<1	Sandy Clay, green/gray, damp to moist, stones throughout			
10					<1	Saprolitic structure at 10.5'			

DRILLING CO.: JFA Geological & Environmental Scientists
 DRILLER: Domingo Gonzalez - Rodriguez

BAKER REP.: Joe Burawa
 BORING NO.: 70SB02 SHEET 1 OF 2

TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: Naval Activity Puerto Rico - SWMU 70

SO NO.: 111626

BORING NO.: 70SB02

SAMPLE TYPE						DEFINITIONS		
S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Air Rotary C = Core D = Direct Push P = Piston N = No Sample						SPT = Standard Penetration Test (ASTM D1586) PID = Photo Ionization Detector Measurement MSL = Mean Sea Level ps/bg = point source/background		
Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab ID	PID (ppm) ps/bg	Visual Description	Well Installation Detail	Elevation (Ft. MSL)
11						<i>Continued from Sheet 1</i>	<p>2" PVC Screen Sand 2 to 14'</p>	90.16
12	D-3	3.1 78%			<1	End of Boring at 12'		
13	A	NA						
14						Bottom of Well at 14'		
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								
27								
28								
29								
30								

DRILLING CO.: JFA Geological & Environmental Scientists

DRILLER: Domingo Gonzalez - Rodriguez

BAKER REP.: Joe Burawa

BORING NO.: 70SB02

SHEET 2 OF 2

TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: Naval Activity Puerto Rico - SWMU 70

PROJ. NO.: 111626

BORING NO.: 70SB03

COORDINATES: EAST: 941353.87

NORTH: 798847.86

ELEVATION: SURFACE: 104.52

TOP OF PVC CASING: 107.33

Rig: Geoprobe 66DT					Date	Progress (Ft.)	Weather	Depth to Water (Ft.)
MC Sampler	Casing	Augers	Core Barrel					
Size (ID)	2"	--	3 1/4"	--	1/14/2009	0.0 - 14.0	85° Sunny	2.5
Length	4'	--	5'	--				
Type	Acetate	--	HSA	--				
Hammer Wt.	--	--	--	--				
Fall	--	--	--	--				

Remarks:

SAMPLE TYPE						WELL INFORMATION			
S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Air Rotary C = Core D = Direct Push P = Piston N = No Sample						Type	Diam.	Top Depth (Ft.)	Bottom Depth (Ft.)
						Schedule 40 PVC Riser	2"	+2.5	4.0
						Schedule 40 PVC Screen	2"	4.0	14.0
Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab ID	PID (ppm)	Visual Description	Well Installation Detail		Elevation (Ft. MSL)
1				70SB03-00 (0-1')	<1	Silt, light gray, soft, some shells, damp		103.52	
2	D-1	2.5 63%		70SB03-01 (1-3')	<1			102.52	
3						Sandy Silt, light gray, very soft, wet			
4		4.0						100.52	
5					<1	Silty Sand, brownish gray, very soft, wet			
6	D-2	1.0 25%							
7									
8		8.0							
9	D-3	1.2 30%			<1	becomes gray and soft at 8'			
10						Cobble, very hard at 10'			

DRILLING CO.: JFA Geological & Environmental Scientists

BAKER REP.: Joe Burawa

DRILLER: Domingo Gonzalez - Rodriguez

BORING NO.: 70SB03

SHEET 1 OF 2

TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: Naval Activity Puerto Rico - SWMU 70

SO NO.: 111626

BORING NO.: 70SB03

SAMPLE TYPE						DEFINITIONS		
S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Air Rotary C = Core D = Direct Push P = Piston N = No Sample						SPT = Standard Penetration Test (ASTM D1586) PID = Photo Ionization Detector Measurement MSL = Mean Sea Level ps/bg = point source/background		
Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab ID	PID (ppm) ps/bg	Visual Description	Well Installation Detail	Elevation (Ft. MSL)
11						<i>Continued from Sheet 1</i>		90.52
12	D-3	1.2 30%			<1	End of Boring at 12'		
13								
14						Bottom of Well at 14'		
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								
27								
28								
29								
30								

DRILLING CO.: JFA Geological & Environmental Scientists

DRILLER: Domingo Gonzalez - Rodriguez

BAKER REP.: Joe Burawa

BORING NO.: 70SB03

SHEET 2 OF 2

TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: Naval Activity Puerto Rico - SWMU 70

PROJ. NO.: 111626

BORING NO.: 70SB04

COORDINATES: EAST: 940800.94

NORTH: 798820.92

ELEVATION: SURFACE: 104.60

TOP OF PVC CASING: 107.11

Rig: Geoprobe 66DT					Date	Progress (Ft.)	Weather	Depth to Water (Ft.)
MC Sampler	Casing	Augers	Core Barrel					
Size (ID)	2"	--	3 1/4"	--	1/15/2009	0.0 - 14.0	85° Sunny	3.0
Length	4'	--	5'	--				
Type	Acetate	--	HSA	--				
Hammer Wt. Fall	--	--	--	--				

Remarks:

SAMPLE TYPE						WELL INFORMATION			
S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Air Rotary C = Core D = Direct Push P = Piston N = No Sample						Type	Diam.	Top Depth (Ft.)	Bottom Depth (Ft.)
						Schedule 40 PVC Riser	2"	+2.5	4.0
						Schedule 40 PVC Screen	2"	4.0	14.0
Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab ID	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)	
1	D-1	2.3 58%		70SB04-00	<1	Brown, plant matter, soft, damp		103.60	
2				70SB04-00D		Sand, light tan, fine-grained, well sorted coral fragments, damp to moist			
3				70SB04-00MS					
4				70SB04-00MSD (0-1')					
5	D-2	1.6 40%		70SB04-01	<1	Wet at 3'		100.60	
6				70SB04-01D					
7				70SB04-01MS					
8				70SB04-01MSD (1-3')					
9	D-3	2.7 68%			<1	Peat, black, soft, wet			
10						Silty Sand, light gray, soft, wet			

DRILLING CO.: JFA Geological & Environmental Scientists

BAKER REP.: Joe Burawa

DRILLER: Domingo Gonzalez - Rodriguez

BORING NO.: 70SB04

SHEET 1 OF 2

TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: Naval Activity Puerto Rico - SWMU 70

SO NO.: 111626

BORING NO.: 70SB04

SAMPLE TYPE						DEFINITIONS		
S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Air Rotary C = Core D = Direct Push P = Piston N = No Sample						SPT = Standard Penetration Test (ASTM D1586) PID = Photo Ionization Detector Measurement MSL = Mean Sea Level ps/bg = point source/background		
Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab ID	PID (ppm) ps/bg	Visual Description	Well Installation Detail	Elevation (Ft. MSL)
11	D-3				<1	Continued from Sheet 1		90.60
12						12.0		
13	A	NA				End of Boring at 12'		90.60
14						14.0		
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								
27								
28								
29								
30								

DRILLING CO.: JFA Geological & Environmental Scientists
 DRILLER: Domingo Gonzalez - Rodriguez

BAKER REP.: Joe Burawa
 BORING NO.: 70SB04 SHEET 2 OF 2

TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: Naval Activity Puerto Rico - SWMU 70
 PROJ. NO.: 111626 BORING NO.: 70SB05
 COORDINATES: EAST: 941297.40 NORTH: 798458.80
 ELEVATION: SURFACE: _____ TOP OF PVC CASING: _____

Rig: Geoprobe 66DT					Date	Progress (Ft.)	Weather	Depth to Water (Ft.)
MC Sampler	Casing	Augers	Core Barrel					
Size (ID)	--	--	--	--	1/20/2009	0.0 - 5.0	82° Cloudy	3.0
Length	--	--	--	--				
Type	--	--	--	--				
Hammer Wt.	--	--	--	--				
Fall	--	--	--	--				

Remarks: Hand Auger

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			
	Schedule 40 PVC Screen	2"	1.0	5.0

Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab ID	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)
1	A	NA		70SB05-00 (0-1')		Sandy Silt, light gray, damp to moist, soft	2" PVC Screen	
2				70SB05-01 (1-3')		Sand, brownish gray, shell fragments, medium-grained sand		
3				wet at 3'				
4								
5								
6						End of Boring at 5.0'		
7								
8								
9								
10								

DRILLING CO.: NA
 DRILLER: NA

BAKER REP.: Joe Burawa
 BORING NO.: 70SB05 SHEET 1 OF 1

Baker

Michael Baker Jr., Inc.

TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: Naval Activity Puerto Rico - SWMU 70

PROJ. NO.: 111626

BORING NO.: 70SB06

COORDINATES: EAST: 940576.50

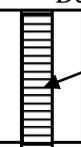
NORTH: 798208.40

ELEVATION: SURFACE:

TOP OF PVC CASING:

Rig: Geoprobe 66DT					Date	Progress (Ft.)	Weather	Depth to Water (Ft.)
MC Sampler	Casing	Augers	Core Barrel					
Size (ID)	--	--	--	--	1/15/2009	0.0 - 2.0	82° Cloudy	0.5
Length	--	--	--	--				
Type	--	--	--	--				
Hammer Wt.	--	--	--	--				
Fall	--	--	--	--				

Remarks: Hand Auger

<u>SAMPLE TYPE</u> S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Air Rotary C = Core D = Direct Push P = Piston N = No Sample					<u>WELL INFORMATION</u>			
					Type	Diam.	Top Depth (Ft.)	Bottom Depth (Ft.)
					Schedule 40 PVC Riser			
					Schedule 40 PVC Screen	2"	+1	2.0
Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab ID	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)
1	A	NA		70SB06-00 (0-1')		Sand and Shells, brownish gray, loose, wet at 0.5'		
2						End of Boring at 2'		
3								
4								
5								
6								
7								
8								
9								
10								

DRILLING CO.: NA

BAKER REP.: Joe Burawa

DRILLER: NA

BORING NO.: 70SB06

SHEET 1 OF 1

Baker

Michael Baker Jr., Inc.

TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: Naval Activity Puerto Rico - SWMU 70

PROJ. NO.: 111626

BORING NO.: 70SB07

COORDINATES: EAST: 940809.10

NORTH: 797786.00

ELEVATION: SURFACE: _____

TOP OF PVC CASING: _____

Rig: Geoprobe 66DT					Date	Progress (Ft.)	Weather	Depth to Water (Ft.)
MC Sampler	Casing	Augers	Core Barrel					
Size (ID)	--	--	--	--	1/15/2009	0.0 - 3.5	82° Cloudy	0.7
Length	--	--	--	--				
Type	--	--	--	--				
Hammer Wt.	--	--	--	--				
Fall	--	--	--	--				

Remarks: Hand Auger

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			
	Schedule 40 PVC Screen	2"	+1	3.5

Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab ID	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)
1	A	NA		70SB07-00 (0-1')		Sandy Silt, grayish brown, shells, loose, wet at 0.7'		
2								
3								
4								
5						End of Boring at 3.5'		
6								
7								
8								
9								
10								

DRILLING CO.: NA

BAKER REP.: Joe Burawa

DRILLER: NA

BORING NO.: 70SB07

SHEET 1 OF 1

Baker

Michael Baker Jr., Inc.

TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: Naval Activity Puerto Rico - SWMU 70

PROJ. NO.: 111626

BORING NO.: 70SB08

COORDINATES: EAST: 941289.90

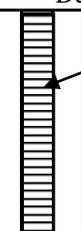
NORTH: 797225.50

ELEVATION: SURFACE:

TOP OF PVC CASING:

Rig: Geoprobe 66DT					Date	Progress (Ft.)	Weather	Depth to Water (Ft.)
MC Sampler	Casing	Augers	Core Barrel					
Size (ID)	--	--	--	--	1/15/2009	0.0 - 3.5	82° Cloudy	2.0
Length	--	--	--	--				
Type	--	--	--	--				
Hammer Wt.	--	--	--	--				
Fall	--	--	--	--				

Remarks: Hand Auger

<u>SAMPLE TYPE</u>					<u>WELL INFORMATION</u>			
S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Air Rotary C = Core D = Direct Push P = Piston N = No Sample					Type	Diam.	Top Depth (Ft.)	Bottom Depth (Ft.)
					Schedule 40 PVC Riser			
					Schedule 40 PVC Screen	2"	+1	3.5
Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab ID	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)
1	A	NA		70SB08-00 (0-1')		Sand and Shells, brownish gray, loose, some coral wet at 2'		
2								
3								
4						End of Boring at 3.5'		
5								
6								
7								
8								
9								
10								

DRILLING CO.: NA

BAKER REP.: Joe Burawa

DRILLER: NA

BORING NO.: 70SB08

SHEET 1 OF 1

CHAIN-OF-CUSTODY FORMS

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

TestAmerica

Fed Ex Airbill:
8480 2694 7569

THE LEADER IN ENVIRONMENTAL TESTING

TestAmerica Savannah
5102 LaRoche Avenue
Savannah, GA 31404

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

70-001

Alternate Laboratory Name/Location

Phone:
Fax:

PROJECT REFERENCE <i>MAPR Investigations</i>		PROJECT NO. <i>111625</i>	PROJECT LOCATION (STATE)	MATRIX TYPE	REQUIRED ANALYSIS							PAGE	OF
TAL (LAB) PROJECT MANAGER <i>Kathy E. Smith</i>		P.O. NUMBER	CONTRACT NO.	COMPOSITE (C) OR GRAB (G) INDICATE AQUEOUS (WATER) SOLID OR SEMISOLID AIR NONAQUEOUS LIQUID (OIL, SOLVENT, ...)	APP. EX VOC	APP. EX SVOC	APP. EX METALS	TPH GRO	TPH DRO	APP. PEST	APP. PCB	STANDARD REPORT DELIVERY <input checked="" type="checkbox"/>	
CLIENT (SITE) PM <i>Mark Kimes</i>		CLIENT PHONE <i>412-337-7465</i>	CLIENT FAX									DATE DUE <i>28 DAY TAT</i>	
CLIENT NAME <i>Michael Baker Jr., Inc.</i>		CLIENT E-MAIL <i>MKimes@mbakercorp.com</i>										EXPEDITED REPORT DELIVERY (SURCHARGE) <input type="checkbox"/>	
CLIENT ADDRESS <i>100 Airside Drive Moon Twp, PA. 15108</i>		COMPANY CONTRACTING THIS WORK (if applicable)										DATE DUE _____	
					PRESERVATIVE							NUMBER OF COOLERS SUBMITTED PER SHIPMENT:	

SAMPLE		SAMPLE IDENTIFICATION	COMPOSITE (C) OR GRAB (G) INDICATE	AQUEOUS (WATER)	SOLID OR SEMISOLID	AIR	NONAQUEOUS LIQUID (OIL, SOLVENT, ...)	NUMBER OF CONTAINERS SUBMITTED							REMARKS
DATE	TIME							1	2	3	4	5	6	7	
<i>1/14/09</i>	<i>0915</i>	<i>70 SB 01 - 00</i>	<i>G</i>	<i>+</i>			<i>X</i>	<i>1</i>	<i>1</i>	<i>X</i>	<i>✓</i>	<i>✓</i>	<i>✓</i>	<i>VOC + GRO added</i>	
<i>1/14/09</i>	<i>0940</i>	<i>70 SB 01 - 01</i>	<i>G</i>	<i>+</i>			<i>X</i>	<i>1</i>	<i>1</i>	<i>X</i>	<i>✓</i>	<i>✓</i>	<i>✓</i>	<i>to all samples</i>	
<i>1/14/09</i>	<i>1115</i>	<i>70 SB 02 - 00</i>	<i>G</i>	<i>+</i>			<i>X</i>	<i>1</i>	<i>1</i>	<i>X</i>	<i>✓</i>	<i>✓</i>	<i>✓</i>	<i>per M. Baker</i>	
<i>1/14/09</i>	<i>1130</i>	<i>70 SB 02 - 01</i>	<i>G</i>	<i>+</i>			<i>X</i>	<i>1</i>	<i>1</i>	<i>X</i>	<i>✓</i>	<i>✓</i>	<i>✓</i>	<i>KS 1/19/09</i>	
		<i>Jan 09 - TB02</i>					<i>X</i>			<i>X</i>				<i>TB added to cel</i>	
														<i>per M. Baker.</i>	
														<i>KS 1/19/09</i>	

RELINQUISHED BY: (SIGNATURE) <i>[Signature]</i>	DATE <i>1/14/09</i>	TIME <i>1500</i>	RELINQUISHED BY: (SIGNATURE) <i>[Signature]</i>	DATE <i>1/14/09</i>	TIME <i>1500</i>	RELINQUISHED BY: (SIGNATURE)	DATE	TIME
RECEIVED BY: (SIGNATURE) <i>[Signature]</i>	DATE <i>1/12/09</i>	TIME <i>0700</i>	RECEIVED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	DATE	TIME

LABORATORY USE ONLY								
RECEIVED FOR LABORATORY BY: (SIGNATURE) <i>[Signature]</i>	DATE <i>011509</i>	TIME	CUSTODY INTACT YES <input type="radio"/> NO <input type="radio"/>	CUSTODY SEAL NO.	SAVANNAH LOG NO. <i>68043925</i>	LABORATORY REMARKS <i>temp 1.8/2.8</i>		

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

TestAmerica

FED EX Airbill No :
8480 2694 7570

THE LEADER IN ENVIRONMENTAL TESTING

TestAmerica Savannah
5102 LaRoche Avenue
Savannah, GA 31404

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

70-002

Alternate Laboratory Name/Location

Phone:
Fax:

PROJECT REFERENCE <i>NAPR Investigations</i>	PROJECT NO. <i>111626</i>	PROJECT LOCATION (STATE)	MATRIX TYPE	REQUIRED ANALYSIS						PAGE <i>1</i>	OF <i>2</i>	
TAL (LAB) PROJECT MANAGER <i>Kathy E. Smith</i>	P.O. NUMBER	CONTRACT NO.	COMPOSITE (C) OR GRAB (G) INDICATE AQUEOUS (WATER) SOLID OR SEMISOLID AIR NONAQUEOUS LIQUID (OIL, SOLVENT, ...)	APP IX VOC	APP IX SUBC	APP IX METALS	TPH DRO	TPH G-RO	APP IX. PEST	APP IX. PCB	STANDARD REPORT DELIVERY <input checked="" type="checkbox"/>	
CLIENT (SITE) PM <i>Mark Kimes</i>	CLIENT PHONE <i>412.337.7465</i>	CLIENT FAX		PREPRESERVATIVE								DATE DUE <i>28 DAY TAT</i>
CLIENT NAME <i>Michael Baker Tr, Inc</i>	CLIENT E-MAIL <i>M.Kimes@mbakercorp.com</i>											EXPEDITED REPORT DELIVERY (SURCHARGE) <input type="checkbox"/>
CLIENT ADDRESS <i>100 Airside Dr. Moon Twp, PA. 15708</i>	COMPANY CONTRACTING THIS WORK (if applicable)											DATE DUE _____

SAMPLE		SAMPLE IDENTIFICATION	COMPOSITE (C) OR GRAB (G) INDICATE	AQUEOUS (WATER)	SOLID OR SEMISOLID	AIR	NONAQUEOUS LIQUID (OIL, SOLVENT, ...)	NUMBER OF CONTAINERS SUBMITTED						REMARKS
DATE	TIME													
<i>1/14/09</i>	<i>1420</i>	<i>70 SB 03 - 00</i>	<i>G</i>	<i>X</i>			<i>3</i>	<i>1</i>	<i>1</i>	<i>✓</i>	<i>3</i>	<i>✓</i>		
<i>1/14/09</i>	<i>1445</i>	<i>70 SB 03 - 01</i>	<i>G</i>	<i>X</i>			<i>3</i>	<i>1</i>	<i>1</i>	<i>✓</i>	<i>3</i>	<i>✓</i>		
<i>1/15/09</i>	<i>0845</i>	<i>70 SB 04 - 00</i>	<i>G</i>	<i>X</i>			<i>3</i>	<i>1</i>	<i>1</i>	<i>✓</i>	<i>3</i>	<i>✓</i>		
	<i>0845</i>	<i>70 SB 04 - 00 D</i>	<i>G</i>	<i>X</i>			<i>3</i>	<i>1</i>	<i>1</i>	<i>✓</i>	<i>3</i>	<i>✓</i>		
	<i>0845</i>	<i>70 SB 04 - 00 MS</i>	<i>G</i>	<i>X</i>			<i>3</i>				<i>3</i>			
	<i>0845</i>	<i>70 SB 04 - 00 MS/MSD</i>	<i>G</i>	<i>X</i>				<i>1</i>	<i>1</i>	<i>✓</i>		<i>✓</i>		
	<i>0915</i>	<i>70 SB 04 - 01</i>	<i>G</i>	<i>X</i>			<i>3</i>	<i>1</i>	<i>1</i>	<i>✓</i>	<i>3</i>	<i>✓</i>		
	<i>0915</i>	<i>70 SB 04 - 01 D</i>	<i>G</i>	<i>X</i>			<i>3</i>	<i>1</i>	<i>1</i>	<i>✓</i>	<i>3</i>	<i>✓</i>		
	<i>0915</i>	<i>70 SB 04 - 01 MS</i>	<i>G</i>	<i>X</i>			<i>3</i>				<i>3</i>			
	<i>0915</i>	<i>70 SB 04 - 01 MSD</i>	<i>G</i>	<i>X</i>			<i>3</i>				<i>3</i>			
<i>1/15/09</i>	<i>0915</i>	<i>70 SB 04 - 01 MS/MSD</i>	<i>G</i>	<i>X</i>				<i>1</i>	<i>1</i>	<i>✓</i>		<i>✓</i>		
<i>1/14/09</i>		<i>JAN 09 - TB 03</i>	<i>G</i>	<i>X</i>			<i>3</i>				<i>3</i>		<i>Trip Blank</i>	

RELINQUISHED BY: (SIGNATURE) <i>[Signature]</i>	DATE <i>1/15/09</i>	TIME <i>1500</i>	RELINQUISHED BY: (SIGNATURE) <i>[Signature]</i>	DATE <i>1/15/09</i>	TIME <i>1500</i>	RELINQUISHED BY: (SIGNATURE)	DATE	TIME
RECEIVED BY: (SIGNATURE) <i>[Signature]</i>	DATE <i>1/12/09</i>	TIME <i>0700</i>	RECEIVED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	DATE	TIME

RECEIVED FOR LABORATORY BY: (SIGNATURE) <i>[Signature]</i>	DATE <i>01/16/09</i>	TIME <i>0857</i>	CUSTODY INTACT YES <input type="checkbox"/> NO <input type="checkbox"/>	CUSTODY SEAL NO.	SAVANNAH LOG NO. <i>68043961</i>	LABORATORY REMARKS <i>temp 1.2/2.0/0.6/0.2</i>
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ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

TestAmerica

FED EX Airbill No. :

8480 2694 7580

THE LEADER IN ENVIRONMENTAL TESTING

TestAmerica Savannah
5102 LaRoche Avenue
Savannah, GA 31404

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

70-003

Alternate Laboratory Name/Location

Phone:
Fax:

PROJECT REFERENCE <i>NAPR Investigations</i>	PROJECT NO. <i>11628</i>	PROJECT LOCATION (STATE)	MATRIX TYPE	REQUIRED ANALYSIS								PAGE <i>1</i>	OF <i>1</i>	
TAL (LAB) PROJECT MANAGER <i>Kathy E. Smith</i>	P.O. NUMBER	CONTRACT NO.	COMPOSITE (C) OR GRAB (G) INDICATE AQUEOUS (WATER) SOLID OR SEMISOLID AIR NONAQUEOUS LIQUID (OIL, SOLVENT, ...)	<i>APP. IX. VOC</i>	<i>APP. IX. SUOC</i>	<i>APP. IX. METALS</i>	<i>TPH DRO</i>	<i>TPH GRO</i>	<i>APP. IX. PEST</i>	<i>APP. IX. PCB</i>	<i>TOC</i>	<i>LL PAH</i>	STANDARD REPORT DELIVERY <input checked="" type="radio"/>	
CLIENT (SITE) PM <i>Mark Kimes</i>	CLIENT PHONE <i>412.337.7465</i>	CLIENT FAX		<i>PREPRESERVATIVE</i>										DATE DUE <i>08 PM TAT</i>
CLIENT NAME <i>Michael Baker Jr., Inc</i>	CLIENT E-MAIL <i>mkimes@mbakercorp.com</i>													EXPEDITED REPORT DELIVERY (SURCHARGE) <input type="radio"/>
CLIENT ADDRESS <i>100 Airside Drive Moon Twp, PA. 15108</i>	COMPANY CONTRACTING THIS WORK (if applicable)													DATE DUE _____

SAMPLE		SAMPLE IDENTIFICATION	COMPOSITE (C) OR GRAB (G) INDICATE	AQUEOUS (WATER)	SOLID OR SEMISOLID	AIR	NONAQUEOUS LIQUID (OIL, SOLVENT, ...)	NUMBER OF CONTAINERS SUBMITTED								REMARKS
DATE	TIME							3	1	1	✓	3	✓	✓	✓	
<i>1/15/09</i>	<i>1520</i>	<i>70 SD 06</i>	<i>G</i>	<i>X</i>				<i>3</i>	<i>1</i>	<i>1</i>	<i>✓</i>	<i>3</i>	<i>✓</i>	<i>include Toc</i>		
<i>1/15/09</i>	<i>1300</i>	<i>70 SD 07</i>	<i>G</i>	<i>X</i>				<i>3</i>	<i>1</i>	<i>1</i>	<i>✓</i>	<i>3</i>	<i>✓</i>	<i>include Toc</i>		
<i>1/15/09</i>	<i>1230</i>	<i>70 SD 08</i>	<i>G</i>	<i>X</i>				<i>3</i>	<i>1</i>	<i>1</i>	<i>✓</i>	<i>3</i>	<i>✓</i>	<i>include Toc</i>		
<i>1/15/09</i>	<i>1135</i>	<i>JAN09 - ER04</i>	<i>G</i>	<i>X</i>				<i>3</i>	<i>2</i>	<i>1</i>	<i>2</i>	<i>3</i>	<i>2</i>			
<i>1/15/09</i>		<i>JAN09 - TB04</i>	<i>G</i>	<i>X</i>				<i>2</i>			<i>2</i>	<i>2</i>				

RELINQUISHED BY: (SIGNATURE) <i>[Signature]</i>	DATE <i>1/16/09</i>	TIME <i>1500</i>	RELINQUISHED BY: (SIGNATURE) <i>[Signature]</i>	DATE <i>1/16/09</i>	TIME <i>1500</i>	RELINQUISHED BY: (SIGNATURE)	DATE	TIME
RECEIVED BY: (SIGNATURE) <i>[Signature]</i>	DATE <i>1/17/09</i>	TIME <i>1500</i>	RECEIVED BY: (SIGNATURE) <i>[Signature]</i>	DATE	TIME	RECEIVED BY: (SIGNATURE)	DATE	TIME

LABORATORY USE ONLY								
RECEIVED FOR LABORATORY BY: (SIGNATURE) <i>[Signature]</i>	DATE <i>01/20/09</i>	TIME <i>10^{am}</i>	CUSTODY INTACT YES <input type="radio"/> NO <input type="radio"/>	CUSTODY SEAL NO.	SAVANNAH LOG NO. <i>68043991</i>	LABORATORY REMARKS <i>0.1/0.4/1.1/1.6/2.0/0.1</i>		

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

TestAmerica

Fed Ex Airbill No. :

8480 2694 7444

THE LEADER IN ENVIRONMENTAL TESTING

TestAmerica Savannah
5102 LaRoche Avenue
Savannah, GA 31404

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

70-004

○ Alternate Laboratory Name/Location

Phone:
Fax:

PROJECT REFERENCE <i>NAPR Investigations</i>	PROJECT NO. <i>11626</i>	PROJECT LOCATION (STATE)	MATRIX TYPE	REQUIRED ANALYSIS							PAGE <i>1</i>	OF <i></i>	
TAL (LAB) PROJECT MANAGER <i>Kathy E. Smith</i>	P.O. NUMBER	CONTRACT NO.	COMPOSITE (C) OR GRAB (G) INDICATE AQUEOUS (WATER) SOLID OR SEMISOLID AIR NONAQUEOUS LIQUID (OIL, SOLVENT, ...)	<i>APP. EX UOC</i>	<i>APP. EX UOC</i>	<i>APP. EX UOC</i>	<i>TPH PRO</i>	<i>TPH G-RO</i>	<i>APP. EX METALS</i>	<i>APP. EX METALS (Dissolved)</i>	<i>APP. EX PEST</i>	<i>APP. EX PCB</i>	STANDARD REPORT DELIVERY <input checked="" type="radio"/>
CLIENT (SITE) PM <i>Mark Kimes</i>	CLIENT PHONE <i>412.337.7465</i>	CLIENT FAX		<i>PREPRESERVATIVE</i>									DATE DUE <i>28 MAY 2009</i>
CLIENT NAME <i>Michael Baker Jr., Inc</i>	CLIENT E-MAIL <i>mkimes@mbakercorp.com</i>												EXPEDITED REPORT DELIVERY (SURCHARGE) <input type="radio"/>
CLIENT ADDRESS <i>100 Airside Pl. Moon Twp., PA. 15108</i>	COMPANY CONTRACTING THIS WORK (if applicable)												DATE DUE _____

SAMPLE		SAMPLE IDENTIFICATION	COMPOSITE (C) OR GRAB (G) INDICATE	AQUEOUS (WATER)	SOLID OR SEMISOLID	AIR	NONAQUEOUS LIQUID (OIL, SOLVENT, ...)	NUMBER OF CONTAINERS SUBMITTED							REMARKS
DATE	TIME														
<i>1/17/09</i>	<i>1500</i>	<i>70 G W 06</i>	<i>G</i>	<i>X</i>			<i>3</i>	<i>2</i>	<i>2</i>	<i>3</i>	<i>1</i>	<i>1</i>	<i>2</i>	<i>Temps:</i>	
<i>1/17/09</i>	<i>0945</i>	<i>70 G W 07</i>	<i>G</i>	<i>X</i>			<i>3</i>	<i>2</i>	<i>2</i>	<i>3</i>	<i>1</i>	<i>1</i>	<i>2</i>		
<i>1/17/09</i>	<i>1145</i>	<i>70 G W 08</i>	<i>G</i>	<i>X</i>			<i>3</i>	<i>2</i>	<i>2</i>	<i>3</i>	<i>1</i>	<i>1</i>	<i>2</i>	<i>1.4/1.1/1.6/1.0</i>	
	<i>1400</i>	<i>70 SD 01</i>	<i>G</i>	<i>X</i>			<i>3</i>	<i>1</i>	<i>X</i>	<i>3</i>	<i>1</i>		<i>X</i>		<i>0.1/1.6/1.1/1.0</i>
	<i>1050</i>	<i>70 SD 02</i>	<i>G</i>	<i>X</i>			<i>3</i>	<i>1</i>	<i>X</i>	<i>3</i>	<i>1</i>		<i>X</i>	<i>0.4/0.1/1.0/1.0</i>	
	<i>1025</i>	<i>70 SD 03</i>	<i>G</i>	<i>X</i>			<i>3</i>	<i>1</i>	<i>X</i>	<i>3</i>	<i>1</i>		<i>X</i>		<i>1.4/1.1/1.6/1.0</i>
		<i>70 SD 03 D</i>	<i>G</i>	<i>X</i>			<i>3</i>	<i>1</i>	<i>X</i>	<i>3</i>	<i>1</i>		<i>X</i>	<i>0.2/3.0/1.0</i>	
		<i>70 SD 03 MS</i>	<i>G</i>	<i>X</i>			<i>3</i>			<i>3</i>					
		<i>70 SD 03 MSD</i>	<i>G</i>	<i>X</i>			<i>3</i>			<i>3</i>					
<i>1/17/09</i>	<i>1025</i>	<i>70 SD 03 MS / MSD</i>	<i>G</i>	<i>X</i>			<i>1</i>		<i>X</i>		<i>1</i>		<i>X</i>		

all cancelled per Baker 1-23-09 KS

RELINQUISHED BY: (SIGNATURE) <i>[Signature]</i>	DATE <i>1/19/09</i>	TIME <i>1500</i>	RELINQUISHED BY: (SIGNATURE) <i>[Signature]</i>	DATE <i>1/19/09</i>	TIME <i>1500</i>	RELINQUISHED BY: (SIGNATURE)	DATE	TIME
RECEIVED BY: (SIGNATURE) <i>[Signature]</i>	DATE <i>1/12/09</i>	TIME <i>0700</i>	RECEIVED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	DATE	TIME

LABORATORY USE ONLY							
RECEIVED FOR LABORATORY BY: (SIGNATURE) <i>[Signature]</i>	DATE <i>012009</i>	TIME <i>0857</i>	CUSTODY INTACT YES <input type="radio"/> NO <input type="radio"/>	CUSTODY SEAL NO.	SAVANNAH LOG NO. <i>68044027</i>	LABORATORY REMARKS	

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

TestAmerica

FED EX Airbill No. :
8617 8652 6859

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70-006

Alternate Laboratory Name/Location

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Fax:

THE LEADER IN ENVIRONMENTAL TESTING

PROJECT REFERENCE <i>MAPR Investigation</i>	PROJECT NO. <i>111626</i>	PROJECT LOCATION (STATE)	MATRIX TYPE	REQUIRED ANALYSIS										PAGE <i>1</i>	OF <i>1</i>
TAL (LAB) PROJECT MANAGER <i>Kathy E. Smith</i>	P.O. NUMBER	CONTRACT NO.	COMPOSITE (C) OR GRAB (G) INDICATE AQUEOUS (WATER) SOLID OR SEMISOLID AIR NONAQUEOUS LIQUID (OIL, SOLVENT, ...)	PRESERVATIVE	MR. UOC	MR. SUOC	MR. VPAA	MR. DRO	MR. GRO	MR. METALS	MR. PEST	MR. PCB	STANDARD REPORT DELIVERY		
CLIENT (SITE) PM <i>Mark Kimes</i>	CLIENT PHONE <i>412.337.7465</i>	CLIENT FAX			MR. TPA	MR. TPA	MR. METALS	MR. PEST	MR. PCB	DATE DUE <i>28 DATA</i>					
CLIENT NAME <i>BAKER</i>	CLIENT E-MAIL <i>mkimes@mbakercorp.com</i>									EXPEDITED REPORT DELIVERY (SURCHARGE)					
CLIENT ADDRESS <i>100 Arside Dr., Moon Twp, PA. 15109</i>	COMPANY CONTRACTING THIS WORK (if applicable)									DATE DUE					
NUMBER OF COOLERS SUBMITTED PER SHIPMENT:															

SAMPLE		SAMPLE IDENTIFICATION	COMPOSITE (C) OR GRAB (G) INDICATE	AQUEOUS (WATER)	SOLID OR SEMISOLID	AIR	NONAQUEOUS LIQUID (OIL, SOLVENT, ...)	NUMBER OF CONTAINERS SUBMITTED										REMARKS
DATE	TIME							1	2	3	4	5	6	7	8	9	10	
<i>1/22/09</i>	<i>1630</i>	<i>70 SD 03</i>	<i>G</i>	<i>X</i>				<i>3</i>	<i>1</i>		<i>X</i>	<i>3</i>	<i>1</i>		<i>X</i>			
		<i>70 SD 03 D</i>	<i> </i>	<i> </i>				<i>3</i>	<i>1</i>		<i>X</i>	<i>3</i>	<i>1</i>		<i>X</i>			
		<i>70 SP 03 MS</i>	<i> </i>	<i> </i>				<i>3</i>				<i>3</i>						
		<i>70 SD 03 MSD</i>	<i> </i>	<i> </i>				<i>3</i>				<i>3</i>						
<i>1/22/09</i>	<i>1630</i>	<i>70 SD 03 MS/MSD</i>	<i>G</i>	<i>X</i>				<i>1</i>		<i>X</i>		<i>1</i>			<i>X</i>			
<i>1/22/09</i>	<i>0900</i>	<i>JAN 09 ER 10</i>	<i>G</i>	<i>X</i>				<i>3</i>	<i>2</i>	<i>2</i>		<i>3</i>				<i>EQUIPMENT RINSATE GW Tubing (9)</i>		
<i>1/22/09</i>		<i>JAN 09 TB 11</i>						<i>2</i>				<i>2</i>						

RELINQUISHED BY: (SIGNATURE) <i>[Signature]</i>	DATE <i>1/22/09</i>	TIME <i>0700</i>	RELINQUISHED BY: (SIGNATURE) <i>[Signature]</i>	DATE <i>1/23/09</i>	TIME <i>1500</i>	RELINQUISHED BY: (SIGNATURE)	DATE	TIME
RECEIVED BY: (SIGNATURE) <i>[Signature]</i>	DATE <i>1/22/09</i>	TIME <i>0700</i>	RECEIVED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	DATE	TIME

RECEIVED FOR LABORATORY BY (SIGNATURE) <i>[Signature]</i>	DATE <i>01/24/09</i>	TIME <i>1020</i>	CUSTODY INTACT YES <input type="radio"/> NO <input type="radio"/>	CUSTODY SEAL NO.	SAVANNAH LOG NO. <i>851028</i>	LABORATORY REMARKS <i>0.6/0.8 TEMP</i>
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ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

TestAmerica

FED EX AIRBILL NO.:
8480 2694 7570

THE LEADER IN ENVIRONMENTAL TESTING

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70-002

○ Alternate Laboratory Name/Location

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PROJECT REFERENCE <i>NAPR Investigations</i>	PROJECT NO. <i>11626</i>	PROJECT LOCATION (STATE)	MATRIX TYPE	REQUIRED ANALYSIS								PAGE <i>2</i>	OF <i>2</i>
TAL (LAB) PROJECT MANAGER <i>Kathy E. Smith</i>	P.O. NUMBER	CONTRACT NO.	COMPOSITE (C) OR GRAB (G) INDICATE AQUEOUS (WATER) SOLID OR SEMISOLID AIR NONAQUEOUS LIQUID (OIL, SOLVENT, ...)	APP IX VOC	APP IX SVOC	APP IX METALS	TPH DRO	TPH GRO	APP IX PEST	APP IX PCB	STANDARD REPORT DELIVERY DATE DUE <i>28 JAN 2009</i>		
CLIENT (SITE) PM <i>Mark Kimes</i>	CLIENT PHONE <i>412-337-7465</i>	CLIENT FAX		TPH DRO	TPH GRO	APP IX PEST	APP IX PCB	EXPEDITED REPORT DELIVERY (SURCHARGE) DATE DUE _____					
CLIENT NAME <i>Michael Baker Jr. Inc</i>	CLIENT E-MAIL <i>Mkimes@mbakercorp.com</i>			PRESERVATIVE								NUMBER OF COOLERS SUBMITTED PER SHIPMENT:	
CLIENT ADDRESS <i>100 Airside Drive Moon TWP, PA. 15108</i>	COMPANY CONTRACTING THIS WORK (if applicable)											REMARKS	

SAMPLE		SAMPLE IDENTIFICATION	COMPOSITE (C) OR GRAB (G) INDICATE	AQUEOUS (WATER)	SOLID OR SEMISOLID	AIR	NONAQUEOUS LIQUID (OIL, SOLVENT, ...)	NUMBER OF CONTAINERS SUBMITTED								REMARKS
DATE	TIME							1	2	3	4	5	6	7	8	
<i>1/14/09</i>	<i>1700</i>	<i>JAN 09 - FRO3</i>	<i>G X</i>					<i>3</i>	<i>2</i>	<i>1</i>	<i>2</i>	<i>3</i>	<i>2</i>	<i>2</i>		<i>Rinsate</i>
<i>1/14/09</i>	<i>1625</i>	<i>JAN 09 - FB01</i>	<i>G X</i>					<i>3</i>	<i>2</i>	<i>1</i>	<i>2</i>	<i>3</i>	<i>2</i>	<i>2</i>		<i>Field Blank</i>
<i>1/15/09</i>	<i>0845</i>	<i>70SB04 - 00 MSD</i>	<i>G X</i>					<i>3</i>				<i>3</i>				

RELINQUISHED BY: (SIGNATURE) <i>[Signature]</i>	DATE <i>1/15/09</i>	TIME <i>1500</i>	RELINQUISHED BY: (SIGNATURE) <i>[Signature]</i>	DATE <i>1/15/09</i>	TIME <i>1500</i>	RELINQUISHED BY: (SIGNATURE)	DATE	TIME
RECEIVED BY: (SIGNATURE) <i>[Signature]</i>	DATE <i>1/12/09</i>	TIME <i>0700</i>	RECEIVED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	DATE	TIME

LABORATORY USE ONLY							
RECEIVED FOR LABORATORY BY (SIGNATURE) <i>[Signature]</i>	DATE <i>01/16/09</i>	TIME <i>0857</i>	CUSTODY INTACT YES <input type="radio"/> NO <input type="radio"/>	CUSTODY SEAL NO.	SAVANNAH LOG NO. <i>08043961</i>	LABORATORY REMARKS <i>Temp 1.2/2.0/0.6/0.2</i>	

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

TestAmerica

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9-005

Alternate Laboratory Name/Location

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THE LEADER IN ENVIRONMENTAL TESTING

PROJECT REFERENCE <i>NARR Investigations</i>	PROJECT NO. <i>11625</i>	PROJECT LOCATION (STATE)	MATRIX TYPE	REQUIRED ANALYSIS								PAGE 1	OF 1		
TAL (LAB) PROJECT MANAGER <i>Kathy E. Smith</i>	P.O. NUMBER	CONTRACT NO.	COMPOSITE (C) OR GRAB (G) INDICATE AQUEOUS (WATER) SOLID OR SEMISOLID AIR NONAQUEOUS LIQUID (OIL, SOLVENT, ...)	DOC	SUC	PAH	DRO	GRO	METALS	METALS	TEMP Volatiles	Benzene	RCI	STANDARD REPORT DELIVERY	
CLIENT (SITE) PM <i>Mark Kimes</i>	CLIENT PHONE <i>412.337.7465</i>	CLIENT FAX		REC	REC	REC	TRH	TRH	TRH	TRH	TRH	TRH	TRH	TRH	DATE DUE <i>28 DAY TAT</i>
CLIENT NAME <i>BAKER</i>	CLIENT E-MAIL <i>mkimes@mbakercorp.com</i>														EXPEDITED REPORT DELIVERY (SURCHARGE)
CLIENT ADDRESS <i>100 Airside Drive, Moon Twp, PA. 15108</i>															DATE DUE
COMPANY CONTRACTING THIS WORK (if applicable)				PRESERVATIVE										NUMBER OF COOLERS SUBMITTED PER SHIPMENT:	

SAMPLE		SAMPLE IDENTIFICATION	COMPOSITE (C) OR GRAB (G) INDICATE	AQUEOUS (WATER)	SOLID OR SEMISOLID	AIR	NONAQUEOUS LIQUID (OIL, SOLVENT, ...)	NUMBER OF CONTAINERS SUBMITTED											REMARKS
DATE	TIME							1	2	3	4	5	6	7	8	9	10	11	
<i>1/21/09</i>	<i>1030</i>	<i>JAN 09 ER 09</i>	<i>G X</i>					<i>3</i>	<i>2</i>	<i>2</i>	<i>3</i>	<i>1</i>						<i>Equipment RIMSATE Bucket Auger</i>	
<i>1/21/09</i>		<i>JAN 09 TB 10</i>	<i>G X</i>					<i>2</i>			<i>2</i>								
<i>1/21/09</i>	<i>1400</i>	<i>9SB49-00</i>	<i>G X</i>					<i>3</i>	<i>1</i>	<i>X</i>	<i>3</i>	<i>1</i>							
<i>1/21/09</i>	<i>1210</i>	<i>9GW47</i>	<i>G X</i>					<i>3</i>	<i>2</i>	<i>2</i>	<i>3</i>								
<i>1/21/09</i>	<i>1405</i>	<i>9GW53</i>	<i>G X</i>					<i>3</i>	<i>2</i>	<i>2</i>	<i>3</i>								
<i>1/21/09</i>	<i>1455</i>	<i>9GW39</i>	<i>G X</i>					<i>3</i>	<i>1</i>	<i>X</i>	<i>3</i>								
<i>1/22/09</i>	<i>0930</i>	<i>JAN 09 - IDW 01</i>	<i>G X</i>										<i>1</i>	<i>1</i>				<i>Soil</i>	
<i>1/22/09</i>	<i>1000</i>	<i>JAN 09 - IDW 02</i>	<i>G X</i>										<i>1</i>					<i>Water</i>	

RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RELINQUISHED BY: (SIGNATURE)	DATE	TIME
			<i>[Signature]</i>	<i>1/22/09</i>	<i>1500</i>			
RECEIVED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	DATE	TIME
<i>[Signature]</i>	<i>1/22/09</i>	<i>0700</i>						

LABORATORY USE ONLY								
RECEIVED FOR LABORATORY BY: (SIGNATURE)	DATE	TIME	CUSTODY INTACT YES <input type="radio"/> NO <input type="radio"/>	CUSTODY SEAL NO.	SAVANNAH LOG NO.	LABORATORY REMARKS		
<i>[Signature]</i>	<i>012409</i>	<i>1020</i>			<i>68044155</i>	<i>1.4/0.8/1.6 TEMP</i>		

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

TestAmerica

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9-003

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PROJECT REFERENCE <i>NAPR Investigations</i>	PROJECT NO. <i>111626</i>	PROJECT LOCATION (STATE)	MATRIX TYPE	REQUIRED ANALYSIS										PAGE <i>2</i> OF <i>4</i>
TAL (LAB) PROJECT MANAGER <i>Kathy E. Smith</i>	P.O. NUMBER	CONTRACT NO.	COMPOSITE (C) OR GRAB (G) INDICATE AQUEOUS (WATER) SOLID OR SEMISOLID AIR NONAQUEOUS LIQUID (OIL, SOLVENT, ...)	<i>UOC</i>	<i>SLOC</i>	<i>WPAA</i>	<i>DRO</i>	<i>GRO</i>	<i>METALS</i>	<i>METALS (CO)</i>	<i>PEST</i>	<i>PCB</i>	STANDARD REPORT DELIVERY DATE DUE <i>AS DATA</i> EXPEDITED REPORT DELIVERY (SURCHARGE) DATE DUE _____ NUMBER OF COOLERS SUBMITTED PER SHIPMENT:	
CLIENT (SITE) PM <i>Mark Kimes</i>	CLIENT PHONE <i>412.337.7465</i>	CLIENT FAX		<i>UOC</i>	<i>SLOC</i>	<i>WPAA</i>	<i>DRO</i>	<i>GRO</i>	<i>METALS</i>	<i>METALS (CO)</i>	<i>PEST</i>	<i>PCB</i>		
CLIENT NAME <i>Baker</i>	CLIENT E-MAIL <i>mkimes@mbankcorp.com</i>			<i>UOC</i>	<i>SLOC</i>	<i>WPAA</i>	<i>DRO</i>	<i>GRO</i>	<i>METALS</i>	<i>METALS (CO)</i>	<i>PEST</i>	<i>PCB</i>		
CLIENT ADDRESS <i>100 Airside Drive, Moon Twp, PA. 15108</i>	COMPANY CONTRACTING THIS WORK (if applicable)			<i>UOC</i>	<i>SLOC</i>	<i>WPAA</i>	<i>DRO</i>	<i>GRO</i>	<i>METALS</i>	<i>METALS (CO)</i>	<i>PEST</i>	<i>PCB</i>		

SAMPLE		SAMPLE IDENTIFICATION	COMPOSITE (C) OR GRAB (G) INDICATE	AQUEOUS (WATER)	SOLID OR SEMISOLID	AIR	NONAQUEOUS LIQUID (OIL, SOLVENT, ...)	PRESERVATIVE										REMARKS
DATE	TIME							ADG	ADG	ADG	ADG	ADG	ADG	ADG	ADG	ADG	ADG	
<i>1/19/09</i>	<i>0910</i>	<i>9SB41-05</i>	<i>G</i>	<i>X</i>			<i>3</i>	<i>1</i>	<i>X</i>	<i>3</i>								
<i>1/18/09</i>	<i>1040</i>	<i>9SB43-00</i>	<i>G</i>				<i>3</i>	<i>1</i>	<i>X</i>	<i>3</i>	<i>1</i>							
<i>1/18/09</i>	<i>1010</i>	<i>9SB45-00</i>	<i>G</i>				<i>3</i>	<i>1</i>	<i>X</i>	<i>3</i>	<i>1</i>							
<i>1/18/09</i>	<i>0930</i>	<i>9SB46-00</i>	<i>G</i>				<i>3</i>	<i>1</i>	<i>X</i>	<i>3</i>	<i>1</i>							
<i>1/19/09</i>	<i>0930</i>	<i>9SB46-00D</i>	<i>G</i>				<i>3</i>	<i>1</i>	<i>X</i>	<i>3</i>	<i>1</i>							
<i>1/19/09</i>	<i>1435</i>	<i>9SB47-00</i>	<i>G</i>				<i>3</i>	<i>1</i>	<i>X</i>	<i>3</i>	<i>1</i>							
	<i>1445</i>	<i>9SB47-03</i>	<i>G</i>				<i>3</i>	<i>1</i>	<i>X</i>	<i>3</i>								
	<i>1455</i>	<i>9SB47-04</i>	<i>G</i>				<i>3</i>	<i>1</i>	<i>X</i>	<i>3</i>								
	<i>1210</i>	<i>9SB53-00</i>	<i>G</i>				<i>3</i>	<i>1</i>	<i>X</i>	<i>3</i>	<i>1</i>							
	<i>1225</i>	<i>9SB53-04</i>	<i>G</i>				<i>3</i>	<i>1</i>	<i>X</i>	<i>3</i>								
<i>1/19/09</i>	<i>1235</i>	<i>9SB53-05</i>	<i>G</i>	<i>X</i>			<i>3</i>	<i>1</i>	<i>X</i>	<i>3</i>								
<i>1/18/09</i>		<i>JAN 09 TBO 7</i>	<i>G</i>	<i>X</i>			<i>3</i>	<i>1</i>	<i>X</i>	<i>3</i>								

RELINQUISHED BY: (SIGNATURE) <i>[Signature]</i>	DATE <i>1/20/09</i>	TIME <i>1500</i>	RELINQUISHED BY: (SIGNATURE) <i>[Signature]</i>	DATE <i>1/20/09</i>	TIME <i>1500</i>	RELINQUISHED BY: (SIGNATURE) <i>[Signature]</i>	DATE	TIME
RECEIVED BY: (SIGNATURE) <i>[Signature]</i>	DATE <i>1/12/09</i>	TIME <i>0700</i>	RECEIVED BY: (SIGNATURE) <i>[Signature]</i>	DATE	TIME	RECEIVED BY: (SIGNATURE) <i>[Signature]</i>	DATE	TIME

LABORATORY USE ONLY								
RECEIVED FOR LABORATORY BY: (SIGNATURE) <i>[Signature]</i>	DATE <i>012109</i>	TIME <i>0957</i>	CUSTODY INTACT YES <input type="radio"/> NO <input type="radio"/>	CUSTODY SEAL NO.	SAVANNAH LOG NO. <i>68044044</i>	LABORATORY REMARKS		

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

TestAmerica

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9-004

Alternate Laboratory Name/Location

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PROJECT REFERENCE NAPR	PROJECT NO. 11162E	PROJECT LOCATION (STATE)	MATRIX TYPE	REQUIRED ANALYSIS										PAGE 3	OF 4
TAL (LAB) PROJECT MANAGER Kathy E. Smith	P.O. NUMBER	CONTRACT NO.	COMPOSITE (C) OR GRAB (G) INDICATE AQUEOUS (WATER) SOLID OR SEMISOLID AIR NONAQUEOUS LIQUID (OIL, SOLVENT, ...)	PRESERVATIVE	MR. DOC	MR. SUOC	MR. UPAH	TPH DRO	TPH GPO	MR. METALS	MR. METALS (D)	MR. PEST	MR. PCB	STANDARD REPORT DELIVERY	
CLIENT (SITE) PM MARK Kimes	CLIENT PHONE 412.337.7465	CLIENT FAX												DATE DUE 28 DAY TAT	
CLIENT NAME BAKER	CLIENT E-MAIL mkimes@mbakercorp.com													EXPEDITED REPORT DELIVERY (SURCHARGE)	
CLIENT ADDRESS 100 Arside Drive, Moon Twp. PA. 15108														DATE DUE _____	
COMPANY CONTRACTING THIS WORK (if applicable)													NUMBER OF COOLERS SUBMITTED PER SHIPMENT:		

SAMPLE		SAMPLE IDENTIFICATION	COMPOSITE (C) OR GRAB (G) INDICATE	AQUEOUS (WATER)	SOLID OR SEMISOLID	AIR	NONAQUEOUS LIQUID (OIL, SOLVENT, ...)	NUMBER OF CONTAINERS SUBMITTED										REMARKS
DATE	TIME							1	2	3	4	5	6	7	8	9	10	
1/20/09	1210	9SB51-01	G	X			3	1	X	3								
		9TW40 9GW40	X				3	2	2	3								
		9PW41 9GW41	X				3	2	2	3								
		9PW41D 9GW41D	X				3	2	2	3								
1/20/09		9PW42 9GW42	X				3	2	2	3								
1/20/09		JAN 09 FB02	X				3	2	2	3	1	X	2					
1/20/09		JAN 09 TB09	X				3	2	2	3								
1/20/09		JAN 09 ERO8	X				3	2	2	3								per Baker, run
1/21/09		9SD 70	X				3	1	X	3	1							82706 AP9
		9SD 71	X				3	1	X	3	1							KS 1/22/09
		9SD 72	X				3	1	X	3	1							
1/21/09		9SD 75	G	X			3	1	X	3	1							

RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RELINQUISHED BY: (SIGNATURE)	DATE	TIME
				1/21/09	1500			
RECEIVED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	DATE	TIME
	1/21/09	0900						

LABORATORY USE ONLY							
RECEIVED FOR LABORATORY BY (SIGNATURE)	DATE	TIME	CUSTODY INTACT	CUSTODY SEAL NO.	SAVANNAH LOG NO.	LABORATORY REMARKS	
	012210	0857	YES <input type="radio"/> NO <input type="radio"/>		6804077		

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

FED EX AIRBILL NO. :
8480 2694 7444

TestAmerica Savannah
5102 LaRoche Avenue
Savannah, GA 31404

Website: www.testamericainc.com
Phone: (912) 354-7858
Fax: (912) 352-0165 **60-004**

Alternate Laboratory Name/Location

Phone:
Fax:

PROJECT REFERENCE NAPR Investigations	PROJECT NO. 111626	PROJECT LOCATION (STATE)	MATRIX TYPE	REQUIRED ANALYSIS								PAGE 1	OF 1
TAL (LAB) PROJECT MANAGER Kathy E. Smith	P.O. NUMBER	CONTRACT NO.	COMPOSITE (C) OR GRAB (G) INDICATE AQUEOUS (WATER) SOLID OR SEMISOLID AIR NONAQUEOUS LIQUID (OIL, SOLVENT, ...)	APP. IX VOC	APP. IX SUOC	APP. IX LEAD'S	TRH DRO	TRH GRO	APP. IX METALS	APP. IX. METALS(D)	APP. IX. PEST	APP. IX. PCB	STANDARD REPORT DELIVERY
CLIENT (SITE) PM Mark James	CLIENT PHONE 412.337.7465	CLIENT FAX		APP. IX. METALS(D)	APP. IX. PEST	APP. IX. PCB	DATE DUE 28 DAY TAT						
CLIENT NAME Michael Baker Jr. Inc.	CLIENT E-MAIL mjames@mbakercorp.com			PRESERVATIVE								EXPEDITED REPORT DELIVERY (SURCHARGE)	
CLIENT ADDRESS 100 Airside Dr., Moon Twp. PA., 15108	COMPANY CONTRACTING THIS WORK (if applicable)											DATE DUE	

SAMPLE		SAMPLE IDENTIFICATION	COMPOSITE (C) OR GRAB (G) INDICATE	AQUEOUS (WATER)	SOLID OR SEMISOLID	AIR	NONAQUEOUS LIQUID (OIL, SOLVENT, ...)	NUMBER OF CONTAINERS SUBMITTED								REMARKS
DATE	TIME							1	2	3	4	5	6	7	8	
1/18/09	0815	60GW05	G	X				3	2		2	3	1	1	2	Temps: 1.4/1.1/1.6/1.0 0.1/1.6/1.1/1.0 0.4/0.1/1.0/1.0 1.4/1.1/1.6/1.0 0.2/3.0/1.0
1/18/09	1025	60GW02	G	X				2	2		2	3	1	1	2	
1/17/09		JAN 09 TBO6	G	X				2			2					
		60SD01	G		X						1			X		
		60SD02	G		X						1			X		
		60SD03	G		X						1			X		
		60SD03D	G		X						1			X		

RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RELINQUISHED BY: (SIGNATURE)	DATE	TIME
			<i>[Signature]</i>	1/19/09	1500			
RECEIVED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	DATE	TIME
<i>[Signature]</i>	1/12/09	0700						

LABORATORY USE ONLY						
RECEIVED FOR LABORATORY BY: (SIGNATURE)	DATE	TIME	CUSTODY INTACT YES <input type="radio"/> NO <input type="radio"/>	CUSTODY SEAL NO.	SAVANNAH LOG NO.	LABORATORY REMARKS
<i>[Signature]</i>	012009	0857			68044016	

IDW ANALYTICAL DATA

APPENDIX A

SUMMARY OF ANALYTICAL RESULTS - IDW WATER SWMU 70 - DISPOSAL AREA NORTHWEST OF LANDFILL PHASE I RFI REPORT NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Sample ID JAN09-IDW02
Sampling Date 1/22/2009 10:00

Metals (ug/L)

Antimony	2.1	J B
Arsenic	6.6	
Barium	1200	
Beryllium	1.2	
Cadmium	0.96	
Chromium	120	
Cobalt	210	B
Copper	310	
Lead	16	
Nickel	150	
Selenium	0.6	U
Silver	0.09	U
Thallium	0.55	U
Tin	1.4	J
Vanadium	160	
Zinc	820	
Mercury	0.08	U

General Chemistry

Flashpoint - Degrees F	>140	
Cyanide, Total - mg/L	0.0057	J
Sulfide - mg/L	1	U
pH - SU	9.9	H

Notes:

- U: Undetected at the Limit of Detection.
- H: Sample was prepped or analyzed beyond the specified holding time
- J: Estimated: The analyte was positively identified; the quantitation is an estimation
- B: Blank contamination: The analyte was detected above one-half the reporting limit in an associated blank.

APPENDIX B
SUMMARY OF ANALYTICAL RESULTS FROM PHASE II ECP

TABLE B-1

**SUMMARY OF ORGANIC DETECTIONS IN SURFACE SOIL
SWMU 70- DISPOSAL AREA NORTHWEST OF LANDFILL
PHASE II ECP REPORT
NAVAL ACTIVITY PUERTO RICO**

	EPA Region III Industrial RBCs (ug/kg)	EPA Region III Residential RBCs (ug/kg)	16E-01	16E-01	16E-02	16E-03	16E-04	16E-05	16E-06
Site ID			16E-01	16E-01	16E-02	16E-03	16E-04	16E-05	16E-06
Sample ID			16E-SS01	16E-SS01D	16E-SS02	16E-SS03	16E-SS04	16E-SS05	16E-SS06
Sample Date			05/13/04	05/13/04	05/13/04	05/13/04	05/13/04	05/13/04	05/13/04
Sample Depth (ft bgs)			0.00 - 1.00	0.00 - 1.00	0.00 - 1.00	0.00 - 0.30	0.00 - 1.00	0.00 - 1.00	0.00 - 1.00
Volatile Organic Compounds (ug/kg)									
Chlorobenzene	2,000,000	160,000	6.1 U	2.4 J	6.3 U	2.2 J	5.4 U	2.2 J	5.2 U
Tetrachloroethene	5,300	1,200	2.4 J	5.5 J	2.1 J	2.3 J	5.4 U	2.3 J	5.2 U
Semivolatile Organic Compounds (ug/kg)									
Benzo(g,h,i)perylene	NE	NE	440 U	450 U	420 U	480 U	390 U	42 J	390 U
Indeno(1,2,3-cd)pyrene	3,900	870	440 U	450 U	420 U	480 U	390 U	46 J	390 U
Pesticides/PCBs (ug/kg)									
Not Detected									
OP-Pesticides (ug/kg)									
Not Detected									
Chlorinated Herbicides (ug/kg)									
Not Detected									

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.

TABLE B-1

**SUMMARY OF ORGANIC DETECTIONS IN SURFACE SOIL
SWMU 70- DISPOSAL AREA NORTHWEST OF LANDFILL
PHASE II ECP REPORT
NAVAL ACTIVITY PUERTO RICO**

Site ID	EPA Region III Industrial RBCs (ug/kg)	EPA Region III Residential RBCs (ug/kg)	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
Sample ID							
Sample Date							
Sample Depth (ft bgs)							
Volatile Organic Compounds (ug/kg)							
Chlorobenzene	2,000,000	160,000	0/7		0/7		16E-SS01D
Tetrachloroethene	5,300	1,200	0/7		0/7		16E-SS01D
Semivolatile Organic Compounds (ug/kg)							
Benzo(g,h,i)perylene	NE	NE	NE		NE		16E-SS05
Indeno(1,2,3-cd)pyrene	3,900	870	0/7		0/7		16E-SS05
Pesticides/PCBs (ug/kg)							
Not Detected							
OP-Pesticides (ug/kg)							
Not Detected							
Chlorinated Herbicides (ug/kg)							
Not Detected							

Notes:

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

TABLE B-2

**SUMMARY OF INORGANIC DETECTIONS IN SURFACE SOIL
SWMU 70 - DISPOSAL AREA NORTHWEST OF LANDFILL
PHASE II ECP REPORT
NAVAL ACTIVITY PUERTO RICO**

Site ID	EPA Region III Industrial RBCs (ug/kg)	EPA Region III Residential RBCs (ug/kg)	<u>2x Average</u> <u>Detected</u> <u>Background</u> (mg/kg)	16E-01 16E-SS01 05/13/04 0.00 - 1.00	16E-01 16E-SS01D 05/13/04 0.00 - 1.00	16E-02 16E-SS02 05/13/04 0.00 - 1.00	16E-03 16E-SS03 05/13/04 0.00 - 0.30	16E-04 16E-SS04 05/13/04 0.00 - 1.00	16E-05 16E-SS05 05/13/04 0.00 - 1.00	16E-06 16E-SS06 05/13/04 0.00 - 1.00
Appendix IX Inorganics (mg/kg)										
Arsenic	1.9	0.43	2.4	1.9	2.2	2	2.9	3.7	3.2	1.9
Barium	7,200	550	181	11	16	120	11	7.8	12	16
Beryllium	200	16	0.45	0.51 U	0.051 B	0.43 B	0.06 B	0.047 B	0.057 B	0.085 B
Cadmium	100	7.8	0.27	0.64 U	0.63 U	0.26 B	0.64 U	0.57 U	0.64 U	0.19 B
Chromium	310	23	59.3	5.8	5.8	19	7.2	4.3	7.8	47
Cobalt	2,000	160	44.0	1.4	1.4	27	2.5	0.76 B	2.4	13
Copper	4,100	310	234	11	14	150	11	3	8.4	43
Lead	400 ⁽¹⁾	400 ⁽¹⁾	125	2.8	2.3	7.9	1.9	0.77	1.4	3.3
Mercury	31 ⁽²⁾	2.3 ⁽²⁾	0.11	0.0079 B	0.0096 B	0.02 B	0.018 B	0.0086 B	0.0063 B	0.012 B
Nickel	2,000	160	16.6	2.3 B	2.6 B	14	2.7 B	1.4 B	3.3 B	<u>19</u>
Sulfide	NE	NE	28.48	34 U	34 U	32 U	36 U	29 U	37 U	<u>30 B</u>
Tin	61,000	4,700	2.43	2 B	<u>2.6 B</u>	<u>2.7 B</u>	<u>3.3 B</u>	<u>2.9 B</u>	2.1 B	<u>2.9 B</u>
Vanadium	100	7.8	355	14 N*	18 N*	96 N*	20 N*	6 N*	23 N*	74 N*
Zinc	31,000	2,300	125	7	9.2	<u>130</u>	11	3.4	7	34

Notes:

- B - The reported result is an estimated concentration that is less than the PQL, but greater than or equal to the MDL.
- N - The matrix spike recovery is not within control limits.
- U - The compound was analyzed for, but was not detected at or above the MDL/PQL.
- * - Duplicate analysis is not within control limits.
- ⁽¹⁾ - 1996 Soil Screening Guidance.
- ⁽²⁾ - Value based on the RBC for Mercuric Chloride.
- NE - Not Established.
- ft bgs - feet below ground surface.
- ug/kg - micrograms per kilogram.
- mg/kg - milligrams per kilogram.

TABLE B-2

**SUMMARY OF INORGANIC DETECTIONS IN SURFACE SOIL
SWMU 70 - DISPOSAL AREA NORTHWEST OF LANDFILL
PHASE II ECP REPORT
NAVAL ACTIVITY PUERTO RICO**

Site ID	EPA Region III Industrial RBCs (ug/kg)	EPA Region III Residential RBCs (ug/kg)	<u>2x Average</u> <u>Detected</u> <u>Background</u> (mg/kg)	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	<u>Number</u> <u>Exceeding</u> <u>2x Average</u> <u>Detected</u> <u>Background</u>	<u>Range</u> <u>Exceeding</u> <u>2x Average</u> <u>Detected</u> <u>Background</u>	Location of Maximum Detection
Appendix IX Inorganics (mg/kg)										
Arsenic	1.9	0.43	2.4	5/7	2 - 3.7	7/7	1.9 - 3.7	3/7	2.9 - 3.7	16E-SS04
Barium	7,200	550	181	0/7		0/7		0/7		16E-SS02
Beryllium	200	16	0.45	0/7		0/7		0/7		16E-SS02
Cadmium	100	7.8	0.27	0/7		0/7		0/7		16E-SS02
Chromium	310	23	59.3	0/7		1/7	47	0/7		16E-SS06
Cobalt	2,000	160	44.0	0/7		0/7		0/7		16E-SS02
Copper	4,100	310	234	0/7		0/7		0/7		16E-SS02
Lead	400 ⁽¹⁾	400 ⁽¹⁾	125	0/7		0/7		0/7		16E-SS02
Mercury	31 ⁽²⁾	2.3 ⁽²⁾	0.11	0/7		0/7		0/7		16E-SS02
Nickel	2,000	160	16.6	0/7		0/7		1/7	19	16E-SS06
Sulfide	NE	NE	28.48	NE		NE		1/7	30B	16E-SS06
Tin	61,000	4,700	2.43	0/7		0/7		5/7	2.6B - 3.3B	16E-SS03
Vanadium	100	7.8	355	0/7		6/7	14N* - 96N*	0/7		16E-SS02
Zinc	31,000	2,300	125	0/7		0/7		1/7	130	16E-SS02

Notes:

- B - The reported result is an estimated concentration that is less than the PQL, but greater than or equal to the MDL.
- N - The matrix spike recovery is not within control limits.
- U - The compound was analyzed for, but was not detected at or above the MDL/PQL.
- * - Duplicate analysis is not within control limits.
- ⁽¹⁾ - 1996 Soil Screening Guidance.
- ⁽²⁾ - Value based on the RBC for Mercuric Chloride.
- NE - Not Established.
- ft bgs - feet below ground surface.
- ug/kg - micrograms per kilogram.
- mg/kg - milligrams per kilogram.

TABLE B-3

**SUMMARY OF ORGANIC DETECTIONS IN SUBSURFACE SOIL
SWMU 70 - DISPOSAL AREA NORTHWEST OF LANDFILL
PHASE II ECP REPORT
NAVAL ACTIVITY PUERTO RICO**

Site ID	EPA Region III Industrial RBCs (ug/kg)	EPA Region III Residential RBCs (ug/kg)	16E-01 16E-SB01-02 05/13/04 3.00 - 5.00	16E-02 16E-SB02-02 05/13/04 3.00 - 5.00	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)									
Acetone	92,000,000	7,000,000	17 J	47 U	0/2		0/2		16E-SB01-02
Semivolatile Organic Compounds (ug/kg)									
Not Detected									
Pesticides/PCBs (ug/kg)									
Not Detected									
OP-Pesticides (ug/kg)									
Not Detected									
Chlorinated Herbicides (ug/kg)									
Not Detected									

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.
- ft bgs - feet below ground surface.
- ug/kg - micrograms per kilogram.

TABLE B-4

SUMMARY OF INORGANIC DETECTIONS IN SUBSURFACE SOIL
 SWMU 70 - DISPOSAL AREA NORTHWEST OF LANDFILL
 PHASE II ECP REPORT
 NAVAL ACTIVITY PUERTO RICO

Site ID	EPA Region III Industrial RBCs (mg/kg)	EPA Region III Residential RBCs (mg/kg)	<u>2x Average</u> <u>Detected</u> <u>Background</u> (mg/kg)	16E-01 16E-SB01-02 05/13/04 3.00 - 5.00	16E-02 16E-SB02-02 05/13/04 3.00 - 5.00	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	<u>Number</u> <u>Exceeding</u> <u>2x Average</u> <u>Detected</u> <u>Background</u>	<u>Range</u> <u>Exceeding</u> <u>2x Average</u> <u>Detected</u> <u>Background</u>	Location of Maximum Detection
Appendix IX Inorganics (mg/kg)												
Arsenic	1.9	0.43	2.05	6.1	6.4	2/2	6.1 - 6.4	2/2	6.1 - 6.4	2/2	6.1 - 6.4	16E-SB02-02
Barium	7,200	550	222	10	13	0/2		0/2		0/2		16E-SB02-02
Beryllium	200	16	0.74	0.072 B	0.43 U	0/2		0/2		0/2		16E-SB01-02
Chromium	310	23	133	13	2.9	0/2		0/2		0/2		16E-SB01-02
Cobalt	2,000	160	30.0	1 B	1.1 U	0/2		0/2		0/2		16E-SB01-02
Copper	4,100	310	193	9.6	1.4 B	0/2		0/2		0/2		16E-SB01-02
Lead	400 ⁽¹⁾	400 ⁽¹⁾	8.68	0.95	0.54 U	0/2		0/2		0/2		16E-SB01-02
Nickel	2,000	160	31.9	4.5 B	0.88 B	0/2		0/2		0/2		16E-SB01-02
Tin	61,000	4,700	2.96	3.3 B	2.7 B	0/2		0/2		1/2	3.3B	16E-SB01-02
Vanadium	100	7.8	462	17 N*	3 N*	0/2		1/2	17N*	0/2		16E-SB01-02
Zinc	31,000	2,300	88.6	8	1.4 B	0/2		0/2		0/2		16E-SB01-02

- Notes:**
- B - The reported result is an estimated concentration that is less than the PQL, but greater than or equal to the MDL.
 - N - The matrix spike recovery is not within control limits.
 - U - The compound was analyzed for, but was not detected at or above the MDL/PQL.
 - * - Duplicate analysis is not within control limits.
 - ⁽¹⁾ - 1996 Soil Screening Guidance.
 - ft bgs - feet below ground surface.
 - mg/kg - milligrams per kilogram.

TABLE B-5

**SUMMARY OF ORGANIC DETECTIONS IN GROUNDWATER
SWMU 70 - DISPOSAL AREA NORTHWEST OF LANDFILL
PHASE II ECP REPORT
NAVAL ACTIVITY PUERTO RICO**

Site ID Sample ID Sample Date	Federal MCLs (ug/L)	EPA Region III Tap Water RBCs (ug/L)	PR Water Quality Standards (ug/L)	16E-01 16E-GW01 05/15/04	16E-01 16E-GW01D 05/15/04	16E-05 16E-GW05 05/12/04	16E-06 16E-GW06 05/12/04
Volatile Organic Compounds (ug/L)							
Acetone	NE	550	NE	6 J	25 U	25 U	25 U
2-Butanone	NE	700	NE	1.3 J	1.3 J	10 U	10 U
Semivolatile Organic Compounds (ug/L)							
Benzo(g,h,i)perylene	NE	NE	NE	10 U	10 U	1 J	10 U
Indeno(1,2,3-cd)pyrene	NE	0.092	NE	10 U	10 U	0.85 J	10 U
Pesticides/PCBs (ug/L)							
Not Detected							
OP-Pesticides (ug/L)							
Not Detected							
Chlorinated Herbicides (ug/L)							
Not Detected							

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.
- NE - Not Established.

TABLE B-5

**SUMMARY OF ORGANIC DETECTIONS IN GROUNDWATER
SWMU 70 - DISPOSAL AREA NORTHWEST OF LANDFILL
PHASE II ECP REPORT
NAVAL ACTIVITY PUERTO RICO**

Site ID Sample ID Sample Date	Federal MCLs (ug/L)	EPA Region III Tap Water RBCs (ug/L)	PR Water Quality Standards (ug/L)	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	NE		0/4		NE		16E-GW01
2-Butanone	NE	700	NE	NE		0/4		NE		16E-GW01, 16E-GW01D
Semivolatile Organic Compounds (ug/L)										
Benzo(g,h,i)perylene	NE	NE	NE	NE		NE		NE		16E-GW05
Indeno(1,2,3-cd)pyrene	NE	0.092	NE	NE		1/4	0.85J	NE		16E-GW05
Pesticides/PCBs (ug/L)										
Not Detected										
OP-Pesticides (ug/L)										
Not Detected										
Chlorinated Herbicides (ug/L)										
Not Detected										

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.
- NE - Not Established.

TABLE B-6

**SUMMARY OF INORGANIC DETECTIONS IN GROUNDWATER
SWMU 70 - DISPOSAL AREA NORTHWEST OF LANDFILL
PHASE II ECP REPORT
NAVAL ACTIVITY PUERTO RICO**

Site ID	Federal MCLs (mg/L)	EPA Region III Tap Water RBCs (mg/L)	PR Water Quality Standards (mg/L)	16E-01 16E-GW01 05/15/04	16E-01 16E-GW01D 05/15/04	16E-05 16E-GW05 05/12/04	16E-06 16E-GW06 05/12/04
Sample ID							
Sample Date							
Appendix IX (Dissolved) Inorganics (mg/L)							
Barium	2	0.26	NE	0.062	0.062	0.031	0.055
Chromium	0.1	0.011	NE	0.0018 B	0.0015 B	0.01 U	0.0017 B
Cobalt	NE	0.073	NE	0.01 U	0.01 U	0.0021 B	0.01 U
Nickel	NE	0.073	NE	0.04 U	0.04 U	0.0041 B	0.0042 B
Vanadium	NE	0.0037	NE	0.015 B	0.019 B	0.05 U	0.013
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.
- mg/L - milligrams per liter.

TABLE B-6

**SUMMARY OF INORGANIC DETECTIONS IN GROUNDWATER
SWMU 70 - DISPOSAL AREA NORTHWEST OF LANDFILL
PHASE II ECP REPORT
NAVAL ACTIVITY PUERTO RICO**

Site ID Sample ID Sample Date	Federal MCLs (mg/L)	EPA Region III Tap Water RBCs (mg/L)	PR Water Quality Standards (mg/L)	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 Maximum Detection
Appendix IX (Dissolved) Inorganics (mg/L)										
Barium	2	0.26	NE	0/4		0/4		NE		16E-GW01, 16E-GW01D
Chromium	0.1	0.011	NE	0/4		0/4		NE		16E-GW01
Cobalt	NE	0.073	NE	NE		0/4		NE		16E-GW05
Nickel	NE	0.073	NE	NE		0/4		NE		16E-GW06
Vanadium	NE	0.0037	NE	NE		3/4	0.013 - 0.019B	NE		16E-GW01D
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.
- mg/L - milligrams per liter.

TABLE B-7

**SUMMARY OF INORGANIC DETECTIONS IN SEDIMENT
SWMU 70 - DISPOSAL AREA NORTHWEST OF LANDFILL
PHASE II ECP REPORT
NAVAL ACTIVITY PUERTO RICO**

Site ID	Marine Sediment Screening Values (mg/kg)	16E-SW/SD01	16E-SW/SD02	Number Exceeding Marine Sediment Screening Values	Range Exceeding Marine Sediment Screening Values	Location of Maximum Detection
Sample ID		16E-SD01	16E-SD02			
Sample Date		05/14/04	05/14/04			
Sample Depth (ft bgs)		0.00 - 0.50	0.00 - 0.50			
Appendix IX Inorganics (mg/kg)						
Arsenic	7.24	3.1	3 B	0/2		16E-SD01
Barium	48.0	8.3	11	0/2		16E-SD02
Chromium	52.3	13	23	0/2		16E-SD02
Cobalt	10.0	3.3	6.4	0/2		16E-SD02
Copper	18.7	21	41	2/2	21 - 41	16E-SD02
Lead	30.2	2	4.8	0/2		16E-SD02
Mercury	0.13	0.018 B	0.036 B	0/2		16E-SD02
Nickel	15.9	5 B	9 B	0/2		16E-SD02
Silver	0.73	1.9 U	0.86 B	1/2	0.86B	16E-SD02
Tin	3.40	3.5 B	6.1 B	2/2	3.5B - 6.1B	16E-SD02
Vanadium	57.0	21 N*	36 N*	0/2		16E-SD02
Zinc	124	24	35	0/2		16E-SD02
Sulfide	NA	160	680	NA		16E-SD02

Notes:

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

N - The matrix spike recovery is not within control limits.

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

* - Duplicate analysis is not within control limits.

NA - Not Available.

ft bgs - feet below ground surface.

mg/kg - milligrams per kilogram.

TABLE B-8

**SUMMARY OF ORGANIC DETECTIONS IN SURFACE WATER
SWMU 70 - DISPOSAL AREA NORTHWEST OF LANDFILL
PHASE II ECP REPORT
NAVAL ACTIVITY PUERTO RICO**

Site ID Sample ID Sample Date	PR Water Quality Standards (ug/L)	Surface Water Screening Values (ug/L)	16E-SW/SD01 16E-SW01 05/14/04	16E-SW/SD02 16E-SW02 05/14/04	Number Exceeding PR Water Quality Standards	Range Exceeding PR Water Quality Standards	Number Exceeding Surface Water Screening Values	Range Exceeding Surface Water Screening Values	Location Maximum Detection
Volatile Organic Compounds (ug/L)									
Bromoform	NE	640	1 U	1	NE		0/2		16E-SW02
Semivolatile Organic Compounds (ug/L)									
Not Detected									
Pesticides/PCBs (ug/L)									
Not Detected									
OP-Pesticides (ug/L)									
Not Detected									
Chlorinated Herbicides (ug/L)									
Not Detected									

Notes:

- U - The compound was analyzed for, but was not detected at or above the MDL/PQL.
- ug/L - micrograms per liter.
- NE - Not Established.

TABLE B-9

**SUMMARY OF INORGANIC DETECTIONS IN SURFACEWATER
SWMU 70 - DISPOSAL AREA NORTHWEST OF LANDFILL
PHASE II ECP REPORT
NAVAL ACTIVITY PUERTO RICO**

Site ID Sample ID Sample Date	PR Water Quality Standards (mg/L)	Surface Water Screening Values (mg/L)	16E-SW/SD01 16E-SW01 05/14/04	16E-SW/SD02 16E-SW02 05/14/04	Number Exceeding PR Water Quality Standards	Range Exceeding PR Water Quality Standards	Number Exceeding Surface Water Screening Values	Range Exceeding Surface Water Screening Values	Location Maximum Detection
Appendix IX (Total) Inorganics (mg/L)									
Barium	NE	50	0.0068 B	0.026	NE		0/2		16E-SW02
Chromium	0.011	0.0504	0.01 U	0.0015 B	0/2		0/2		16E-SW02
Vanadium	NE	0.120 ⁽¹⁾	0.1 U	0.018	NE		0/2		16E-SW02
Zinc	0.081	0.086	0.025	0.012 B	0/2		0/2		16E-SW01

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.

⁽¹⁾ - This chemical lacks a marine/estuarine surface water screening value. The value shown is a freshwater screening value.

NE - Not Established.

mg/L - milligrams per liter.

APPENDIX C
LABORATORY ANALYTICAL RESULTS

SURFACE SOIL

APPENDIX C

**SUMMARY OF ANALYTICAL RESULTS - SURFACE SOIL
SWMU 70 - DISPOSAL AREA NORTHWEST OF LANDFILL
PHASE I RFI REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO**

Site ID	70SB01	70SB02	70SB03	70SB04	70SB04	70SB05
Sample ID	70SB01-00	70SB02-00	70SB03-00	70SB04-00	70SB04-00D	70SB05-00
Date	1/14/2009	1/14/2009	1/14/2009	1/15/2009	1/15/2009	1/20/2009
Depth Range	0.0-1.0	0.0-1.0	0.0-1.0	0.0-1.0	0.0-1.0	0.0-1.0

Volatile Organic Compounds (ug/kg)

1,1,1,2-Tetrachloroethane	0.65 U	0.88 U	0.75 U	0.85 U	0.84 U	0.91 U
1,1,1-Trichloroethane	0.59 U	0.8 U	0.68 U	0.77 U	0.77 U	0.83 U
1,1,2,2-Tetrachloroethane	1.4 U	1.9 U	1.6 U	1.9 U	1.8 U	2 U
1,1,2-Trichloroethane	1.2 U	1.6 U	1.4 U	1.6 U	1.6 U	1.7 U
1,1-Dichloroethane	0.51 U	0.69 U	0.59 U	0.67 U	0.66 U	0.71 U
1,1-Dichloroethene	0.55 U	0.74 U	0.63 U	0.72 U	0.71 U	0.77 U
1,2,3-Trichloropropane	1.4 U	1.9 U	1.6 U	1.9 U	1.8 U	2 U
1,2-Dibromo-3-Chloropropane	2.9 U	3.8 U	3.3 U	3.7 U	3.7 U	4 UJ
1,2-Dichloroethane	1 U	1.4 U	1.2 U	1.3 U	1.3 U	1.4 U
1,2-Dichloropropane	1.1 U	1.5 U	1.3 U	1.5 U	1.5 U	1.6 U
2-Butanone (MEK)	2.8 U	3.7 U	3.2 U	3.6 U	3.6 U	3.8 U
2-Chloro-1,3-butadiene	0.58 U	0.78 U	0.67 U	0.76 U	0.75 U	0.81 U
2-Hexanone	2.1 U	2.9 U	2.5 U	2.8 U	2.8 U	3 U
3-Chloro-1-propene	1.5 U	2.1 U	1.8 UJ	2 UJ	2 UJ	2.1 U
4-Methyl-2-pentanone (MIBK)	3 U	4 U	3.4 U	3.9 U	3.8 U	4.1 U
Acetone	4.5 U	6 U	5.2 U	5.9 U	5.8 U	22 R
Acetonitrile	46 U	62 U	53 U	60 U	59 U	64 R
Acrolein	19 UJ	26 UJ	22 U	25 U	25 U	27 UJ
Acrylonitrile	23 UJ	32 UJ	27 U	31 U	30 U	33 UJ
Benzene	0.81 U	1.1 U	0.93 U	1.1 U	1 U	1.6 J
Bromoform	1.1 U	1.5 U	1.3 U	1.5 U	1.5 U	1.6 UJ
Bromomethane	1.6 U	2.2 U	1.9 UJ	2.1 UJ	2.1 UJ	2.3 UJ
Carbon disulfide	1.2 U	2.4 J	1.4 U	1.6 U	1.6 U	1.7 U
Carbon tetrachloride	1 U	1.4 U	1.2 U	1.3 U	1.3 U	1.4 U
Chlorobenzene	0.75 U	1 U	0.86 U	0.97 U	0.96 U	1 U
Chlorodibromomethane	0.51 U	0.69 U	0.59 U	0.67 U	0.66 U	0.71 UJ
Chloroethane	1.2 U	1.6 U	1.4 UJ	1.6 UJ	1.6 UJ	1.7 UJ
Chloroform	0.51 U	0.69 U	0.59 U	0.67 U	0.66 U	0.71 U
Chloromethane	0.72 U	0.97 U	0.83 U	0.95 U	0.94 U	1 U
cis-1,3-Dichloropropene	0.89 U	1.2 U	1 U	1.2 U	1.1 U	1.2 U
Dibromomethane	1.2 U	1.6 U	1.4 U	1.6 U	1.6 U	1.7 U
Dichlorobromomethane	0.85 U	1.1 U	0.97 U	1.1 U	1.1 U	1.2 U
Dichlorodifluoromethane	0.91 U	1.2 U	1 U	1.2 U	1.2 U	1.3 UJ
Ethyl methacrylate	2.2 U	3 U	2.6 U	2.9 U	2.9 U	3.1 U
Ethylbenzene	0.77 U	1 U	0.88 U	1 U	0.99 U	1.1 U
Ethylene Dibromide	1.5 U	2.1 U	1.8 U	2 U	2 U	2.1 U
Iodomethane	1 U	1.4 U	1.2 U	1.3 U	1.3 U	1.4 UJ
Isobutyl alcohol	70 U	95 U	81 U	92 U	91 U	98 R
Methacrylonitrile	24 U	33 U	28 U	32 U	32 U	34 U
Methyl methacrylate	3.8 U	5.1 U	4.3 U	4.9 U	4.9 U	5.3 U
Methylene Chloride	1 U	1.4 U	1.2 U	1.3 U	1.3 U	2.6 UJ

APPENDIX C

**SUMMARY OF ANALYTICAL RESULTS - SURFACE SOIL
SWMU 70 - DISPOSAL AREA NORTHWEST OF LANDFILL
PHASE I RFI REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO**

Site ID	70SB01	70SB02	70SB03	70SB04	70SB04	70SB05
Sample ID	70SB01-00	70SB02-00	70SB03-00	70SB04-00	70SB04-00D	70SB05-00
Date	1/14/2009	1/14/2009	1/14/2009	1/15/2009	1/15/2009	1/20/2009
Depth Range	0.0-1.0	0.0-1.0	0.0-1.0	0.0-1.0	0.0-1.0	0.0-1.0
Volatile Organic Compounds (ug/kg)						
Pentachloroethane	2.2 U	3 U	2.6 UJ	2.9 UJ	2.9 UJ	3.1 UJ
Propionitrile	21 U	29 U	25 U	28 U	28 U	30 UJ
Styrene	0.67 U	0.91 U	0.77 U	0.88 U	0.87 U	0.94 U
Tetrachloroethene	0.75 U	1 U	0.86 U	0.97 U	0.96 U	1 U
Toluene	0.81 U	1.1 U	0.93 U	1.1 U	1 U	1.1 U
trans-1,2-Dichloroethene	0.99 U	1.3 U	1.1 U	1.3 U	1.3 U	1.4 U
trans-1,3-Dichloropropene	0.89 U	1.2 U	1 U	1.2 U	1.1 U	1.2 U
trans-1,4-Dichloro-2-butene	3.2 U	4.3 U	3.6 U	4.1 U	4.1 U	4.4 U
Trichloroethene	1 U	1.4 U	1.2 U	1.3 U	1.3 U	1.4 U
Trichlorofluoromethane	1.5 U	2.1 U	1.8 UJ	2 UJ	2 UJ	2.1 U
Vinyl acetate	1.5 U	2.1 U	1.8 U	2 UJ	2 UJ	2.1 U
Vinyl chloride	0.59 U	0.8 U	0.68 U	0.77 U	0.77 U	0.83 U
Xylenes, Total	2.3 U	3.2 U	2.7 U	3.1 U	3 U	3.3 U
Semivolatile Organic Compounds (ug/kg)						
1,2,4,5-Tetrachlorobenzene	6.7 UJ	9.5 U	8.9 U	7.9 UJ	8.3 UJ	7.5 U
1,2,4-Trichlorobenzene	7.8 U	11 U	10 U	9.3 U	9.7 U	8.8 U
1,2-Dichlorobenzene	7.4 U	11 U	9.8 U	8.8 U	9.2 U	8.4 U
1,3,5-Trinitrobenzene	18 UJ	26 U	24 U	21 UJ	22 UJ	20 UJ
1,3-Dichlorobenzene	6.4 U	9.1 U	8.4 U	7.5 U	7.9 U	7.2 U
1,3-Dinitrobenzene	4.1 U	5.9 U	5.5 U	4.9 U	5.1 U	4.7 U
1,4-Dichlorobenzene	6.6 U	9.4 U	8.7 U	7.8 U	8.2 U	7.4 U
1,4-Dioxane	8.5 U	12 U	11 U	10 U	11 U	9.6 U
1,4-Naphthoquinone	4.1 U	5.9 U	5.5 U	4.9 U	5.1 U	4.7 U
1-Naphthylamine	16 UJ	23 U	21 U	19 U	20 U	18 U
2,2'-oxybis[1-chloropropane]	6.7 U	9.5 U	8.9 U	7.9 U	8.3 U	7.5 U
2,3,4,6-Tetrachlorophenol	4.4 U	6.3 U	5.9 U	5.3 U	5.5 U	5 U
2,4,5-Trichlorophenol	7.2 U	10 U	9.6 U	8.5 U	8.9 U	8.1 U
2,4,6-Trichlorophenol	8.4 U	12 U	11 U	9.9 U	10 U	9.4 U
2,4-Dichlorophenol	8.6 U	12 U	11 U	10 U	11 U	9.7 U
2,4-Dimethylphenol	18 U	26 U	24 U	21 U	22 U	20 U
2,4-Dinitrophenol	88 UJ	130 U	120 U	100 UJ	110 UJ	99 UJ
2,4-Dinitrotoluene	6.2 U	8.9 U	8.3 U	7.4 U	7.8 U	7.1 U
2,6-Dichlorophenol	6.8 U	9.7 U	9 U	8 U	8.4 U	7.6 U
2,6-Dinitrotoluene	6.6 U	9.4 U	8.7 U	7.8 U	8.2 U	7.4 U
2-Acetylaminofluorene	5.4 U	7.7 U	7.2 U	6.4 U	6.7 U	6.1 U
2-Chloronaphthalene	6.6 U	9.4 U	8.7 U	7.8 U	8.2 U	7.4 U
2-Chlorophenol	7 U	10 U	9.3 U	8.3 U	8.7 U	7.9 U
2-Methylnaphthalene	6.6 J	7.2 J	38	84 J	4.6 J	2 U
2-Methylphenol	8.6 U	12 U	11 U	10 U	11 U	9.7 U
2-Naphthylamine	21 UJ	30 UJ	28 UJ	25 UJ	26 UJ	24 UJ
2-Nitroaniline	6.9 U	9.8 U	9.1 U	8.1 U	8.6 U	7.8 U
2-Nitrophenol	7.7 U	11 U	10 U	9.1 U	9.6 U	8.7 U

APPENDIX C

**SUMMARY OF ANALYTICAL RESULTS - SURFACE SOIL
SWMU 70 - DISPOSAL AREA NORTHWEST OF LANDFILL
PHASE I RFI REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO**

Site ID	70SB01	70SB02	70SB03	70SB04	70SB04	70SB05
Sample ID	70SB01-00	70SB02-00	70SB03-00	70SB04-00	70SB04-00D	70SB05-00
Date	1/14/2009	1/14/2009	1/14/2009	1/15/2009	1/15/2009	1/20/2009
Depth Range	0.0-1.0	0.0-1.0	0.0-1.0	0.0-1.0	0.0-1.0	0.0-1.0
Semivolatile Organic Compounds (ug/kg)						
2-Picoline	13 U	18 U	17 U	15 U	16 U	14 U
2-Toluidine	9.8 U	14 U	13 U	12 U	12 U	11 U
3 & 4 Methylphenol	7.7 U	11 U	10 U	9.1 U	9.6 U	8.7 U
3,3'-Dichlorobenzidine	9.7 U	14 U	13 U	12 U	12 U	11 U
3,3'-Dimethylbenzidine	190 UJ	270 UJ	250 UJ	230 UJ	240 UJ	220 UJ
3-Methylcholanthrene	6.5 U	9.2 U	8.6 U	7.6 U	8 U	7.3 U
3-Nitroaniline	4.8 U	6.8 U	6.3 U	5.6 U	5.9 U	5.4 U
4,6-Dinitro-2-methylphenol	6.1 UJ	8.7 U	8.1 U	7.3 UJ	7.6 UJ	6.9 UJ
4-Aminobiphenyl	14 U	20 U	18 U	16 U	17 U	16 UJ
4-Bromophenyl phenyl ether	7.5 U	11 U	10 U	8.9 U	9.3 U	8.5 U
4-Chloro-3-methylphenol	7.9 U	11 U	11 U	9.4 U	9.9 U	9 U
4-Chloroaniline	6.4 U	9.1 U	8.4 U	7.5 U	7.9 U	7.2 U
4-Chlorophenyl phenyl ether	6.6 U	9.4 U	8.7 U	7.8 U	8.2 U	7.4 U
4-Nitroaniline	8.2 U	12 U	11 U	9.6 U	10 U	9.2 U
4-Nitrophenol	35 U	50 U	46 U	41 U	43 U	39 U
4-Nitroquinoline-1-oxide	12 R	17 R	15 R	14 R	14 R	13 R
7,12-Dimethylbenz(a)anthracene	9.8 U	14 U	13 U	12 U	12 U	11 U
Acenaphthene	1.8 U	2.6 U	2.4 U	2.1 U	2.2 U	2 U
Acenaphthylene	1.8 R	2.6 R	2.4 R	2.1 R	2.2 R	2 U
Acetophenone	9.1 U	13 U	12 U	11 U	11 U	10 U
alpha,alpha-Dimethyl phenethylamine	62 U	89 U	83 U	74 U	78 U	71 U
Aniline	6.7 U	9.5 U	8.9 U	7.9 U	8.3 U	7.5 U
Anthracene	1.8 U	2.6 U	2.4 U	2.1 U	2.2 U	2 U
Aramite, Total	12 UJ	17 U	15 U	14 UJ	14 UJ	13 U
Benzo[a]anthracene	1.8 U	2.6 U	2.4 U	2.1 U	2.2 U	6.2 J
Benzo[a]pyrene	1.8 U	2.6 U	2.4 U	2.1 U	2.2 U	8.7
Benzo[b]fluoranthene	1.8 U	2.6 UJ	2.4 UJ	2.1 U	2.2 U	9.1
Benzo[g,h,i]perylene	1.8 UJ	2.6 U	2.4 U	2.1 UJ	2.2 UJ	6.7 J
Benzo[k]fluoranthene	1.8 U	2.6 U	2.4 U	2.1 U	2.2 U	9.3
Benzyl alcohol	8.5 U	12 U	11 U	10 U	11 U	9.6 U
Bis(2-chloroethoxy)methane	7.2 U	10 U	9.6 U	8.5 U	8.9 U	8.1 U
Bis(2-chloroethyl)ether	6 U	8.6 U	8 U	7.1 U	7.5 U	6.8 U
Bis(2-ethylhexyl) phthalate	14 U	32 U	69 U	23 U	19 U	12 UJ
Butyl benzyl phthalate	7.6 U	11 U	10 U	9 U	9.5 U	8.6 U
Chrysene	1.8 U	2.6 U	2.4 U	2.1 U	2.2 U	7.3 J
Diallate	10 U	14 U	13 U	12 U	13 U	11 U
Dibenz(a,h)anthracene	0.6 UJ	0.86 U	0.8 U	0.71 UJ	0.75 UJ	2.7 J
Dibenzofuran	4.4 R	6.3 R	5.9 R	5.3 R	5.5 R	5 U
Diethyl phthalate	12 U	17 U	15 U	14 U	14 U	13 U
Dimethyl phthalate	6.8 R	9.7 R	9 R	8 R	8.4 R	7.6 U
Di-n-butyl phthalate	26 U	38 U	35 U	31 U	33 U	30 U
Di-n-octyl phthalate	3.5 U	5 U	4.6 U	4.1 U	4.3 U	3.9 U

APPENDIX C

**SUMMARY OF ANALYTICAL RESULTS - SURFACE SOIL
SWMU 70 - DISPOSAL AREA NORTHWEST OF LANDFILL
PHASE I RFI REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO**

Site ID	70SB01	70SB02	70SB03	70SB04	70SB04	70SB05
Sample ID	70SB01-00	70SB02-00	70SB03-00	70SB04-00	70SB04-00D	70SB05-00
Date	1/14/2009	1/14/2009	1/14/2009	1/15/2009	1/15/2009	1/20/2009
Depth Range	0.0-1.0	0.0-1.0	0.0-1.0	0.0-1.0	0.0-1.0	0.0-1.0
Semivolatile Organic Compounds (ug/kg)						
Dinoseb	18 U	26 U	24 U	21 U	22 U	20 UJ
Ethyl methanesulfonate	12 U	17 U	15 U	14 U	14 U	13 U
Fluoranthene	0.4 U	0.57 U	0.86 J	0.77 J	0.5 U	4.1 J
Fluorene	1.8 U	2.6 U	2.4 U	2.1 U	2.2 U	2 U
Hexachlorobenzene	7.2 U	10 U	9.6 U	8.5 U	8.9 U	8.1 U
Hexachlorobutadiene	9.6 U	14 U	13 U	11 U	12 U	11 U
Hexachlorocyclopentadiene	15 UJ	21 UJ	20 UJ	18 UJ	18 UJ	17 UJ
Hexachloroethane	7.8 U	11 U	10 U	9.3 U	9.7 U	8.8 U
Hexachlorophene	880 UJ	1300 UJ	1200 UJ	1000 UJ	1100 UJ	990 R
Hexachloropropene	7.6 U	11 U	10 U	9 U	9.5 U	8.6 U
Indeno[1,2,3-cd]pyrene	3.5 UJ	5 U	4.6 U	4.1 UJ	4.3 UJ	4 J
Isophorone	6.6 U	9.4 U	8.7 U	7.8 U	8.2 U	7.4 U
Isosafrole	7.5 U	11 U	10 U	8.9 U	9.3 U	8.5 U
Methapyrilene	9.8 U	14 U	13 U	12 U	12 U	11 U
Methyl methanesulfonate	9.8 U	14 U	13 U	12 U	12 U	11 U
Naphthalene	1.8 U	2.6 U	2.7 J	4.2 J	2.2 U	2 U
Nitrobenzene	7.3 U	10 U	9.7 U	8.6 U	9.1 U	8.2 U
N-Nitro-o-toluidine	6.4 U	9.1 U	8.4 U	7.5 U	7.9 U	7.2 U
N-Nitrosodiethylamine	13 U	18 U	17 U	15 U	16 U	14 U
N-Nitrosodimethylamine	10 U	15 U	14 U	12 U	13 U	12 U
N-Nitrosodi-n-butylamine	9.6 U	14 U	13 U	11 U	12 U	11 U
N-Nitrosodi-n-propylamine	6.9 U	9.8 U	9.1 U	8.1 U	8.6 U	7.8 U
N-Nitrosodiphenylamine	7.5 U	11 U	10 U	8.9 U	9.3 U	8.5 U
N-Nitrosomethylethylamine	6 U	8.6 U	8 U	7.1 U	7.5 U	6.8 U
N-Nitrosomorpholine	7 U	10 U	9.3 U	8.3 U	8.7 U	7.9 U
N-Nitrosopiperidine	9 U	13 U	12 U	11 U	11 U	10 U
N-Nitrosopyrrolidine	9.4 U	13 U	13 U	11 U	12 U	11 U
p-Dimethylamino azobenzene	7.5 U	11 U	10 U	8.9 U	9.3 U	8.5 U
Pentachlorobenzene	6.6 U	9.4 U	8.7 U	7.8 U	8.2 U	7.4 U
Pentachloronitrobenzene	6.2 U	8.9 U	8.3 U	7.4 U	7.8 U	7.1 U
Pentachlorophenol	8.8 U	13 U	12 U	10 U	11 U	9.9 UJ
Phenacetin	5 U	7.1 U	6.6 U	5.9 U	6.2 U	5.6 U
Phenanthrene	1.8 U	2.6 U	2.4 U	2.1 U	2.2 U	2 U
Phenol	5.1 U	7.2 U	6.7 U	6 U	6.3 U	5.7 U
p-Phenylene diamine	170 UJ	240 UJ	220 UJ	200 UJ	210 UJ	190 U
Pronamide	9.5 U	14 U	13 U	11 U	12 U	11 U
Pyrene	1.8 U	2.6 U	2.4 U	2.1 U	2.2 U	4.8 J
Pyridine	12 U	17 U	15 U	14 U	14 U	13 U
Safrole, Total	8.8 U	13 U	12 U	10 U	11 U	9.9 U

APPENDIX C

**SUMMARY OF ANALYTICAL RESULTS - SURFACE SOIL
SWMU 70 - DISPOSAL AREA NORTHWEST OF LANDFILL
PHASE I RFI REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO**

	Site ID	70SB01	70SB02	70SB03	70SB04	70SB04	70SB05
	Sample ID	70SB01-00	70SB02-00	70SB03-00	70SB04-00	70SB04-00D	70SB05-00
	Date	1/14/2009	1/14/2009	1/14/2009	1/15/2009	1/15/2009	1/20/2009
	Depth Range	0.0-1.0	0.0-1.0	0.0-1.0	0.0-1.0	0.0-1.0	0.0-1.0
PCBs (ug/kg)							
PCB-1016		4 U	5.7 U	5.3 U	4.7 U	5 U	4.5 U
PCB-1221		14 U	20 U	18 U	16 U	17 U	16 U
PCB-1232		7.9 U	11 U	11 U	9.3 U	9.8 U	9 U
PCB-1242		5.1 U	7.2 U	6.7 U	6 U	6.3 U	5.7 U
PCB-1248		5.4 U	7.7 U	7.2 U	6.3 U	6.6 U	6.1 U
PCB-1254		2.4 U	3.5 U	3.2 U	2.9 U	3 U	2.7 U
PCB-1260		5.1 U	7.2 U	6.7 U	6 U	6.3 U	5.7 U
Metals (mg/kg)							
Antimony		0.53 U	0.53 U	1.1 U	0.74 U	0.62 U	0.51 U
Arsenic		4.2	1.9 U	2.2 J	4.4	6	7
Barium		7.9 J	8.2 J	9.4 J	11 J	12 J	30
Beryllium		0.08 U	0.13 U	0.12 U	0.11 U	0.11 U	0.041 J
Cadmium		0.14 U	0.22 U	0.21 U	0.19 U	0.19 U	0.043 J
Chromium		5.7 J	7.8 J	6.4 U	4.4 U	3.8 U	13
Cobalt		1.1 J	0.94 J	1.1 J	0.73 J	0.67 J	3.4
Copper		4.4 J	5.3 J	5.1 J	3 UJ	3.1 UJ	12
Lead		0.43 J	0.63 UJ	0.61 UJ	0.53 UJ	0.55 UJ	0.58
Mercury		0.004 U	0.005 U	0.0048 U	0.0048 U	0.0048 U	0.0066 J
Nickel		2.6 J	3.2 J	2.4 J	1.9 J	1.6 J	4.4
Selenium		0.53 U	0.85 U	0.83 U	0.73 U	0.75 U	0.27 U
Silver		0.071 U	0.11 U	0.11 U	0.097 U	0.1 U	0.019 U
Thallium		0.53 U	0.85 U	0.83 U	0.73 U	0.75 U	0.14 U
Tin		18 U	28 U	28 U	24 U	25 U	4.7 U
Vanadium		11 J	8.5 J	8 J	7.5 J	4.4 UJ	27
Zinc		4.2 UJ	6.2 UJ	6.7 UJ	3.9 UJ	4 UJ	5.5
TPH DRO and GRO (mg/kg)							
Diesel Range Organics		0.81 U	1.9 U	12	2.6 U	1.9 U	30
Gasoline Range Organics		0.067 U	0.079 U	0.19 U	0.087 U	0.086 U	0.098 J

SUBSURFACE SOIL

APPENDIX C

**SUMMARY OF ANALYTICAL RESULTS - SUBSURFACE SOIL
SWMU 70 - DISPOSAL AREA NORTHWEST OF LANDFILL
PHASE I RFI REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO**

Site ID	70SB01	70SB02	70SB03	70SB04	70SB04	70SB05	70SB05
Sample ID	70SB01-01	70SB02-01	70SB03-01	70SB04-01	70SB04-01D	70SB05-01	70SB05-01D
Date	1/14/2009	1/14/2009	1/14/2009	1/15/2009	1/15/2009	1/20/2009	1/20/2009
Depth Range	1.0-3.0	1.0-3.0	1.0-3.0	1.0-3.0	1.0-3.0	1.0-3.0	1.0-3.0

Volatile Organic Compounds (ug/kg)

1,1,1,2-Tetrachloroethane	0.82 U	1.1 U	0.84 U	0.89 U	0.88 U	1 U	0.95 U
1,1,1-Trichloroethane	0.74 U	0.96 U	0.76 U	0.81 U	0.8 U	0.94 U	0.86 U
1,1,2,2-Tetrachloroethane	1.8 U	2.3 U	1.8 U	2 U	1.9 U	2.3 U	2.1 U
1,1,2-Trichloroethane	1.5 U	2 U	1.6 U	1.7 U	1.7 U	1.9 U	1.8 U
1,1-Dichloroethane	0.64 U	0.83 U	0.66 U	0.7 U	0.69 U	0.81 U	0.74 U
1,1-Dichloroethene	0.69 U	0.89 U	0.71 U	0.75 U	0.75 U	0.87 U	0.8 U
1,2,3-Trichloropropane	1.8 U	2.3 U	1.8 U	2 U	1.9 U	2.3 U	2.1 U
1,2-Dibromo-3-Chloropropane	3.6 U	4.6 U	3.7 U	3.9 U	3.9 U	4.5 UJ	4.1 UJ
1,2-Dichloroethane	1.3 U	1.7 U	1.3 U	1.4 U	1.4 U	1.6 U	1.5 U
1,2-Dichloropropane	1.4 U	1.8 U	1.4 U	1.5 U	1.5 U	1.8 U	1.6 U
2-Butanone (MEK)	3.4 U	5 U	3.5 U	3.8 U	3.7 U	4.8 U	4 U
2-Chloro-1,3-butadiene	0.73 U	0.94 U	0.75 U	0.8 U	0.79 U	0.92 U	0.84 U
2-Hexanone	2.7 U	3.5 U	2.8 U	2.9 U	2.9 U	3.4 U	3.1 U
3-Chloro-1-propene	1.9 U	2.5 U	2 UJ	2.1 UJ	2.1 UJ	2.4 U	2.2 U
4-Methyl-2-pentanone (MIBK)	3.7 U	4.8 U	3.8 U	4.1 U	4 U	4.7 U	4.3 U
Acetone	5.8 U	24 U	5.8 U	6.2 U	6.1 U	30 R	26 R
Acetonitrile	57 U	74 U	59 U	63 U	62 U	73 R	67 R
Acrolein	24 UJ	31 UJ	25 U	27 U	26 U	31 UJ	28 UJ
Acrylonitrile	29 UJ	38 UJ	30 U	32 U	32 U	37 UJ	34 UJ
Benzene	1 U	1.3 U	1 U	1.1 U	1.1 U	1.5 J	1.2 U
Bromoform	1.4 U	1.8 U	1.4 U	1.5 U	1.5 U	1.8 UJ	1.6 UJ
Bromomethane	2 U	2.6 U	2.1 UJ	2.2 UJ	2.2 UJ	2.6 UJ	2.4 UJ
Carbon disulfide	1.5 U	2 U	1.6 U	1.7 U	1.7 U	2 J	2.3 J
Carbon tetrachloride	1.3 U	1.7 U	1.3 U	1.4 U	1.4 U	1.6 U	1.5 U
Chlorobenzene	0.93 U	1.2 U	0.96 U	1 U	1 U	1.2 U	1.1 U
Chlorodibromomethane	0.64 U	0.83 U	0.66 U	0.7 U	0.69 U	0.81 UJ	0.74 UJ
Chloroethane	1.5 U	2 U	1.6 UJ	1.7 UJ	1.7 UJ	1.9 UJ	1.8 UJ
Chloroform	0.64 U	0.83 U	0.66 U	0.7 U	0.69 U	0.81 U	0.74 U
Chloromethane	0.91 U	1.2 U	0.93 U	0.99 U	0.98 U	1.1 U	1.1 U
cis-1,3-Dichloropropene	1.1 U	1.4 U	1.1 U	1.2 U	1.2 U	1.4 U	1.3 U
Dibromomethane	1.5 U	2 U	1.6 U	1.7 U	1.7 U	1.9 U	1.8 U
Dichlorobromomethane	1.1 U	1.4 U	1.1 U	1.2 U	1.1 U	1.3 U	1.2 U
Dichlorodifluoromethane	1.1 U	1.5 U	1.2 U	1.2 U	1.2 U	1.4 UJ	1.3 UJ
Ethyl methacrylate	2.8 U	3.6 U	2.9 U	3.1 U	3 U	3.6 U	3.3 U
Ethylbenzene	0.96 U	1.2 U	0.98 U	1 U	1 U	1.2 U	1.1 U
Ethylene Dibromide	1.9 U	2.5 U	2 U	2.1 U	2.1 U	2.4 U	2.2 U
Iodomethane	1.3 U	1.7 U	1.3 U	1.4 U	1.4 U	1.6 UJ	1.5 UJ
Isobutyl alcohol	88 U	110 U	91 U	96 U	95 U	110 R	100 R
Methacrylonitrile	31 U	40 U	31 U	34 U	33 U	39 U	36 U
Methyl methacrylate	4.7 U	6.1 U	4.9 U	5.2 U	5.1 U	6 U	5.5 U
Methylene Chloride	1.3 U	1.7 U	1.3 U	1.4 U	1.4 U	4 UJ	2.6 UJ
Pentachloroethane	2.8 U	3.6 U	2.9 UJ	3.1 UJ	3 UJ	3.6 UJ	3.3 UJ
Propionitrile	27 U	35 U	28 U	29 U	29 U	34 UJ	31 UJ

APPENDIX C

**SUMMARY OF ANALYTICAL RESULTS - SUBSURFACE SOIL
SWMU 70 - DISPOSAL AREA NORTHWEST OF LANDFILL
PHASE I RFI REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO**

Site ID	70SB01	70SB02	70SB03	70SB04	70SB04	70SB05	70SB05
Sample ID	70SB01-01	70SB02-01	70SB03-01	70SB04-01	70SB04-01D	70SB05-01	70SB05-01D
Date	1/14/2009	1/14/2009	1/14/2009	1/15/2009	1/15/2009	1/20/2009	1/20/2009
Depth Range	1.0-3.0	1.0-3.0	1.0-3.0	1.0-3.0	1.0-3.0	1.0-3.0	1.0-3.0
Volatile Organic Compounds (ug/kg)							
Styrene	0.84 U	1.1 U	0.87 U	0.92 U	0.91 U	1.1 U	0.98 U
Tetrachloroethene	0.93 U	1.2 U	0.96 U	1 U	1 U	1.2 U	1.1 U
Toluene	1 U	1.3 U	1 U	1.1 U	1.1 U	1.6 U	1.2 U
trans-1,2-Dichloroethene	1.2 U	1.6 U	1.3 U	1.4 U	1.3 U	1.6 U	1.4 U
trans-1,3-Dichloropropene	1.1 U	1.4 U	1.1 U	1.2 U	1.2 U	1.4 U	1.3 U
trans-1,4-Dichloro-2-butene	4 U	5.1 U	4.1 U	4.3 U	4.3 U	5 U	4.6 U
Trichloroethene	1.3 U	1.7 U	1.3 U	1.4 U	1.4 U	1.6 U	1.5 U
Trichlorofluoromethane	1.9 U	2.5 U	2 UJ	2.1 UJ	2.1 UJ	2.4 U	2.2 U
Vinyl acetate	1.9 U	2.5 U	2 U	2.1 U	2.1 U	2.4 U	2.2 U
Vinyl chloride	0.74 U	0.96 U	0.76 U	0.81 U	0.8 U	0.94 U	0.86 U
Xylenes, Total	2.9 U	3.8 U	3 U	3.2 U	3.2 U	3.7 U	3.4 U
Semivolatile Organic Compounds (ug/kg)							
1,2,4,5-Tetrachlorobenzene	8.2 U	11 U	8.9 UJ	9.3 U	9 UJ	8.8 U	8.8 U
1,2,4-Trichlorobenzene	9.6 U	13 U	10 U	11 U	11 U	10 U	10 U
1,2-Dichlorobenzene	9.1 U	12 U	9.9 U	10 U	10 U	9.7 U	9.7 U
1,3,5-Trinitrobenzene	22 U	30 U	24 UJ	25 U	24 UJ	24 UJ	24 UJ
1,3-Dichlorobenzene	7.8 U	10 U	8.5 U	8.9 U	8.6 U	8.3 U	8.4 U
1,3-Dinitrobenzene	5.1 U	6.8 U	5.5 U	5.8 U	5.6 U	5.4 U	5.4 U
1,4-Dichlorobenzene	8 U	11 U	8.8 U	9.2 U	8.9 U	8.6 U	8.6 U
1,4-Dioxane	10 U	14 U	11 U	12 U	11 U	11 U	11 U
1,4-Naphthoquinone	5.1 U	6.8 U	5.5 U	5.8 U	5.6 U	5.4 U	5.4 U
1-Naphthylamine	19 U	26 U	21 U	22 U	22 U	21 U	21 U
2,2'-oxybis[1-chloropropane]	8.2 U	11 U	8.9 U	9.3 U	9 U	8.8 U	8.8 U
2,3,4,6-Tetrachlorophenol	5.4 U	7.3 U	5.9 U	6.2 U	6 U	5.8 U	5.8 U
2,4,5-Trichlorophenol	8.8 U	12 U	9.6 U	10 U	9.8 U	9.5 U	9.5 U
2,4,6-Trichlorophenol	10 U	14 U	11 U	12 U	11 U	11 U	11 U
2,4-Dichlorophenol	11 U	14 U	11 U	12 U	12 U	11 U	11 U
2,4-Dimethylphenol	22 U	30 U	24 U	25 U	24 U	24 U	24 U
2,4-Dinitrophenol	110 U	150 U	120 UJ	120 U	120 UJ	120 UJ	120 UJ
2,4-Dinitrotoluene	7.7 U	10 U	8.3 U	8.7 U	8.5 U	8.2 U	8.2 U
2,6-Dichlorophenol	8.3 U	11 U	9 U	9.5 U	9.2 U	8.9 U	8.9 U
2,6-Dinitrotoluene	8 U	11 U	8.8 U	9.2 U	8.9 U	8.6 U	8.6 U
2-Acetylaminofluorene	6.6 U	8.9 U	7.2 U	7.5 U	7.3 U	7.1 U	7.1 U
2-Chloronaphthalene	8 U	11 U	8.8 U	9.2 U	8.9 U	8.6 U	8.6 U
2-Chlorophenol	8.6 U	12 U	9.3 U	9.7 U	9.5 U	9.2 U	9.2 U
2-Methylnaphthalene	2.2 U	12	3 J	2.5 U	2.4 U	2.4 U	2.4 U
2-Methylphenol	11 U	14 U	11 U	12 U	12 U	11 U	11 U
2-Naphthylamine	26 U	35 U	28 UJ	30 UJ	29 UJ	28 UJ	28 UJ
2-Nitroaniline	8.4 U	11 U	9.2 U	9.6 U	9.3 U	9 U	9 U
2-Nitrophenol	9.5 U	13 U	10 U	11 U	10 U	10 U	10 U
2-Picoline	16 U	21 U	17 U	18 U	17 U	17 U	17 U
2-Toluidine	12 U	16 U	13 U	14 U	13 U	13 U	13 U
3 & 4 Methylphenol	9.5 U	13 U	10 U	11 U	10 U	10 U	10 U
3,3'-Dichlorobenzidine	12 U	16 U	13 U	14 U	13 U	13 U	13 U

APPENDIX C

**SUMMARY OF ANALYTICAL RESULTS - SUBSURFACE SOIL
SWMU 70 - DISPOSAL AREA NORTHWEST OF LANDFILL
PHASE I RFI REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO**

Site ID	70SB01	70SB02	70SB03	70SB04	70SB04	70SB05	70SB05
Sample ID	70SB01-01	70SB02-01	70SB03-01	70SB04-01	70SB04-01D	70SB05-01	70SB05-01D
Date	1/14/2009	1/14/2009	1/14/2009	1/15/2009	1/15/2009	1/20/2009	1/20/2009
Depth Range	1.0-3.0	1.0-3.0	1.0-3.0	1.0-3.0	1.0-3.0	1.0-3.0	1.0-3.0
Semivolatile Organic Compounds (ug/kg)							
3,3'-Dimethylbenzidine	230 U	310 U	250 UJ	270 UJ	260 UJ	250 UJ	250 UJ
3-Methylcholanthrene	7.9 U	11 U	8.6 U	9 U	8.8 U	8.5 U	8.5 U
3-Nitroaniline	5.8 U	7.9 U	6.4 U	6.6 U	6.5 U	6.3 U	6.3 U
4,6-Dinitro-2-methylphenol	7.5 U	10 U	8.2 UJ	8.6 U	8.3 UJ	8.1 UJ	8.1 UJ
4-Aminobiphenyl	17 U	23 U	18 U	19 U	19 U	18 UJ	18 UJ
4-Bromophenyl phenyl ether	9.2 U	12 U	10 U	10 U	10 U	9.9 U	9.9 U
4-Chloro-3-methylphenol	9.7 U	13 U	11 U	11 U	11 U	10 U	10 U
4-Chloroaniline	7.8 U	10 U	8.5 U	8.9 U	8.6 U	8.3 U	8.4 U
4-Chlorophenyl phenyl ether	8 U	11 U	8.8 U	9.2 U	8.9 U	8.6 U	8.6 U
4-Nitroaniline	10 U	13 U	11 U	11 U	11 U	11 U	11 U
4-Nitrophenol	43 U	58 U	47 U	49 U	47 U	46 U	46 U
4-Nitroquinoline-1-oxide	14 R	19 R	16 R	16 R	16 R	15 R	15 R
7,12-Dimethylbenz(a)anthracene	12 U	16 U	13 U	14 U	13 U	13 U	13 U
Acenaphthene	2.2 U	3 U	2.4 U	2.5 U	2.4 U	2.4 U	2.4 U
Acenaphthylene	2.2 R	3 R	2.4 R	2.5 R	2.4 R	2.4 U	2.4 U
Acetophenone	11 U	15 U	12 U	13 U	12 U	12 U	12 U
alpha,alpha-Dimethyl phenethylamine	77 U	100 U	83 U	87 U	85 U	82 U	82 U
Aniline	8.2 U	11 U	8.9 U	9.3 U	9 U	8.8 U	8.8 U
Anthracene	2.2 U	3 U	2.4 U	2.5 U	2.4 U	2.4 U	2.4 U
Aramite, Total	14 U	19 U	16 UJ	16 U	16 UJ	15 U	15 U
Benzo[a]anthracene	2.2 U	3 U	2.4 U	2.5 U	2.4 U	2.4 U	2.4 U
Benzo[a]pyrene	2.2 U	3 U	2.4 U	2.5 U	2.4 U	2.4 U	2.4 U
Benzo[b]fluoranthene	2.2 U	3 U	2.4 U	2.5 UJ	2.4 U	2.4 U	2.4 U
Benzo[g,h,i]perylene	2.2 U	3 U	2.4 UJ	2.5 U	2.4 UJ	2.4 UJ	2.4 UJ
Benzo[k]fluoranthene	2.2 U	3 U	2.4 U	2.5 U	2.4 U	2.4 U	2.4 U
Benzyl alcohol	10 U	14 U	11 U	12 U	11 U	11 U	11 U
Bis(2-chloroethoxy)methane	8.8 U	12 U	9.6 U	10 U	9.8 U	9.5 U	9.5 U
Bis(2-chloroethyl)ether	7.4 U	10 U	8.1 U	8.4 U	8.2 U	7.9 U	7.9 U
Bis(2-ethylhexyl) phthalate	29 U	47 U	23 U	21 U	19 U	13 UJ	10 UJ
Butyl benzyl phthalate	9.3 U	13 U	10 U	11 U	10 U	10 U	10 U
Chrysene	2.2 U	3 U	2.4 U	2.5 U	2.4 U	2.4 U	2.4 U
Diallate	12 U	17 U	14 U	14 U	14 U	13 U	13 U
Dibenz(a,h)anthracene	0.74 U	1 U	0.81 UJ	0.84 U	0.82 UJ	0.79 UJ	0.79 UJ
Dibenzofuran	5.4 R	7.3 R	5.9 R	6.2 R	6 R	5.8 U	5.8 U
Diethyl phthalate	14 U	19 U	16 U	16 U	16 U	15 U	15 U
Dimethyl phthalate	8.3 R	11 R	9 R	9.5 R	9.2 R	8.9 U	8.9 U
Di-n-butyl phthalate	32 U	44 U	35 U	37 U	36 U	35 U	35 U
Di-n-octyl phthalate	4.3 U	5.8 U	4.7 U	4.9 U	4.7 U	4.6 U	4.6 U
Dinoseb	22 U	30 U	24 U	25 U	24 U	24 UJ	24 UJ
Ethyl methanesulfonate	14 U	19 U	16 U	16 U	16 U	15 U	15 U
Fluoranthene	0.49 U	0.66 U	0.54 U	0.56 U	0.55 U	0.53 U	0.53 U
Fluorene	2.2 U	3 U	2.4 U	2.5 U	2.4 U	2.4 U	2.4 U
Hexachlorobenzene	8.8 U	12 U	9.6 U	10 U	9.8 U	9.5 U	9.5 U

APPENDIX C

**SUMMARY OF ANALYTICAL RESULTS - SUBSURFACE SOIL
SWMU 70 - DISPOSAL AREA NORTHWEST OF LANDFILL
PHASE I RFI REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO**

Site ID	70SB01	70SB02	70SB03	70SB04	70SB04	70SB05	70SB05
Sample ID	70SB01-01	70SB02-01	70SB03-01	70SB04-01	70SB04-01D	70SB05-01	70SB05-01D
Date	1/14/2009	1/14/2009	1/14/2009	1/15/2009	1/15/2009	1/20/2009	1/20/2009
Depth Range	1.0-3.0	1.0-3.0	1.0-3.0	1.0-3.0	1.0-3.0	1.0-3.0	1.0-3.0
Semivolatile Organic Compounds (ug/kg)							
Hexachlorobutadiene	12 U	16 U	13 U	13 U	13 U	13 U	13 U
Hexachlorocyclopentadiene	18 U	24 U	20 UJ	21 UJ	20 UJ	19 UJ	19 UJ
Hexachloroethane	9.6 U	13 U	10 U	11 U	11 U	10 U	10 U
Hexachlorophene	1100 U	1500 U	1200 UJ	1200 UJ	1200 UJ	1200 R	1200 R
Hexachloropropene	9.3 U	13 U	10 U	11 U	10 U	10 U	10 U
Indeno[1,2,3-cd]pyrene	4.3 U	5.8 U	4.7 UJ	4.9 U	4.7 UJ	4.6 UJ	4.6 UJ
Isophorone	8 U	11 U	8.8 U	9.2 U	8.9 U	8.6 U	8.6 U
Isosafrole	9.2 U	12 U	10 U	10 U	10 U	9.9 U	9.9 U
Methapyrilene	12 U	16 U	13 U	14 U	13 U	13 U	13 U
Methyl methanesulfonate	12 U	16 U	13 U	14 U	13 U	13 U	13 U
Naphthalene	2.2 U	3 U	2.4 U	2.5 U	2.4 U	2.4 U	2.4 U
Nitrobenzene	9 U	12 U	9.7 U	10 U	9.9 U	9.6 U	9.6 U
N-Nitro-o-toluidine	7.8 U	10 U	8.5 U	8.9 U	8.6 U	8.3 U	8.4 U
N-Nitrosodiethylamine	16 U	21 U	17 U	18 U	17 U	17 U	17 U
N-Nitrosodimethylamine	13 U	17 U	14 U	14 U	14 U	14 U	14 U
N-Nitrosodi-n-butylamine	12 U	16 U	13 U	13 U	13 U	13 U	13 U
N-Nitrosodi-n-propylamine	8.4 U	11 U	9.2 U	9.6 U	9.3 U	9 U	9 U
N-Nitrosodiphenylamine	9.2 U	12 U	10 U	10 U	10 U	9.9 U	9.9 U
N-Nitrosomethylethylamine	7.4 U	10 U	8.1 U	8.4 U	8.2 U	7.9 U	7.9 U
N-Nitrosomorpholine	8.6 U	12 U	9.3 U	9.7 U	9.5 U	9.2 U	9.2 U
N-Nitrosopiperidine	11 U	15 U	12 U	13 U	12 U	12 U	12 U
N-Nitrosopyrrolidine	12 U	16 U	13 U	13 U	13 U	12 U	12 U
p-Dimethylamino azobenzene	9.2 U	12 U	10 U	10 U	10 U	9.9 U	9.9 U
Pentachlorobenzene	8 U	11 U	8.8 U	9.2 U	8.9 U	8.6 U	8.6 U
Pentachloronitrobenzene	7.7 U	10 U	8.3 U	8.7 U	8.5 U	8.2 U	8.2 U
Pentachlorophenol	11 U	15 U	12 U	12 U	12 U	12 UJ	12 UJ
Phenacetin	6.1 U	8.2 U	6.6 U	6.9 U	6.7 U	6.5 U	6.5 U
Phenanthrene	2.2 U	3 U	2.4 U	2.5 U	2.4 U	2.4 U	2.4 U
Phenol	6.2 U	8.4 U	6.8 U	7.1 U	6.9 U	6.7 U	6.7 U
p-Phenylene diamine	210 U	280 U	230 UJ	240 UJ	230 UJ	220 U	220 U
Pronamide	12 U	16 U	13 U	13 U	13 U	13 U	13 U
Pyrene	2.2 U	3 U	2.4 U	2.5 U	2.4 U	2.4 U	2.4 U
Pyridine	14 U	19 U	16 U	16 U	16 U	15 U	15 U
Safrole, Total	11 U	15 U	12 U	12 U	12 U	12 U	12 U
PCBs (ug/kg)							
PCB-1016	4.9 U	6.6 U	5.4 U	5.6 U	5.4 U	5.3 U	5.3 U
PCB-1221	17 U	23 U	18 U	19 U	19 U	18 U	18 U
PCB-1232	9.7 U	13 U	11 U	11 U	11 U	10 U	10 U
PCB-1242	6.2 U	8.4 U	6.8 U	7.1 U	6.9 U	6.7 U	6.7 U
PCB-1248	6.6 U	8.9 U	7.2 U	7.5 U	7.3 U	7.1 U	7.1 U
PCB-1254	3 U	4 U	3.2 U	3.4 U	3.3 U	3.2 U	3.2 U
PCB-1260	6.2 U	8.4 U	6.8 U	7.1 U	6.9 U	6.7 U	6.7 U

APPENDIX C

**SUMMARY OF ANALYTICAL RESULTS - SUBSURFACE SOIL
SWMU 70 - DISPOSAL AREA NORTHWEST OF LANDFILL
PHASE I RFI REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO**

	Site ID	70SB01	70SB02	70SB03	70SB04	70SB04	70SB05	70SB05
	Sample ID	70SB01-01	70SB02-01	70SB03-01	70SB04-01	70SB04-01D	70SB05-01	70SB05-01D
	Date	1/14/2009	1/14/2009	1/14/2009	1/15/2009	1/15/2009	1/20/2009	1/20/2009
	Depth Range	1.0-3.0	1.0-3.0	1.0-3.0	1.0-3.0	1.0-3.0	1.0-3.0	1.0-3.0
Metals (mg/kg)								
Antimony		0.47 U	0.56 U	0.67 U	0.51 U	0.48 U	0.32 U	0.26 U
Arsenic		3.8	6.1	3.9	5.6	4.8	4.8	4.7
Barium		8.8 J	12 J	10 J	8.6 J	9 J	10	11
Beryllium		0.11 U	0.13 U	0.11 U	0.11 U	0.11 U	0.021 U	0.025 J
Cadmium		0.19 U	0.23 U	0.19 U	0.19 U	0.2 U	0.036 U	0.038 U
Chromium		3.6 UJ	21 J	8.8 J	3 U	2.6 U	7.3	9
Cobalt		0.74 J	4.3 J	1.1 J	0.66 J	0.71 J	1.7 J	3.7 J
Copper		3 UJ	23 J	5.7 U	3.1 UJ	3.2 UJ	5.5 R	14 R
Lead		0.54 UJ	0.67 UJ	0.55 UJ	0.55 UJ	0.56 UJ	0.2 U	0.35 U
Mercury		0.0051 U	0.007 U	0.049	0.006 U	0.0053 U	0.0052 U	0.0052 U
Nickel		1.9 J	64 J	3 J	1.6 J	1.7 J	2.3 J	4 J
Selenium		0.73 U	0.89 U	0.75 U	0.75 U	0.76 U	0.25 U	0.24 U
Silver		0.097 U	0.12 U	0.1 U	0.1 U	0.1 U	0.019 U	0.02 U
Thallium		0.73 U	0.89 U	0.75 U	0.75 U	0.76 U	0.14 U	0.15 U
Tin		24 U	30 U	25 U	25 U	25 U	4.7 U	4.9 U
Vanadium		5.9 UJ	25 J	11 J	4.5 UJ	4 UJ	21 J	35 J
Zinc		3.9 UJ	16 UJ	6.4 UJ	4 UJ	4.1 UJ	2.1 U	3.8 U
TPH DRO and GRO (mg/kg)								
Diesel Range Organics		1.4 U	1.9 U	1.5 U	1.3 U	0.94 U	1.2 U	2.3 U
Gasoline Range Organics		0.084 U	0.092 U	0.083 U	0.084 U	0.076 U	0.085 R	0.16 J

OPEN WATER SEDIMENT

APPENDIX C

**SUMMARY OF ANALYTICAL RESULTS - OPEN WATER SEDIMENT
SWMU 70 - DISPOSAL AREA NORTHWEST OF LANDFILL
PHASE I RFI REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO**

Site ID	70SD01	70SD02	70SD03	70SD03
Sample ID	70SD01	70SD02	70SD03	70SD03D
Date	1/17/2009	1/17/2009	1/22/2009	1/22/2009
Depth Range	0.0-0.5	0.0-0.5	0.0-0.5	0.0-0.5

Volatile Organic Compounds (ug/kg)

1,1,1,2-Tetrachloroethane	0.93 U	0.97 U	1.2 UJ	1.1 UJ
1,1,1-Trichloroethane	0.84 U	0.88 U	1.1 UJ	1 UJ
1,1,2,2-Tetrachloroethane	2 U	2.1 U	2.7 UJ	2.4 UJ
1,1,2-Trichloroethane	1.7 U	1.8 U	2.3 UJ	2.1 UJ
1,1-Dichloroethane	0.72 U	0.76 U	0.97 UJ	0.87 UJ
1,1-Dichloroethene	0.78 U	0.82 U	1 UJ	0.94 UJ
1,2,3-Trichloropropane	2 U	2.1 U	2.7 UJ	2.4 UJ
1,2-Dibromo-3-Chloropropane	4 U	4.2 U	5.4 UJ	4.9 UJ
1,2-Dichloroethane	1.4 U	1.5 U	1.9 UJ	1.7 UJ
1,2-Dichloropropane	1.6 U	1.7 U	2.1 UJ	1.9 UJ
2-Butanone (MEK)	10 U	25 U	29 UJ	40 UJ
2-Chloro-1,3-butadiene	0.82 U	0.86 U	1.1 UJ	0.99 UJ
2-Hexanone	3 U	3.2 U	4.1 UJ	3.6 UJ
3-Chloro-1-propene	2.2 U	2.3 U	2.9 UJ	2.6 UJ
4-Methyl-2-pentanone (MIBK)	4.2 U	4.4 U	5.6 UJ	5 UJ
Acetone	140 J	300 J	140 J	240 J
Acetonitrile	65 UJ	68 UJ	87 UJ	78 UJ
Acrolein	27 U	29 U	37 UJ	33 UJ
Acrylonitrile	33 U	35 U	45 UJ	40 UJ
Benzene	1.1 U	1.2 U	1.6 J	1.4 UJ
Bromoform	1.6 U	1.7 U	2.1 UJ	1.9 UJ
Bromomethane	2.3 UJ	2.4 UJ	3.1 UJ	2.8 UJ
Carbon disulfide	8.5	17	5.7 J	5.9 J
Carbon tetrachloride	1.4 U	1.5 U	1.9 UJ	1.7 UJ
Chlorobenzene	1.1 U	1.1 U	1.4 UJ	1.3 UJ
Chlorodibromomethane	0.72 U	0.76 U	0.97 UJ	0.87 UJ
Chloroethane	1.7 U	1.8 U	2.3 UJ	2.1 UJ
Chloroform	0.72 U	0.76 U	0.97 UJ	0.87 UJ
Chloromethane	1 U	1.1 U	1.4 UJ	1.2 UJ
cis-1,3-Dichloropropene	1.3 U	1.3 U	1.7 UJ	1.5 UJ
Dibromomethane	1.7 U	1.8 U	2.3 UJ	2.1 UJ
Dichlorobromomethane	1.2 U	1.3 U	1.6 UJ	1.4 UJ
Dichlorodifluoromethane	1.3 U	1.3 U	1.7 UJ	1.5 UJ
Ethyl methacrylate	3.2 U	3.3 U	4.3 UJ	3.8 UJ
Ethylbenzene	1.1 U	1.1 U	1.5 UJ	1.3 UJ
Ethylene Dibromide	2.2 U	2.3 U	2.9 UJ	2.6 UJ
Iodomethane	1.4 U	1.5 U	1.9 UJ	1.7 UJ
Isobutyl alcohol	100 R	100 R	130 R	120 R
Methacrylonitrile	35 U	36 U	47 UJ	42 UJ
Methyl methacrylate	5.3 U	5.6 U	7.2 UJ	6.4 UJ
Methylene Chloride	2.5 J	3.2 J	1.9 UJ	1.7 UJ
Pentachloroethane	3.2 UJ	3.3 UJ	4.3 UJ	3.8 UJ
Propionitrile	30 U	32 U	41 UJ	36 UJ

APPENDIX C

**SUMMARY OF ANALYTICAL RESULTS - OPEN WATER SEDIMENT
SWMU 70 - DISPOSAL AREA NORTHWEST OF LANDFILL
PHASE I RFI REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO**

Site ID	70SD01	70SD02	70SD03	70SD03
Sample ID	70SD01	70SD02	70SD03	70SD03D
Date	1/17/2009	1/17/2009	1/22/2009	1/22/2009
Depth Range	0.0-0.5	0.0-0.5	0.0-0.5	0.0-0.5

Volatile Organic Compounds (ug/kg)

Styrene	0.95 U	1 U	1.3 UJ	1.1 UJ
Tetrachloroethene	1.1 U	1.1 U	1.4 UJ	1.3 UJ
Toluene	1.1 U	1.2 U	1.5 UJ	1.4 UJ
trans-1,2-Dichloroethene	1.4 U	1.5 U	1.9 UJ	1.7 UJ
trans-1,3-Dichloropropene	1.3 U	1.3 U	1.7 UJ	1.5 UJ
trans-1,4-Dichloro-2-butene	4.5 U	4.7 U	6 UJ	5.4 UJ
Trichloroethene	1.4 U	1.5 U	1.9 UJ	1.7 UJ
Trichlorofluoromethane	2.2 U	2.3 U	2.9 UJ	2.6 UJ
Vinyl acetate	2.2 U	2.3 U	2.9 UJ	2.6 UJ
Vinyl chloride	0.84 U	0.88 U	1.1 UJ	1 UJ
Xylenes, Total	3.3 U	3.5 U	4.5 UJ	4 UJ

Semivolatile Organic Compounds (ug/kg)

1,2,4,5-Tetrachlorobenzene	11 U	11 U	15 UJ	13 UJ
1,2,4-Trichlorobenzene	12 U	12 U	17 UJ	15 UJ
1,2-Dichlorobenzene	12 U	12 U	16 UJ	14 UJ
1,3,5-Trinitrobenzene	29 UJ	29 UJ	40 UJ	34 UJ
1,3-Dichlorobenzene	10 U	10 U	14 UJ	12 UJ
1,3-Dinitrobenzene	6.5 U	6.5 U	9.2 UJ	7.8 UJ
1,4-Dichlorobenzene	10 U	10 U	15 UJ	12 UJ
1,4-Dioxane	13 U	13 U	19 UJ	16 UJ
1,4-Naphthoquinone	6.5 U	6.5 U	9.2 UJ	7.8 UJ
1-Naphthylamine	25 U	25 U	35 UJ	30 UJ
2,2'-oxybis[1-chloropropane]	11 U	11 U	15 UJ	13 UJ
2,3,4,6-Tetrachlorophenol	7 U	7 U	9.9 UJ	8.4 UJ
2,4,5-Trichlorophenol	11 U	11 U	16 UJ	14 UJ
2,4,6-Trichlorophenol	13 U	13 U	19 UJ	16 UJ
2,4-Dichlorophenol	14 U	14 U	19 UJ	16 UJ
2,4-Dimethylphenol	29 U	29 U	40 UJ	34 UJ
2,4-Dinitrophenol	140 U	140 U	200 UJ	170 UJ
2,4-Dinitrotoluene	9.9 U	9.9 U	14 UJ	12 UJ
2,6-Dichlorophenol	11 U	11 U	15 UJ	13 UJ
2,6-Dinitrotoluene	10 U	10 U	15 UJ	12 UJ
2-Acetylaminofluorene	8.6 U	8.6 U	12 UJ	10 UJ
2-Chloronaphthalene	10 U	10 U	15 UJ	12 UJ
2-Chlorophenol	11 U	11 U	16 UJ	13 UJ
2-Methylnaphthalene	2.9 U	2.9 U	4 UJ	3.4 UJ
2-Methylphenol	14 U	14 U	19 UJ	16 UJ
2-Naphthylamine	34 U	34 U	47 UJ	40 UJ
2-Nitroaniline	11 U	11 U	15 UJ	13 UJ
2-Nitrophenol	12 U	12 U	17 UJ	15 UJ
2-Picoline	20 U	20 U	28 UJ	24 UJ
2-Toluidine	16 U	16 U	22 UJ	19 UJ
3 & 4 Methylphenol	12 U	94	17 UJ	15 UJ

APPENDIX C

**SUMMARY OF ANALYTICAL RESULTS - OPEN WATER SEDIMENT
SWMU 70 - DISPOSAL AREA NORTHWEST OF LANDFILL
PHASE I RFI REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO**

Site ID	70SD01	70SD02	70SD03	70SD03
Sample ID	70SD01	70SD02	70SD03	70SD03D
Date	1/17/2009	1/17/2009	1/22/2009	1/22/2009
Depth Range	0.0-0.5	0.0-0.5	0.0-0.5	0.0-0.5

Semivolatile Organic Compounds (ug/kg)

3,3'-Dichlorobenzidine	15 UJ	15 UJ	22 UJ	18 UJ
3,3'-Dimethylbenzidine	300 UJ	300 UJ	420 UJ	360 UJ
3-Methylcholanthrene	10 U	10 U	14 UJ	12 UJ
3-Nitroaniline	7.5 U	7.5 U	11 UJ	9 UJ
4,6-Dinitro-2-methylphenol	9.7 U	9.7 U	14 UJ	12 UJ
4-Aminobiphenyl	22 U	22 U	31 UJ	26 UJ
4-Bromophenyl phenyl ether	12 U	12 U	17 UJ	14 UJ
4-Chloro-3-methylphenol	13 U	13 U	18 UJ	15 UJ
4-Chloroaniline	10 U	10 U	14 UJ	12 UJ
4-Chlorophenyl phenyl ether	10 U	10 U	15 UJ	12 UJ
4-Nitroaniline	13 U	13 U	18 UJ	15 UJ
4-Nitrophenol	55 U	55 U	78 UJ	66 UJ
4-Nitroquinoline-1-oxide	18 R	18 R	26 R	22 R
7,12-Dimethylbenz(a)anthracene	16 U	16 U	22 UJ	19 UJ
Acenaphthene	2.9 U	2.9 U	4 UJ	3.4 UJ
Acenaphthylene	2.9 U	2.9 U	4 UJ	3.4 UJ
Acetophenone	14 U	14 U	20 UJ	17 UJ
alpha,alpha-Dimethyl phenethylamine	99 U	99 U	140 UJ	120 UJ
Aniline	11 U	11 U	15 UJ	13 UJ
Anthracene	2.9 U	2.9 U	4 UJ	3.4 UJ
Aramite, Total	18 U	18 U	26 UJ	22 UJ
Benzo[a]anthracene	9.9 J	2.9 U	4 UJ	3.4 UJ
Benzo[a]pyrene	7.4 J	2.9 U	4 UJ	3.4 UJ
Benzo[b]fluoranthene	8.2 J	4.1 J	4 UJ	3.4 UJ
Benzo[g,h,i]perylene	2.9 U	2.9 U	4 UJ	3.4 UJ
Benzo[k]fluoranthene	6.6 J	2.9 U	4 UJ	3.4 UJ
Benzyl alcohol	13 U	13 U	19 UJ	16 UJ
Bis(2-chloroethoxy)methane	11 U	11 U	16 UJ	14 UJ
Bis(2-chloroethyl)ether	9.6 U	9.6 U	13 UJ	11 UJ
Bis(2-ethylhexyl) phthalate	20 U	21 U	19 J	25 J
Butyl benzyl phthalate	12 U	12 U	17 UJ	14 UJ
Chrysene	6.8 J	2.9 U	4 UJ	3.4 UJ
Diallate	16 U	16 U	23 UJ	19 UJ
Dibenz(a,h)anthracene	0.96 U	0.96 U	1.3 UJ	1.1 UJ
Dibenzofuran	7 U	7 U	9.9 UJ	8.4 UJ
Diethyl phthalate	18 U	18 U	26 UJ	22 UJ
Dimethyl phthalate	11 U	11 U	15 UJ	13 UJ
Di-n-butyl phthalate	42 U	42 U	59 UJ	50 UJ
Di-n-octyl phthalate	5.5 U	5.5 U	7.8 UJ	6.6 UJ
Dinoseb	29 U	29 U	40 UJ	34 UJ
Ethyl methanesulfonate	18 U	18 U	26 UJ	22 UJ
Fluoranthene	13	0.64 U	5.2 J	4 J
Fluorene	2.9 U	2.9 U	4 UJ	3.4 UJ

APPENDIX C

**SUMMARY OF ANALYTICAL RESULTS - OPEN WATER SEDIMENT
SWMU 70 - DISPOSAL AREA NORTHWEST OF LANDFILL
PHASE I RFI REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO**

Site ID	70SD01	70SD02	70SD03	70SD03
Sample ID	70SD01	70SD02	70SD03	70SD03D
Date	1/17/2009	1/17/2009	1/22/2009	1/22/2009
Depth Range	0.0-0.5	0.0-0.5	0.0-0.5	0.0-0.5

Semivolatile Organic Compounds (ug/kg)

Hexachlorobenzene	11 U	11 U	16 UJ	14 UJ
Hexachlorobutadiene	15 U	15 U	21 UJ	18 UJ
Hexachlorocyclopentadiene	23 U	23 U	33 UJ	28 UJ
Hexachloroethane	12 U	12 U	17 UJ	15 UJ
Hexachlorophene	1400 UJ	1400 UJ	2000 UJ	1700 R
Hexachloropropene	12 UJ	12 UJ	17 UJ	14 UJ
Indeno[1,2,3-cd]pyrene	5.5 U	5.5 U	7.8 UJ	6.6 UJ
Isophorone	10 U	10 U	15 UJ	12 UJ
Isosafrole	12 U	12 U	17 UJ	14 UJ
Methapyrilene	16 U	16 U	22 UJ	19 UJ
Methyl methanesulfonate	16 U	16 U	22 UJ	19 UJ
Naphthalene	2.9 U	2.9 U	4 UJ	3.4 UJ
Nitrobenzene	12 U	12 U	16 UJ	14 UJ
N-Nitro-o-toluidine	10 U	10 U	14 UJ	12 UJ
N-Nitrosodiethylamine	20 U	20 U	28 UJ	24 UJ
N-Nitrosodimethylamine	16 U	16 U	23 UJ	20 UJ
N-Nitrosodi-n-butylamine	15 U	15 U	21 UJ	18 UJ
N-Nitrosodi-n-propylamine	11 U	11 U	15 UJ	13 UJ
N-Nitrosodiphenylamine	12 U	12 U	17 UJ	14 UJ
N-Nitrosomethylethylamine	9.6 U	9.6 U	13 UJ	11 UJ
N-Nitrosomorpholine	11 U	11 U	16 UJ	13 UJ
N-Nitrosopiperidine	14 U	14 U	20 UJ	17 UJ
N-Nitrosopyrrolidine	15 U	15 U	21 UJ	18 UJ
p-Dimethylamino azobenzene	12 U	12 U	17 UJ	14 UJ
Pentachlorobenzene	10 U	10 U	15 UJ	12 UJ
Pentachloronitrobenzene	9.9 U	9.9 U	14 UJ	12 UJ
Pentachlorophenol	14 UJ	14 UJ	20 UJ	17 UJ
Phenacetin	7.9 U	7.9 U	11 UJ	9.4 UJ
Phenanthrene	3 J	2.9 U	4 UJ	3.4 UJ
Phenol	8 U	44 U	69 UJ	60 UJ
p-Phenylene diamine	270 UJ	270 UJ	380 UJ	320 UJ
Pronamide	15 U	15 U	21 UJ	18 UJ
Pyrene	14	2.9 U	5.5 J	4.2 J
Pyridine	18 U	18 U	26 UJ	22 UJ
Safrole, Total	14 U	14 U	20 UJ	17 UJ

PCBs (ug/kg)

PCB-1016	6.4 U	6.5 U	9 UJ	7.6 UJ
PCB-1221	22 U	22 U	31 UJ	26 UJ
PCB-1232	13 U	13 U	18 UJ	15 UJ
PCB-1242	8 U	8.1 U	11 UJ	9.5 UJ
PCB-1248	8.6 U	8.7 U	12 UJ	10 UJ
PCB-1254	3.9 U	3.9 U	5.4 UJ	4.6 UJ
PCB-1260	8 U	8.1 U	11 UJ	9.5 UJ

APPENDIX C

**SUMMARY OF ANALYTICAL RESULTS - OPEN WATER SEDIMENT
SWMU 70 - DISPOSAL AREA NORTHWEST OF LANDFILL
PHASE I RFI REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO**

Site ID	70SD01	70SD02	70SD03	70SD03
Sample ID	70SD01	70SD02	70SD03	70SD03D
Date	1/17/2009	1/17/2009	1/22/2009	1/22/2009
Depth Range	0.0-0.5	0.0-0.5	0.0-0.5	0.0-0.5

Metals (mg/kg)

Antimony	0.17 UJ	0.26 UJ	0.21 UJ	0.15 UJ
Arsenic	2	4.4	5.6 J	5.3 J
Barium	7	12	13 J	13 J
Beryllium	0.026 U	0.057 J	0.098 J	0.075 J
Cadmium	0.045 U	0.047 U	0.067 UJ	0.058 UJ
Chromium	2.9	21	18 J	16 J
Cobalt	0.85	6.4	4.9 J	4.3 J
Copper	1.8 J	21	29 J	25 J
Lead	0.51	1.3	2 J	1.9 J
Mercury	0.0057 U	0.015 J	0.015 J	0.014 J
Nickel	0.83	8.7	7.1 J	6.3 J
Selenium	0.17 U	0.2 J	0.3 UJ	0.33 UJ
Silver	0.023 U	0.053 U	0.083 UJ	0.081 UJ
Thallium	0.17 U	0.18 U	0.26 UJ	0.22 UJ
Tin	5.8 U	6.1 U	8.7 UJ	7.5 UJ
Vanadium	4.3	35	45 J	37 J
Zinc	3.1 U	17	23 J	20 J

TPH DRO and GRO (mg/kg)

Diesel Range Organics	1.2 U	1 U	29 J	13 UJ
Gasoline Range Organics	0.1 U	0.1 U	0.14 J	0.16 J

ESTUARINE SEDIMENT

APPENDIX C

**SUMMARY OF ANALYTICAL RESULTS - ESTUARINE SEDIMENT
SWMU 70 - DISPOSAL AREA NORTHWEST OF LANDFILL
PHASE I RFI REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO**

Site ID	70SB06	70SB07	70SB08
Sample ID	70SD06	70SD07	70SD08
Date	1/15/2009	1/15/2009	1/15/2009
Depth Range	0.0-0.5	0.0-0.5	0.0-0.5

Volatile Organic Compounds (ug/kg)

1,1,1,2-Tetrachloroethane	0.77 U	0.81 U	0.93 U
1,1,1-Trichloroethane	0.69 U	0.74 U	0.84 U
1,1,2,2-Tetrachloroethane	1.7 U	1.8 U	2 U
1,1,2-Trichloroethane	1.4 U	1.5 U	1.7 U
1,1-Dichloroethane	0.6 U	0.63 U	0.73 U
1,1-Dichloroethene	0.65 U	0.69 U	0.79 U
1,2,3-Trichloropropane	1.7 U	1.8 U	2 U
1,2-Dibromo-3-Chloropropane	3.3 U	3.6 U	4.1 U
1,2-Dichloroethane	1.2 U	1.3 U	1.5 U
1,2-Dichloropropane	1.3 U	1.4 U	1.6 U
2-Butanone (MEK)	14 U	3.4 U	6.3 U
2-Chloro-1,3-butadiene	0.68 U	0.72 U	0.83 U
2-Hexanone	2.5 U	2.7 U	3.1 U
3-Chloro-1-propene	1.8 U	1.9 U	2.2 U
4-Methyl-2-pentanone (MIBK)	3.5 U	3.7 U	4.2 U
Acetone	48 J	7.6 J	25 J
Acetonitrile	54 U	57 U	66 U
Acrolein	23 U	24 U	28 U
Acrylonitrile	27 U	29 U	33 U
Benzene	0.94 U	1 U	1.2 U
Bromoform	1.3 U	1.4 U	1.6 U
Bromomethane	1.9 UJ	2 UJ	2.3 UJ
Carbon disulfide	1.4 U	1.5 U	6.6 J
Carbon tetrachloride	1.2 U	1.3 U	1.5 U
Chlorobenzene	0.87 U	0.93 U	1.1 U
Chlorodibromomethane	0.6 U	0.63 U	0.73 U
Chloroethane	1.4 U	1.5 U	1.7 U
Chloroform	0.6 U	0.63 U	0.73 U
Chloromethane	0.85 U	0.9 U	1 U
cis-1,3-Dichloropropene	1 U	1.1 U	1.3 U
Dibromomethane	1.4 U	1.5 U	1.7 U
Dichlorobromomethane	0.99 U	1.1 U	1.2 U
Dichlorodifluoromethane	1.1 U	1.1 U	1.3 U
Ethyl methacrylate	2.6 U	2.8 U	3.2 U
Ethylbenzene	0.9 U	0.95 U	1.1 U
Ethylene Dibromide	1.8 U	1.9 U	2.2 U
Iodomethane	1.2 UJ	1.3 UJ	1.5 UJ
Isobutyl alcohol	82 U	88 U	100 U
Methacrylonitrile	29 U	30 U	35 U
Methyl methacrylate	4.4 U	4.7 U	5.4 U
Methylene Chloride	1.5 J	1.3 J	2.5 J
Pentachloroethane	2.6 U	2.8 U	3.2 U
Propionitrile	25 U	27 U	31 U

APPENDIX C

**SUMMARY OF ANALYTICAL RESULTS - ESTUARINE SEDIMENT
SWMU 70 - DISPOSAL AREA NORTHWEST OF LANDFILL
PHASE I RFI REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO**

Site ID	70SB06	70SB07	70SB08
Sample ID	70SD06	70SD07	70SD08
Date	1/15/2009	1/15/2009	1/15/2009
Depth Range	0.0-0.5	0.0-0.5	0.0-0.5

Volatile Organic Compounds (ug/kg)

Styrene	0.79 U	0.84 U	0.96 U
Tetrachloroethene	0.87 UJ	0.93 UJ	1.1 UJ
Toluene	0.94 U	1 U	1.2 U
trans-1,2-Dichloroethene	1.2 U	1.2 U	1.4 U
trans-1,3-Dichloropropene	1 U	1.1 U	1.3 U
trans-1,4-Dichloro-2-butene	3.7 U	3.9 U	4.5 U
Trichloroethene	1.2 U	1.3 U	1.5 U
Trichlorofluoromethane	1.8 UJ	1.9 UJ	2.2 UJ
Vinyl acetate	1.8 U	1.9 U	2.2 U
Vinyl chloride	0.69 U	0.74 U	0.84 U
Xylenes, Total	2.7 U	2.9 U	3.3 U

Semivolatile Organic Compounds (ug/kg)

1,2,4,5-Tetrachlorobenzene	8.8 U	8.6 U	9.3 U
1,2,4-Trichlorobenzene	10 UJ	10 UJ	11 UJ
1,2-Dichlorobenzene	9.8 U	9.6 U	10 U
1,3,5-Trinitrobenzene	24 UJ	23 UJ	25 UJ
1,3-Dichlorobenzene	8.4 U	8.2 U	8.8 U
1,3-Dinitrobenzene	5.5 U	5.3 U	5.8 U
1,4-Dichlorobenzene	8.7 U	8.5 U	9.1 U
1,4-Dioxane	11 U	11 U	12 U
1,4-Naphthoquinone	5.5 U	5.3 U	5.8 U
1-Naphthylamine	21 U	21 U	22 U
2,2'-oxybis[1-chloropropane]	8.8 U	8.6 U	9.3 U
2,3,4,6-Tetrachlorophenol	5.9 U	5.7 U	6.2 U
2,4,5-Trichlorophenol	9.5 UJ	9.3 UJ	10 UJ
2,4,6-Trichlorophenol	11 U	11 U	12 U
2,4-Dichlorophenol	11 U	11 U	12 U
2,4-Dimethylphenol	24 U	23 U	25 U
2,4-Dinitrophenol	120 U	110 U	120 U
2,4-Dinitrotoluene	8.3 U	8.1 U	8.7 U
2,6-Dichlorophenol	9 U	8.7 U	9.4 U
2,6-Dinitrotoluene	8.7 U	8.5 U	9.1 U
2-Acetylaminofluorene	7.2 U	7 U	7.5 U
2-Chloronaphthalene	8.7 UJ	8.5 UJ	9.1 UJ
2-Chlorophenol	9.3 U	9 U	9.7 U
2-Methylnaphthalene	2.4 U	2.3 U	2.5 U
2-Methylphenol	11 U	11 U	12 U
2-Naphthylamine	28 U	27 U	29 U
2-Nitroaniline	9.1 U	8.9 U	9.6 U
2-Nitrophenol	10 U	10 U	11 U
2-Picoline	17 U	16 U	18 U
2-Toluidine	13 U	13 U	14 U
3 & 4 Methylphenol	10 U	10 U	11 U

APPENDIX C

**SUMMARY OF ANALYTICAL RESULTS - ESTUARINE SEDIMENT
SWMU 70 - DISPOSAL AREA NORTHWEST OF LANDFILL
PHASE I RFI REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO**

Site ID	70SB06	70SB07	70SB08
Sample ID	70SD06	70SD07	70SD08
Date	1/15/2009	1/15/2009	1/15/2009
Depth Range	0.0-0.5	0.0-0.5	0.0-0.5

Semivolatile Organic Compounds (ug/kg)

3,3'-Dichlorobenzidine	13 UJ	13 UJ	14 UJ
3,3'-Dimethylbenzidine	250 UJ	250 UJ	270 UJ
3-Methylcholanthrene	8.6 U	8.3 U	9 U
3-Nitroaniline	6.3 U	6.2 U	6.6 U
4,6-Dinitro-2-methylphenol	8.1 U	7.9 U	8.6 U
4-Aminobiphenyl	18 U	18 U	19 U
4-Bromophenyl phenyl ether	10 UJ	9.7 UJ	10 UJ
4-Chloro-3-methylphenol	11 U	10 U	11 U
4-Chloroaniline	8.4 U	8.2 U	8.8 U
4-Chlorophenyl phenyl ether	8.7 U	8.5 U	9.1 U
4-Nitroaniline	11 U	11 U	11 U
4-Nitrophenol	46 U	45 U	49 U
4-Nitroquinoline-1-oxide	15 R	15 R	16 R
7,12-Dimethylbenz(a)anthracene	13 U	13 U	14 U
Acenaphthene	2.4 U	2.3 U	2.5 U
Acenaphthylene	2.4 U	2.3 U	2.5 U
Acetophenone	12 U	12 U	13 U
alpha,alpha-Dimethyl phenethylamine	83 U	81 U	87 U
Aniline	8.8 U	8.6 U	9.3 U
Anthracene	2.4 U	2.3 U	2.5 U
Aramite, Total	15 U	15 U	16 U
Benzo[a]anthracene	2.4 U	2.3 U	2.5 U
Benzo[a]pyrene	2.4 U	2.3 U	2.5 U
Benzo[b]fluoranthene	2.4 U	2.3 U	2.5 U
Benzo[g,h,i]perylene	2.4 U	2.3 U	2.5 U
Benzo[k]fluoranthene	2.4 U	2.3 U	2.5 U
Benzyl alcohol	11 U	11 U	12 U
Bis(2-chloroethoxy)methane	9.5 U	9.3 U	10 U
Bis(2-chloroethyl)ether	8 U	7.8 U	8.4 U
Bis(2-ethylhexyl) phthalate	16 U	19 U	18 U
Butyl benzyl phthalate	10 U	9.8 U	11 U
Chrysene	2.4 U	2.3 U	2.5 U
Diallate	13 U	13 U	14 U
Dibenz(a,h)anthracene	0.8 U	0.78 U	0.84 U
Dibenzofuran	5.9 U	5.7 U	6.2 U
Diethyl phthalate	15 U	15 U	16 U
Dimethyl phthalate	9 U	8.7 U	9.4 U
Di-n-butyl phthalate	35 U	34 U	37 U
Di-n-octyl phthalate	4.6 UJ	4.5 UJ	4.9 UJ
Dinoseb	24 U	23 U	25 U
Ethyl methanesulfonate	15 U	15 U	16 U
Fluoranthene	0.56 J	1.8 J	1.1 J
Fluorene	2.4 U	2.3 U	2.5 U

APPENDIX C

**SUMMARY OF ANALYTICAL RESULTS - ESTUARINE SEDIMENT
SWMU 70 - DISPOSAL AREA NORTHWEST OF LANDFILL
PHASE I RFI REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO**

Site ID	70SB06	70SB07	70SB08
Sample ID	70SD06	70SD07	70SD08
Date	1/15/2009	1/15/2009	1/15/2009
Depth Range	0.0-0.5	0.0-0.5	0.0-0.5

Semivolatile Organic Compounds (ug/kg)

Hexachlorobenzene	9.5 UJ	9.3 UJ	10 UJ
Hexachlorobutadiene	13 UJ	12 UJ	13 UJ
Hexachlorocyclopentadiene	20 U	19 U	21 UJ
Hexachloroethane	10 U	10 U	11 U
Hexachlorophene	1200 UJ	1100 UJ	1200 UJ
Hexachloropropene	10 UJ	9.8 UJ	11 UJ
Indeno[1,2,3-cd]pyrene	4.6 U	4.5 U	4.9 U
Isophorone	8.7 UJ	8.5 UJ	9.1 UJ
Isosafrole	10 U	9.7 U	10 U
Methapyrilene	13 U	13 U	14 U
Methyl methanesulfonate	13 U	13 U	14 U
Naphthalene	2.4 U	2.3 U	2.5 U
Nitrobenzene	9.7 U	9.4 U	10 U
N-Nitro-o-toluidine	8.4 U	8.2 U	8.8 U
N-Nitrosodiethylamine	17 U	16 U	18 U
N-Nitrosodimethylamine	14 U	13 U	14 U
N-Nitrosodi-n-butylamine	13 U	12 U	13 U
N-Nitrosodi-n-propylamine	9.1 U	8.9 U	9.6 U
N-Nitrosodiphenylamine	10 UJ	9.7 UJ	10 UJ
N-Nitrosomethylethylamine	8 U	7.8 U	8.4 U
N-Nitrosomorpholine	9.3 U	9 U	9.7 U
N-Nitrosopiperidine	12 U	12 U	13 U
N-Nitrosopyrrolidine	12 U	12 U	13 U
p-Dimethylamino azobenzene	10 U	9.7 U	10 U
Pentachlorobenzene	8.7 U	8.5 U	9.1 U
Pentachloronitrobenzene	8.3 U	8.1 U	8.7 U
Pentachlorophenol	12 UJ	11 UJ	12 UJ
Phenacetin	6.6 U	6.4 U	6.9 U
Phenanthrene	2.4 U	2.3 U	2.5 U
Phenol	6.7 U	6.6 U	7.1 U
p-Phenylene diamine	220 UJ	220 UJ	240 UJ
Pronamide	13 U	12 U	13 U
Pyrene	2.4 U	2.7 J	2.5 U
Pyridine	15 U	15 U	16 U
Safrole, Total	12 U	11 U	12 U

PCBs (ug/kg)

PCB-1016	5.3 U	5.2 U	5.6 U
PCB-1221	18 U	18 U	19 U
PCB-1232	10 U	10 U	11 U
PCB-1242	6.7 U	6.6 U	7.1 U
PCB-1248	7.1 U	7 U	7.5 U
PCB-1254	3.2 U	3.2 U	3.4 U
PCB-1260	6.7 U	6.6 U	7.1 U

APPENDIX C

**SUMMARY OF ANALYTICAL RESULTS - ESTUARINE SEDIMENT
SWMU 70 - DISPOSAL AREA NORTHWEST OF LANDFILL
PHASE I RFI REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO**

Site ID	70SB06	70SB07	70SB08
Sample ID	70SD06	70SD07	70SD08
Date	1/15/2009	1/15/2009	1/15/2009
Depth Range	0.0-0.5	0.0-0.5	0.0-0.5

Metals (mg/kg)

Antimony	1.2 U	0.71 U	0.58 U
Arsenic	3.5	3 U	5.5
Barium	42 J	18 J	11 J
Beryllium	0.17 U	0.11 U	0.12 U
Cadmium	0.18 U	0.19 U	0.2 U
Chromium	10 J	54 J	31 J
Cobalt	9.4 J	22 J	8 J
Copper	53 J	80 J	20 J
Lead	4.8 J	1.1 UJ	1.3 UJ
Mercury	0.005 U	0.0081 J	0.012 J
Nickel	7.2 J	24 J	9.8 J
Selenium	0.71 U	0.75 U	0.78 U
Silver	0.3 U	0.1 U	0.1 U
Thallium	0.71 U	0.75 U	0.78 U
Tin	24 U	25 U	26 U
Vanadium	67 J	290 J	63 J
Zinc	47 J	39 J	15 UJ

TPH DRO and GRO (mg/kg)

Diesel Range Organics	2.4 U	0.82 U	0.97 U
Gasoline Range Organics	0.073 U	0.073 U	0.069 U
Total Organic Carbon (mg/kg)			
Total Organic Carbon	30000	5400	36000

GROUNDWATER

APPENDIX C

**SUMMARY OF ANALYTICAL RESULTS - GROUNDWATER
SWMU 70 - DISPOSAL AREA NORTHWEST OF LANDFILL
PHASE I RFI REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO**

Site ID	70SB01	70SB02	70SB02	70SB03	70SB04	70SB05	70SB06	70SB07	70SB08
Sample ID	70GW01	70GW02	70GW02D	70GW03	70GW04	70 GW05	70GW06	70GW07	70GW08
Date	1/17/2009	1/17/2009	1/17/2009	1/17/2009	1/17/2009	1/20/2009	1/17/2009	1/17/2009	1/17/2009

Volatile Organic Compounds (ug/L)

1,1,1,2-Tetrachloroethane	0.29 U	0.29 R	0.29 R	0.29 U	0.29 U	0.29 R	0.29 U	0.29 U	0.29 U
1,1,1-Trichloroethane	0.39 U	0.39 R	0.39 R	0.39 U	0.39 U	0.39 R	0.39 U	0.39 U	0.39 U
1,1,2,2-Tetrachloroethane	0.26 U	0.26 R	0.26 R	0.26 U	0.26 U	0.26 R	0.26 U	0.26 U	0.26 U
1,1,2-Trichloroethane	0.51 U	0.51 R	0.51 R	0.51 U	0.51 U	0.51 R	0.51 U	0.51 U	0.51 U
1,1-Dichloroethane	0.32 U	0.32 R	0.32 R	0.32 U	0.32 U	0.32 R	0.32 U	0.32 U	0.32 U
1,1-Dichloroethene	0.36 U	0.36 R	0.36 R	0.36 U	0.36 U	0.36 R	0.36 U	0.36 U	0.36 U
1,2,3-Trichloropropane	0.42 U	0.42 R	0.42 R	0.42 U	0.42 U	0.42 R	0.42 U	0.42 U	0.42 U
1,2-Dibromo-3-Chloropropane	0.48 U	0.48 R	0.48 R	0.48 U	0.48 U	0.48 R	0.48 U	0.48 U	0.48 U
1,2-Dichloroethane	0.31 U	0.31 R	0.31 R	0.31 U	0.31 U	0.31 R	0.31 U	0.31 U	0.31 U
1,2-Dichloropropane	0.36 U	0.36 R	0.36 R	0.36 U	0.36 U	0.36 R	0.36 U	0.36 U	0.36 U
2-Butanone (MEK)	0.6 U	0.6 R	0.6 R	0.6 U	0.6 U	1.9 R	0.6 U	0.6 U	0.6 U
2-Chloro-1,3-butadiene	0.35 UJ	0.35 R	0.35 R	0.35 UJ	0.35 UJ	0.35 R	0.35 UJ	0.35 UJ	0.35 UJ
2-Hexanone	0.68 U	0.68 R	0.68 R	0.68 U	0.68 U	0.68 R	0.68 U	0.68 U	0.68 U
3-Chloro-1-propene	0.46 U	0.46 R	0.46 R	0.46 U	0.46 U	0.46 R	0.46 U	0.46 U	0.46 U
4-Methyl-2-pentanone (MIBK)	0.6 U	0.6 R	0.6 R	0.6 U	0.6 U	0.6 R	0.6 U	0.6 U	0.6 U
Acetone	5.5 J	5 R	6.4 J	5 U	5 U	14 J	5 U	5 U	5 U
Acetonitrile	15 U	15 R	15 R	15 U	15 U	15 R	15 U	15 U	15 U
Acrolein	18 U	18 R	18 R	18 U	18 U	18 R	18 U	18 U	18 U
Acrylonitrile	3.8 U	3.8 R	3.8 R	3.8 U	3.8 U	3.8 R	3.8 U	3.8 U	3.8 U
Benzene	0.32 U	0.32 R	0.32 R	0.32 U	0.32 U	0.32 R	0.32 U	0.32 U	0.32 U
Bromoform	0.41 U	0.41 R	0.41 R	0.41 U	0.41 U	0.41 R	0.41 U	0.41 U	0.41 U
Bromomethane	0.5 U	0.5 R	0.5 R	0.5 U	0.5 U	0.5 R	0.5 U	0.5 U	0.5 U
Carbon disulfide	1.3 U	0.6 R	0.73 R	0.6 U	0.6 U	0.86 J	0.6 U	0.6 U	0.6 U
Carbon tetrachloride	0.27 U	0.27 R	0.27 R	0.27 U	0.27 U	0.27 R	0.27 U	0.27 U	0.27 U
Chlorobenzene	0.34 U	0.34 R	0.34 R	0.34 U	0.34 U	0.34 R	0.34 U	0.34 U	0.34 U
Chlorodibromomethane	0.3 U	0.3 R	0.3 R	0.3 U	0.3 U	0.3 R	0.3 U	0.3 U	0.3 U
Chloroethane	1 U	1 R	1 R	1 U	1 U	1 R	1 U	1 U	1 U
Chloroform	0.29 U	0.29 R	0.29 R	0.29 U	0.29 U	0.29 R	0.29 U	0.29 U	0.29 U
Chloromethane	0.28 U	0.28 R	0.28 R	0.28 U	0.28 U	0.28 R	0.28 U	0.28 U	0.28 U

APPENDIX C

**SUMMARY OF ANALYTICAL RESULTS - GROUNDWATER
SWMU 70 - DISPOSAL AREA NORTHWEST OF LANDFILL
PHASE I RFI REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO**

	Site ID	70SB01	70SB02	70SB02	70SB03	70SB04	70SB05	70SB06	70SB07	70SB08
	Sample ID	70GW01	70GW02	70GW02D	70GW03	70GW04	70 GW05	70GW06	70GW07	70GW08
	Date	1/17/2009	1/17/2009	1/17/2009	1/17/2009	1/17/2009	1/20/2009	1/17/2009	1/17/2009	1/17/2009
Volatile Organic Compounds (ug/L)										
cis-1,3-Dichloropropene		0.37 U	0.37 R	0.37 R	0.37 U	0.37 U	0.37 R	0.37 U	0.37 U	0.37 U
Dibromomethane		0.29 U	0.29 R	0.29 R	0.29 U	0.29 U	0.29 R	0.29 U	0.29 U	0.29 U
Dichlorobromomethane		0.34 U	0.34 R	0.34 R	0.34 U	0.34 U	0.34 R	0.34 U	0.34 U	0.34 U
Dichlorodifluoromethane		0.33 U	0.33 R	0.33 R	0.33 U	0.33 U	0.33 R	0.33 U	0.33 U	0.33 U
Ethyl methacrylate		1 U	1 R	1 R	1 U	1 U	1 R	1 U	1 U	1 U
Ethylbenzene		0.3 U	0.3 R	0.3 R	0.3 U	0.3 U	0.3 R	0.3 U	0.3 U	0.3 U
Ethylene Dibromide		0.3 U	0.3 R	0.3 R	0.3 U	0.3 U	0.3 R	0.3 U	0.3 U	0.3 U
Iodomethane		1 UJ	1 R	1 R	1 UJ	1 UJ	1 R	1 UJ	1 UJ	1 UJ
Isobutanol		19 R								
Methacrylonitrile		6.6 U	6.6 R	6.6 R	6.6 U	6.6 U	6.6 R	6.6 U	6.6 U	6.6 U
Methyl methacrylate		0.38 U	0.38 R	0.38 R	0.38 U	0.38 U	0.38 R	0.38 U	0.38 U	0.38 U
Methylene Chloride		1 U	1 R	1 R	1 U	1 U	1 R	1 U	1 U	1 U
Pentachloroethane		1.3 UJ	1.3 R	1.3 R	1.3 UJ	1.3 UJ	1.3 R	1.3 UJ	1.3 UJ	1.3 UJ
Propionitrile		9.2 U	9.2 R	9.2 R	9.2 U	9.2 U	9.2 R	9.2 U	9.2 U	9.2 U
Styrene		0.36 U	0.36 R	0.36 R	0.36 U	0.36 U	0.36 R	0.36 U	0.36 U	0.36 U
Tetrachloroethene		0.28 U	0.28 R	0.28 R	0.28 U	0.28 U	0.28 R	0.28 U	0.28 U	0.28 U
Toluene		0.31 U	0.31 R	0.31 R	0.31 U	0.31 U	0.31 R	0.31 U	0.31 U	0.31 U
trans-1,2-Dichloroethene		0.3 U	0.3 R	0.3 R	0.3 U	0.3 U	0.3 R	0.3 U	0.3 U	0.3 U
trans-1,3-Dichloropropene		0.27 U	0.27 R	0.27 R	0.27 U	0.27 U	0.27 R	0.27 U	0.27 U	0.27 U
trans-1,4-Dichloro-2-butene		0.83 U	0.83 R	0.83 R	0.83 U	0.83 U	0.83 R	0.83 U	0.83 U	0.83 U
Trichloroethene		0.4 U	0.4 R	0.4 R	0.4 U	0.4 U	0.4 R	0.4 U	0.4 U	0.4 U
Trichlorofluoromethane		0.29 U	0.29 R	0.29 R	0.29 U	0.29 U	0.29 R	0.29 U	0.29 U	0.29 U
Vinyl acetate		0.62 U	0.62 R	0.62 R	0.62 U	0.62 U	0.62 R	0.62 U	0.62 U	0.62 U
Vinyl chloride		0.2 U	0.2 R	0.2 R	0.2 U	0.23 J	0.2 R	0.2 U	0.2 U	0.2 U
Xylenes, Total		0.87 U	0.87 R	0.87 R	0.87 U	0.87 U	0.87 R	0.87 U	0.87 U	0.87 U
Semivolatile Organic Compounds (ug/L)										
1,2,4,5-Tetrachlorobenzene		0.24 U	0.24 U	0.24 U	0.23 U	0.23 U	0.24 U	0.24 U	0.23 U	0.23 U
1,2,4-Trichlorobenzene		0.13 U								
1,2-Dichlorobenzene		0.13 U								
1,3,5-Trinitrobenzene		0.21 UJ	0.21 U	0.21 UJ	0.2 U	0.2 UJ	0.21 U	0.21 U	0.2 U	0.2 U
1,3-Dichlorobenzene		0.12 U	0.21 J	0.12 U	0.12 U	0.12 U				

APPENDIX C

**SUMMARY OF ANALYTICAL RESULTS - GROUNDWATER
SWMU 70 - DISPOSAL AREA NORTHWEST OF LANDFILL
PHASE I RFI REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO**

	Site ID	70SB01	70SB02	70SB02	70SB03	70SB04	70SB05	70SB06	70SB07	70SB08
	Sample ID	70GW01	70GW02	70GW02D	70GW03	70GW04	70 GW05	70GW06	70GW07	70GW08
	Date	1/17/2009	1/17/2009	1/17/2009	1/17/2009	1/17/2009	1/20/2009	1/17/2009	1/17/2009	1/17/2009
Semivolatile Organic Compounds (ug/L)										
1,3-Dinitrobenzene		0.23 U	0.23 U	0.23 U	0.22 U	0.22 U	0.23 U	0.23 U	0.22 U	0.22 U
1,4-Dichlorobenzene		0.12 U								
1,4-Dioxane		0.51 U	0.51 U	0.49 U	0.49 U	0.49 U	0.5 U	0.49 U	0.49 U	0.49 U
1,4-Naphthoquinone		0.16 U								
1-Naphthylamine		0.35 U	0.35 UJ	0.33 U	0.33 UJ	0.33 U	0.34 UJ	0.33 UJ	0.33 UJ	0.33 UJ
2,2'-oxybis[1-chloropropane]		0.1 U	0.1 U	0.098 U	0.097 U	0.097 U	0.1 U	0.098 U	0.097 U	0.097 U
2,3,4,6-Tetrachlorophenol		0.31 U	0.31 U	0.29 U	0.29 U	0.29 U	0.3 U	0.29 U	0.29 U	0.29 U
2,4,5-Trichlorophenol		0.16 U								
2,4,6-Trichlorophenol		0.16 U								
2,4-Dichlorophenol		0.15 U	0.15 UJ	0.15 U	0.15 U	0.15 U				
2,4-Dimethylphenol		0.42 U	0.42 U	0.4 U	0.4 U	0.4 U	0.41 UJ	0.4 U	0.4 U	0.4 U
2,4-Dinitrophenol		2.6 UJ	2.6 U	2.5 UJ	2.4 U	2.4 UJ	2.5 UJ	2.5 U	2.4 U	2.4 U
2,4-Dinitrotoluene		0.18 U	0.18 U	0.18 U	0.17 U	0.17 U	0.18 U	0.18 U	0.17 U	0.17 U
2,6-Dichlorophenol		0.22 U	0.22 U	0.22 U	0.21 U	0.21 U	0.22 U	0.22 U	0.21 U	0.21 U
2,6-Dinitrotoluene		0.15 U								
2-Acetylaminofluorene		0.2 U	0.2 U	0.2 U	0.19 U	0.19 U	0.2 U	0.2 U	0.19 U	0.19 U
2-Chloronaphthalene		0.12 U	0.12 UJ	0.12 U	0.12 U	0.12 U				
2-Chlorophenol		0.15 U	0.15 UJ	0.15 U	0.15 U	0.15 U				
2-Methylnaphthalene		0.023 U	0.023 U	0.023 U	0.022 U	0.022 U	0.027 J	0.023 U	0.022 U	0.022 U
2-Methylphenol		0.15 U	0.15 UJ	0.15 U	0.15 U	0.15 U				
2-Naphthylamine		1.1 UJ								
2-Nitroaniline		0.14 U	0.14 UJ	0.14 U	0.14 U	0.14 U				
2-Nitrophenol		0.17 U	0.17 UJ	0.17 U	0.17 U	0.17 U				
2-Picoline		0.6 U	0.6 U	0.58 U	0.57 U	0.57 U	0.59 U	0.58 U	0.57 U	0.57 U
2-Toluidine		0.34 U	0.34 U	0.32 U	0.32 U	0.32 U	0.33 U	0.32 U	0.32 U	0.32 U
3 & 4 Methylphenol		0.4 J	0.73 J	0.49 J	0.15 U	0.26 J	0.15 UJ	0.15 U	0.15 U	0.15 U
3,3'-Dichlorobenzidine		3.9 U	3.9 UJ	3.7 UJ	3.7 U	3.7 U	3.8 UJ	3.7 U	3.7 U	3.7 U
3,3'-Dimethylbenzidine		3.9 UJ	3.9 U	3.7 UJ	3.7 U	3.7 UJ	3.8 U	3.7 U	3.7 U	3.7 U
3-Methylcholanthrene		0.21 U	0.21 U	0.21 U	0.2 U	0.2 U	0.21 U	0.21 U	0.2 U	0.2 U
3-Nitroaniline		0.3 U	0.3 U	0.28 U	0.28 U	0.28 U	0.29 UJ	0.28 U	0.28 U	0.28 U
4,6-Dinitro-2-methylphenol		0.51 UJ	0.51 U	0.49 UJ	0.49 U	0.49 UJ	0.5 UJ	0.49 U	0.49 U	0.49 U

APPENDIX C

**SUMMARY OF ANALYTICAL RESULTS - GROUNDWATER
SWMU 70 - DISPOSAL AREA NORTHWEST OF LANDFILL
PHASE I RFI REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO**

	Site ID	70SB01	70SB02	70SB02	70SB03	70SB04	70SB05	70SB06	70SB07	70SB08
	Sample ID	70GW01	70GW02	70GW02D	70GW03	70GW04	70 GW05	70GW06	70GW07	70GW08
	Date	1/17/2009	1/17/2009	1/17/2009	1/17/2009	1/17/2009	1/20/2009	1/17/2009	1/17/2009	1/17/2009
Semivolatile Organic Compounds (ug/L)										
4-Aminobiphenyl		0.71 UJ	0.71 U	0.69 UJ	0.68 U	0.68 UJ	0.7 U	0.69 U	0.68 U	0.68 U
4-Bromophenyl phenyl ether		0.16 U								
4-Chloro-3-methylphenol		0.16 U	0.16 UJ	0.16 U	0.16 U	0.16 U				
4-Chloroaniline		0.42 U	0.42 U	0.4 U	0.4 U	0.4 U	0.41 U	0.4 U	0.4 U	0.4 U
4-Chlorophenyl phenyl ether		0.15 U								
4-Nitroaniline		0.28 U	0.28 U	0.26 U	0.26 U	0.26 U	0.27 UJ	0.26 U	0.26 U	0.26 U
4-Nitrophenol		0.19 U	0.19 U	0.19 U	0.18 U	0.18 U	0.19 U	0.19 U	0.18 U	0.18 U
4-Nitroquinoline-1-oxide		0.28 R	0.28 R	0.26 R	0.26 R	0.26 R	0.27 R	0.26 R	0.26 R	0.26 R
7,12-Dimethylbenz(a)anthracene		0.21 U	0.21 U	0.21 U	0.2 U	0.2 U	0.21 U	0.21 U	0.2 U	0.2 U
Acenaphthene		0.023 U	0.023 U	0.023 U	0.022 U	0.022 U	0.023 U	0.023 U	0.022 U	0.022 U
Acenaphthylene		0.02 U	0.02 U	0.02 U	0.019 U	0.019 U	0.02 UJ	0.02 U	0.019 U	0.019 U
Acetophenone		0.2 U	0.2 U	0.2 U	0.19 U	0.19 U	0.2 U	0.2 U	0.19 U	0.19 U
alpha,alpha-Dimethyl phenethylamine		1.3 U								
Aniline		0.42 U	0.42 U	0.4 U	0.4 U	0.4 U	0.41 U	0.4 U	0.4 U	0.4 U
Anthracene		0.027 U	0.027 U	0.025 U	0.025 U	0.025 U	0.026 U	0.025 U	0.025 U	0.039 J
Aramite, Total		0.51 U	0.51 U	0.49 U	0.49 U	0.49 U	0.5 U	0.49 U	0.49 U	0.49 U
Benzo[a]anthracene		0.051 U	0.051 U	0.049 U	0.049 U	0.049 U	0.05 U	0.049 U	0.049 U	0.049 U
Benzo[a]pyrene		0.017 U								
Benzo[b]fluoranthene		0.021 U	0.021 UJ	0.021 U	0.02 UJ	0.02 U	0.021 UJ	0.021 UJ	0.02 UJ	0.02 UJ
Benzo[g,h,i]perylene		0.051 UJ	0.051 UJ	0.049 UJ	0.049 UJ	0.049 UJ	0.05 UJ	0.049 UJ	0.049 UJ	0.049 UJ
Benzo[k]fluoranthene		0.036 U	0.036 UJ	0.034 UJ	0.034 U	0.034 U	0.035 U	0.034 U	0.034 U	0.034 U
Benzyl alcohol		0.46 U	0.17 U	0.16 U	0.16 U	0.16 U	0.24 U	0.16 U	0.16 U	0.16 U
Bis(2-chloroethoxy)methane		0.15 U								
Bis(2-chloroethyl)ether		0.14 U								
Bis(2-ethylhexyl) phthalate		0.36 UJ	0.49 J	1.8 J	0.35 J	0.4 J	0.35 U	0.91 J	0.37 J	0.36 J
Butyl benzyl phthalate		0.17 U								
Chrysene		0.051 U	0.051 U	0.049 U	0.049 U	0.049 U	0.05 U	0.049 U	0.049 U	0.049 U
Diallate		0.2 U	0.2 U	0.2 U	0.19 U	0.19 U	0.2 U	0.2 U	0.19 U	0.19 U
Dibenz(a,h)anthracene		0.022 UJ	0.022 UJ	0.022 UJ	0.021 UJ	0.021 UJ	0.022 UJ	0.022 UJ	0.021 UJ	0.021 UJ
Dibenzofuran		0.1 U	0.1 U	0.098 U	0.097 U	0.097 U	0.1 U	0.098 U	0.097 U	0.097 U
Diethyl phthalate		0.19 U	0.19 U	0.19 U	0.18 U	0.18 U	0.19 U	0.19 U	0.18 U	0.18 U

APPENDIX C

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SWMU 70 - DISPOSAL AREA NORTHWEST OF LANDFILL
PHASE I RFI REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO**

Site ID	70SB01	70SB02	70SB02	70SB03	70SB04	70SB05	70SB06	70SB07	70SB08
Sample ID	70GW01	70GW02	70GW02D	70GW03	70GW04	70 GW05	70GW06	70GW07	70GW08
Date	1/17/2009	1/17/2009	1/17/2009	1/17/2009	1/17/2009	1/20/2009	1/17/2009	1/17/2009	1/17/2009
Semivolatile Organic Compounds (ug/L)									
Dimethyl phthalate	0.18 U	0.18 U	0.18 U	0.17 U	0.17 U	0.18 U	0.18 U	0.17 U	0.17 U
Di-n-butyl phthalate	0.11 U	0.12 U	0.12 U	0.22 U	0.11 U	0.11 U	0.11 U	0.18 U	0.11 U
Di-n-octyl phthalate	0.1 U	0.1 UJ	0.098 UJ	0.097 U	0.097 U	0.1 U	0.098 U	0.097 U	0.097 U
Dinoseb	0.51 UJ	0.51 U	0.49 UJ	0.49 U	0.49 UJ	0.5 U	0.49 U	0.49 U	0.49 U
Ethyl methanesulfonate	0.24 U	0.24 U	0.24 U	0.23 U	0.23 U	0.24 U	0.24 U	0.23 U	0.23 U
Fluoranthene	0.019 U	0.019 U	0.019 U	0.018 U	0.018 U	0.019 U	0.019 U	0.018 U	0.018 U
Fluorene	0.027 U	0.027 U	0.025 U	0.025 U	0.025 U	0.026 UJ	0.025 U	0.025 U	0.025 U
Hexachlorobenzene	0.16 U								
Hexachlorobutadiene	0.13 U								
Hexachlorocyclopentadiene	0.51 UJ	0.51 UJ	0.49 UJ	0.49 UJ	0.49 UJ	0.5 UJ	0.49 UJ	0.49 UJ	0.49 UJ
Hexachloroethane	0.15 U								
Hexachlorophene	51 R	51 UJ	49 R	49 UJ	49 R	50 UJ	49 UJ	49 UJ	49 UJ
Hexachloropropene	0.12 U								
Indeno[1,2,3-cd]pyrene	0.051 UJ	0.051 UJ	0.049 UJ	0.049 UJ	0.049 UJ	0.05 UJ	0.049 UJ	0.049 UJ	0.049 UJ
Isophorone	0.15 U	0.15 UJ	0.15 U	0.15 U	0.15 U				
Isosafrole	0.32 U	0.32 U	0.3 U	0.3 U	0.3 U	0.31 U	0.3 U	0.3 U	0.3 U
Methapyrilene	0.28 U	0.28 U	0.26 U	0.26 U	0.26 U	0.27 U	0.26 U	0.26 U	0.26 U
Methyl methanesulfonate	0.48 U	0.48 U	0.46 U	0.46 U	0.46 U	0.47 U	0.46 U	0.46 U	0.46 U
Naphthalene	0.027 U	0.027 U	0.025 U	0.025 U	0.029 J	0.12 J	0.025 U	0.025 U	0.025 U
Nitrobenzene	0.14 U								
N-Nitro-o-toluidine	0.26 U	0.26 U	0.25 U	0.24 U	0.24 U	0.25 U	0.25 U	0.24 U	0.24 U
N-Nitrosodiethylamine	0.34 U	0.34 U	0.32 U	0.32 U	0.32 U	0.33 U	0.32 U	0.32 U	0.32 U
N-Nitrosodimethylamine	0.2 U	0.2 U	0.2 U	0.19 U	0.19 U	0.2 U	0.2 U	0.19 U	0.19 U
N-Nitrosodi-n-butylamine	0.19 U	0.19 U	0.19 U	0.18 U	0.18 U	0.19 U	0.19 U	0.18 U	0.18 U
N-Nitrosodi-n-propylamine	0.13 U	0.13 UJ	0.13 U	0.13 U	0.13 U				
N-Nitrosodiphenylamine	0.18 U	0.18 U	0.18 U	0.17 U	0.17 U	0.18 UJ	0.18 U	0.17 U	0.17 U
N-Nitrosomethylethylamine	0.3 U	0.3 U	0.28 U	0.28 U	0.28 U	0.29 U	0.28 U	0.28 U	0.28 U
N-Nitrosomorpholine	0.2 U	0.2 U	0.2 U	0.19 U	0.19 U	0.2 U	0.2 U	0.19 U	0.19 U
N-Nitrosopiperidine	0.23 U	0.23 U	0.23 U	0.22 U	0.22 U	0.23 U	0.23 U	0.22 U	0.22 U
N-Nitrosopyrrolidine	0.27 U	0.27 U	0.25 U	0.25 U	0.25 U	0.26 U	0.25 U	0.25 U	0.25 U
p-Dimethylamino azobenzene	0.63 U	0.63 U	0.61 U	0.6 U	0.6 U	0.62 U	0.61 U	0.6 U	0.6 U

APPENDIX C

**SUMMARY OF ANALYTICAL RESULTS - GROUNDWATER
SWMU 70 - DISPOSAL AREA NORTHWEST OF LANDFILL
PHASE I RFI REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO**

Site ID	70SB01	70SB02	70SB02	70SB03	70SB04	70SB05	70SB06	70SB07	70SB08
Sample ID	70GW01	70GW02	70GW02D	70GW03	70GW04	70 GW05	70GW06	70GW07	70GW08
Date	1/17/2009	1/17/2009	1/17/2009	1/17/2009	1/17/2009	1/20/2009	1/17/2009	1/17/2009	1/17/2009
Semivolatile Organic Compounds (ug/L)									
Pentachlorobenzene	0.29 U	0.29 U	0.27 U	0.27 U	0.27 U	0.28 U	0.27 U	0.27 U	0.27 U
Pentachloronitrobenzene	0.32 U	0.32 U	0.3 U	0.3 U	0.3 U	0.31 U	0.3 U	0.3 U	0.3 U
Pentachlorophenol	0.19 U	0.19 U	0.19 U	0.18 U	0.18 U	0.19 UJ	0.19 U	0.18 U	0.18 U
Phenacetin	0.21 U	0.21 U	0.21 U	0.2 U	0.2 U	0.21 U	0.21 U	0.2 U	0.2 U
Phenanthrene	0.032 U	0.032 U	0.03 U	0.03 U	0.03 U	0.039 J	0.03 U	0.03 U	0.03 U
Phenol	0.49 U	0.14 U	0.14 U	0.14 U	0.66 U	0.86 UJ	0.14 U	0.14 U	0.14 U
p-Phenylene diamine	2.6 U	2.6 U	2.5 U	2.4 U	2.4 U	2.5 U	2.5 U	2.4 U	2.4 U
Pronamide	0.27 U	0.27 U	0.25 U	0.25 U	0.25 U	0.26 U	0.25 U	0.25 U	0.25 U
Pyrene	0.022 U	0.022 U	0.022 U	0.021 U	0.021 U	0.022 U	0.022 U	0.021 U	0.021 U
Pyridine	0.23 U	0.23 U	0.23 U	0.22 U	0.22 U	0.23 U	0.23 U	0.22 U	0.22 U
Safrole, Total	0.24 U	0.24 U	0.24 U	0.23 U	0.23 U	0.24 U	0.24 U	0.23 U	0.23 U
PCBs (ug/L)									
PCB-1016	0.94 U	0.94 U	0.94 U	0.094 U	0.094 U	0.094 U	0.094 U	0.094 U	0.094 U
PCB-1221	3.9 U	3.9 U	3.9 U	0.39 U	0.39 U	0.39 U	0.39 U	0.39 U	0.39 U
PCB-1232	0.81 U	0.81 U	0.81 U	0.081 U	0.081 U	0.081 U	0.081 U	0.081 U	0.081 U
PCB-1242	0.93 U	0.93 U	0.93 U	0.093 U	0.093 U	0.093 U	0.093 U	0.093 U	0.093 U
PCB-1248	0.81 U	0.81 U	0.81 U	0.081 U	0.081 U	0.081 U	0.081 U	0.081 U	0.081 U
PCB-1254	0.88 U	0.88 U	0.88 U	0.088 U	0.088 U	0.088 U	0.088 U	0.088 U	0.088 U
PCB-1260	0.97 U	0.97 U	0.97 U	0.097 U	0.097 U	0.097 U	0.097 U	0.097 U	0.097 U
Total Metals (ug/L)									
Antimony	7.2 U	14 U	7.2 U	7.2 U	7.2 U				
Arsenic	41 U	16 U	5.6 U	10 U	40 U	20 U	5.6 U	6.6 U	5.6 U
Barium	40 U	390	390	95 J	40 U	80 U	70 J	55 J	77 J
Beryllium	1.3 U	2.6 U	1.3 U	1.3 U	1.3 U				
Cadmium	2.4 U	4.8 U	2.4 U	2.4 U	2.4 U				
Chromium	12 U	21 J	12 U	12 U	12 U	24 U	12 U	12 U	12 U
Cobalt	1.1 U	2.4 U	2.9 U	67	2.2 U	3.7 U	1.4 U	6.7 U	2.1 U
Copper	24 U	25 J	24 U	24 U	24 U	48 U	24 U	24 U	24 U
Lead	3 U	3 U	3 U	3 U	3 U	6 U	3 U	3 U	3 U
Mercury	0.08 U	0.08 UJ	0.08 U	0.08 U	0.08 U				
Nickel	6.4 U	12 J	6.4 U	35	6.4 U	13 U	6.4 U	6.4 U	6.4 U

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	Site ID	70SB01	70SB02	70SB02	70SB03	70SB04	70SB05	70SB06	70SB07	70SB08
	Sample ID	70GW01	70GW02	70GW02D	70GW03	70GW04	70 GW05	70GW06	70GW07	70GW08
	Date	1/17/2009	1/17/2009	1/17/2009	1/17/2009	1/17/2009	1/20/2009	1/17/2009	1/17/2009	1/17/2009
Total Metals (ug/L)										
Selenium		12 U	24 U	12 U	12 U	12 U				
Silver		1.8 U	1.8 U	1.8 U	2.7 U	1.8 U	3.6 U	1.8 U	1.8 U	1.8 U
Thallium		11 U	22 U	11 U	11 U	11 U				
Tin		18 U	36 U	18 U	18 U	18 U				
Vanadium		19 J	34 J	24 J	16 U	16 U	32 U	16 U	16 J	17 J
Zinc		130 U	260 U	130 U	130 U	130 U				
Dissolved Metals (ug/L)										
Antimony		7.2 U	23 U	7.2 U	7.2 U	7.2 U				
Arsenic		44 J	13 J	16 J	9.4 J	33 J	15 U	5.6 U	5.6 U	5.6 U
Barium		40 U	400	390	93 J	40 U	80 U	72 J	56 J	80 J
Beryllium		1.3 U	2.6 U	1.3 U	1.3 U	1.3 U				
Cadmium		2.4 U	4.8 U	2.4 U	2.4 U	2.4 U				
Chromium		12 U	24 U	12 U	12 U	12 U				
Cobalt		2.5 U	3.4 U	2.1 U	66	2.3 U	4.3 U	1.4 U	6.9 U	2.9 U
Copper		24 UJ	28 J	24 UJ	24 UJ	24 UJ	48 U	24 UJ	24 UJ	24 UJ
Lead		3 U	3 U	3 U	3 U	3 U	6 U	3 U	3 U	3 U
Mercury		0.08 UJ	0.08 U	0.08 UJ	0.08 UJ	0.08 UJ				
Nickel		6.4 U	6.4 U	6.4 U	31	11 J	13 U	6.4 U	6.4 U	6.4 U
Selenium		12 U	24 U	12 U	12 U	12 U				
Silver		1.8 U	1.8 U	1.8 U	3.4 U	1.8 U	3.6 U	1.8 U	1.8 U	1.8 U
Thallium		11 U	22 U	11 U	11 U	11 U				
Tin		18 U	36 U	18 U	18 U	18 U				
Vanadium		17 J	32 J	31 J	16 U	16 U	32 U	16 U	16 U	17 J
Zinc		130 U	260 U	130 U	130 U	130 U				
TPH DRO and GRO (mg/L)										
Diesel Range Organics		1.5	0.65	0.5	0.64	0.12 U	0.2 U	0.12 U	0.078 U	0.45
Gasoline Range Organics		0.012 U	0.012 R	0.012 R	0.012 U	0.012 U	0.013 J	0.012 U	0.012 U	0.012 U

QA/QC DATA

APPENDIX C

**SUMMARY OF ANALYTICAL RESULTS - TRIP BLANKS
SWMU 70 - DISPOSAL AREA NORTHWEST OF LANDFILL
PHASE I RFI REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO**

Sample ID	JAN09-TB02	JAN09-TB03	JAN09-TB04	JAN09-TB06	JAN09-TB07	JAN09-TB09	JAN09-TB11
Date	1/14/2009	1/14/2009	1/15/2009	1/17/2009	1/18/2009	1/20/2009	1/22/2009

Volatile Organic Compounds (ug/L)

1,1,1,2-Tetrachloroethane	0.29 R	0.29 U	0.29 U	0.29 U	0.29 U	0.29 U	0.29 U
1,1,1-Trichloroethane	0.39 R	0.39 U	0.39 U	0.39 U	0.39 U	0.39 U	0.39 U
1,1,2,2-Tetrachloroethane	0.26 R	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U
1,1,2-Trichloroethane	0.51 R	0.51 U	0.51 U	0.51 U	0.51 U	0.51 U	0.51 U
1,1-Dichloroethane	0.32 R	0.32 U	0.32 U	0.32 U	0.32 U	0.32 U	0.32 U
1,1-Dichloroethene	0.36 R	0.36 U	0.36 U	0.36 U	0.36 U	0.36 U	0.36 U
1,2,3-Trichloropropane	0.42 R	0.42 U	0.42 U	0.42 U	0.42 U	0.42 U	0.42 U
1,2-Dibromo-3-Chloropropane	0.48 R	0.48 U	0.48 U	0.48 U	0.48 U	0.48 U	0.48 U
1,2-Dichloroethane	0.31 R	0.31 U	0.31 U	0.31 U	0.31 U	0.31 U	0.31 U
1,2-Dichloropropane	0.36 R	0.36 U	0.36 U	0.36 U	0.36 U	0.36 U	0.36 U
2-Butanone (MEK)	0.74 J	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U
2-Chloro-1,3-butadiene	0.35 R	0.35 U	0.35 U	0.35 UJ	0.35 UJ	0.35 UJ	0.35 UJ
2-Hexanone	0.68 R	0.68 U	0.68 U	0.68 U	0.68 U	0.68 U	0.68 U
3-Chloro-1-propene	0.46 R	0.46 U	0.46 U	0.46 U	0.46 U	0.46 U	0.46 U
4-Methyl-2-pentanone (MIBK)	0.6 R	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U
Acetone	9.8 J	5 U	5 U	5 U	5 U	5 U	5 U
Acetonitrile	15 R	15 U	15 U	15 U	15 U	15 U	15 U
Acrolein	18 R	18 U	18 U	18 U	18 U	18 U	18 U
Acrylonitrile	3.8 R	3.8 U	3.8 U	3.8 U	3.8 U	3.8 U	3.8 U
Benzene	0.32 R	0.32 U	0.32 U	0.32 U	0.32 U	0.32 U	0.32 U
Bromoform	0.41 R	0.41 U	0.41 U	0.41 U	0.41 U	0.41 U	0.41 UJ
Bromomethane	0.5 R	0.5 UJ	0.5 UJ	0.5 U	0.5 UJ	0.5 UJ	0.5 UJ
Carbon disulfide	0.6 R	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U
Carbon tetrachloride	0.27 R	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U
Chlorobenzene	0.34 R	0.34 U	0.34 U	0.34 U	0.34 U	0.34 U	0.34 U
Chlorodibromomethane	0.3 R	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U
Chloroethane	1 R	1 U	1 U	1 U	1 UJ	1 UJ	1 U
Chloroform	0.29 R	0.29 U	0.29 U	0.29 U	0.29 U	0.29 U	0.29 U
Chloromethane	0.28 R	0.28 U	0.28 U	0.28 U	0.28 U	0.33 J	0.28 U
cis-1,3-Dichloropropene	0.37 R	0.37 U	0.37 U	0.37 U	0.37 U	0.37 U	0.37 U
Dibromomethane	0.29 R	0.29 U	0.29 U	0.29 U	0.29 U	0.29 U	0.29 U
Dichlorobromomethane	0.34 R	0.34 U	0.34 U	0.34 U	0.34 U	0.34 U	0.34 U
Dichlorodifluoromethane	0.33 R	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U
Ethyl methacrylate	1 R	1 U	1 U	1 U	1 U	1 U	1 U
Ethylbenzene	0.3 R	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U
Ethylene Dibromide	0.3 R	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U
Iodomethane	1 R	1 U	1 U	1 UJ	1 UJ	1 UJ	1 UJ
Isobutanol	19 R	19 R	19 R	19 R	19 R	19 R	19 R
Methacrylonitrile	6.6 R	6.6 U	6.6 U	6.6 U	6.6 U	6.6 U	6.6 U
Methyl methacrylate	0.38 R	0.38 U	0.38 U	0.38 U	0.38 U	0.38 U	0.38 U
Methylene Chloride	1 R	1 U	1 U	1 U	1 U	1 U	1 U
Pentachloroethane	1.3 R	1.3 UJ	1.3 UJ	1.3 UJ	1.3 UJ	1.3 UJ	1.3 UJ
Propionitrile	9.2 R	9.2 U	9.2 U	9.2 U	9.2 U	9.2 U	9.2 U
Styrene	0.36 R	0.36 U	0.36 U	0.36 U	0.36 U	0.36 U	0.36 U

APPENDIX C

**SUMMARY OF ANALYTICAL RESULTS - TRIP BLANKS
SWMU 70 - DISPOSAL AREA NORTHWEST OF LANDFILL
PHASE I RFI REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO**

Sample ID	JAN09-TB02	JAN09-TB03	JAN09-TB04	JAN09-TB06	JAN09-TB07	JAN09-TB09	JAN09-TB11
Date	1/14/2009	1/14/2009	1/15/2009	1/17/2009	1/18/2009	1/20/2009	1/22/2009
Volatile Organic Compounds (ug/L)							
Tetrachloroethene	0.28 R	0.28 U					
Toluene	0.31 R	0.31 U					
trans-1,2-Dichloroethene	0.3 R	0.3 U					
trans-1,3-Dichloropropene	0.27 R	0.27 U					
trans-1,4-Dichloro-2-butene	0.83 R	0.83 U					
Trichloroethene	0.4 R	0.4 U					
Trichlorofluoromethane	0.29 R	0.29 U					
Vinyl acetate	0.62 R	0.62 UJ	0.62 UJ	0.62 U	0.62 U	0.62 U	0.62 U
Vinyl chloride	0.2 R	0.2 U					
Xylenes, Total	0.87 R	0.87 U					
Gasoline Range Organics (mg/L)							
Gasoline Range Organics	0.012 R	0.012 R	0.012 U				

APPENDIX C

**SUMMARY OF ANALYTICAL RESULTS - EQUIPMENT RINSATE AND FIELD BLANKS
SWMU 70 - DISPOSAL AREA NORTHWEST OF LANDFILL
PHASE I RFI REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO**

	Sample ID	JAN09-ER03	JAN09-ER04	JAN09-ER05	JAN09-ER06	JAN09-ER08
	Date	1/14/2009	1/15/2009	1/17/2009	1/17/2009	1/20/2009
Volatile Organic Compounds (ug/L)						
1,1,1,2-Tetrachloroethane		0.29 U				
1,1,1-Trichloroethane		0.39 U				
1,1,2,2-Tetrachloroethane		0.26 U				
1,1,2-Trichloroethane		0.51 U				
1,1-Dichloroethane		0.32 U				
1,1-Dichloroethene		0.36 U				
1,2,3-Trichloropropane		0.42 U				
1,2-Dibromo-3-Chloropropane		0.48 U				
1,2-Dichloroethane		0.31 U				
1,2-Dichloropropane		0.36 U				
2-Butanone (MEK)		1 J	0.6 U	0.6 U	0.6 U	0.6 U
2-Chloro-1,3-butadiene		0.35 U	0.35 U	0.35 UJ	0.35 UJ	0.35 UJ
2-Hexanone		0.68 U				
3-Chloro-1-propene		0.46 U				
4-Methyl-2-pentanone (MIBK)		0.6 U				
Acetone		5 U	5 U	5 U	5 U	5 U
Acetonitrile		15 U				
Acrolein		18 U				
Acrylonitrile		3.8 U				
Benzene		0.32 U				
Bromoform		0.41 U				
Bromomethane		0.5 UJ	0.5 UJ	0.5 U	0.5 UJ	0.5 UJ
Carbon disulfide		0.6 U				
Carbon tetrachloride		0.27 U				
Chlorobenzene		0.34 U				
Chlorodibromomethane		0.3 U				
Chloroethane		1 U	1 U	1 U	1 UJ	1 U
Chloroform		0.29 U				
Chloromethane		0.28 U				
cis-1,3-Dichloropropene		0.37 U				
Dibromomethane		0.29 U				
Dichlorobromomethane		0.34 U				
Dichlorodifluoromethane		0.33 U				
Ethyl methacrylate		1 U	1 U	1 U	1 U	1 U
Ethylbenzene		0.3 U				
Ethylene Dibromide		0.3 U				
Iodomethane		1 U	1 U	1 UJ	1 UJ	1 U
Isobutanol		19 R				
Methacrylonitrile		6.6 U				
Methyl methacrylate		0.38 U				
Methylene Chloride		1 U	1 U	1 U	1 U	1 U
Pentachloroethane		1.3 UJ				
Propionitrile		9.2 U				
Styrene		0.36 U				
Tetrachloroethene		0.28 U				

APPENDIX C

**SUMMARY OF ANALYTICAL RESULTS - EQUIPMENT RINSATE AND FIELD BLANKS
SWMU 70 - DISPOSAL AREA NORTHWEST OF LANDFILL
PHASE I RFI REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO**

	Sample ID	JAN09-ER03	JAN09-ER04	JAN09-ER05	JAN09-ER06	JAN09-ER08
	Date	1/14/2009	1/15/2009	1/17/2009	1/17/2009	1/20/2009
Volatile Organic Compounds (ug/L)						
Toluene		0.31 U	1.2	0.99 J	0.45 J	0.31 U
trans-1,2-Dichloroethene		0.3 U				
trans-1,3-Dichloropropene		0.27 U				
trans-1,4-Dichloro-2-butene		0.83 U				
Trichloroethene		0.4 U				
Trichlorofluoromethane		0.29 U				
Vinyl acetate		0.62 UJ	0.62 UJ	0.62 U	0.62 U	0.62 U
Vinyl chloride		0.2 U				
Xylenes, Total		0.87 U				
Semivolatile Organic Compounds (ug/L)						
1,2,4,5-Tetrachlorobenzene		0.23 U	0.23 U	0.23 U	0.23 U	0.24 UJ
1,2,4-Trichlorobenzene		0.13 U	0.13 U	0.12 U	0.13 U	0.13 UJ
1,2-Dichlorobenzene		0.13 U	0.13 U	0.12 U	0.13 U	0.13 UJ
1,3,5-Trinitrobenzene		0.2 U	0.2 U	0.2 UJ	0.2 U	0.21 UJ
1,3-Dichlorobenzene		0.12 U	0.12 U	0.11 U	0.12 U	0.12 UJ
1,3-Dinitrobenzene		0.22 U	0.22 U	0.22 U	0.22 U	0.23 UJ
1,4-Dichlorobenzene		0.12 U	0.12 U	0.11 U	0.12 U	0.12 UJ
1,4-Dioxane		0.49 U	0.49 U	0.47 U	0.49 U	2.9 J
1,4-Naphthoquinone		0.16 U	0.16 U	0.15 U	0.16 U	0.16 UJ
1-Methylnaphthalene		NA	NA	NA	NA	NA
1-Naphthylamine		0.33 U	0.33 UJ	0.32 U	0.33 UJ	0.33 UJ
2,2'-oxybis[1-chloropropane]		0.097 U	0.097 U	0.094 U	0.097 U	0.098 UJ
2,3,4,6-Tetrachlorophenol		0.29 U	0.29 U	0.28 U	0.29 U	0.29 UJ
2,4,5-Trichlorophenol		0.16 U	0.16 U	0.15 U	0.16 U	0.16 UJ
2,4,6-Trichlorophenol		0.16 U	0.16 U	0.15 U	0.16 U	0.16 UJ
2,4-Dichlorophenol		0.15 U	0.15 U	0.14 U	0.15 UJ	0.15 UJ
2,4-Dimethylphenol		0.4 U	0.4 U	0.39 U	0.4 UJ	0.4 UJ
2,4-Dinitrophenol		2.4 UJ	2.4 U	2.4 UJ	2.4 UJ	2.5 UJ
2,4-Dinitrotoluene		0.17 U	0.17 U	0.17 U	0.17 U	0.18 UJ
2,6-Dichlorophenol		0.21 U	0.21 U	0.21 U	0.21 U	0.22 UJ
2,6-Dinitrotoluene		0.15 U	0.15 UJ	0.14 U	0.15 U	0.15 UJ
2-Acetylaminofluorene		0.19 U	0.19 U	0.19 U	0.19 U	0.2 UJ
2-Chloronaphthalene		0.12 U	0.12 U	0.11 U	0.12 U	0.12 UJ
2-Chlorophenol		0.15 U	0.15 U	0.14 U	0.15 UJ	0.15 UJ
2-Methylnaphthalene		0.022 U	0.022 U	0.022 U	0.022 U	0.023 UJ
2-Methylphenol		0.15 U	0.15 U	0.14 U	0.15 UJ	0.15 UJ
2-Naphthylamine		1.1 U	1.1 UJ	1 UJ	1.1 UJ	1.1 UJ
2-Nitroaniline		0.14 U	0.14 UJ	0.13 U	0.14 UJ	0.14 UJ
2-Nitrophenol		0.17 U	0.17 U	0.16 U	0.17 UJ	0.17 UJ
2-Picoline		0.57 U	0.57 U	0.56 U	0.57 U	0.58 UJ
2-Toluidine		0.32 U	0.32 U	0.31 U	0.32 U	0.32 UJ
3 & 4 Methylphenol		0.15 U	0.15 U	0.14 U	0.15 UJ	0.15 UJ
3,3'-Dichlorobenzidine		3.7 UJ	3.7 UJ	3.6 U	3.7 UJ	3.7 UJ
3,3'-Dimethylbenzidine		3.7 U	3.7 U	3.6 UJ	3.7 UJ	3.7 UJ
3-Methylcholanthrene		0.2 U	0.2 U	0.2 U	0.2 U	0.21 UJ
3-Nitroaniline		0.28 U	0.28 U	0.27 U	0.28 UJ	0.28 UJ

APPENDIX C

**SUMMARY OF ANALYTICAL RESULTS - EQUIPMENT RINSATE AND FIELD BLANKS
SWMU 70 - DISPOSAL AREA NORTHWEST OF LANDFILL
PHASE I RFI REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO**

Sample ID	JAN09-ER03	JAN09-ER04	JAN09-ER05	JAN09-ER06	JAN09-ER08
Date	1/14/2009	1/15/2009	1/17/2009	1/17/2009	1/20/2009
Semivolatile Organic Compounds (ug/L)					
4,6-Dinitro-2-methylphenol	0.49 UJ	0.49 U	0.47 UJ	0.49 UJ	0.49 UJ
4-Aminobiphenyl	0.68 U	0.68 U	0.66 UJ	0.68 U	0.69 UJ
4-Bromophenyl phenyl ether	0.16 U	0.16 U	0.15 U	0.16 U	0.16 UJ
4-Chloro-3-methylphenol	0.16 U	0.16 U	0.15 U	0.16 UJ	0.16 UJ
4-Chloroaniline	0.4 U	0.4 U	0.39 U	0.4 U	0.4 UJ
4-Chlorophenyl phenyl ether	0.15 U	0.15 U	0.14 U	0.15 U	0.15 UJ
4-Nitroaniline	0.26 U	0.26 U	0.25 U	0.26 UJ	0.26 UJ
4-Nitrophenol	0.18 U	0.18 U	0.18 U	0.18 U	0.19 UJ
4-Nitroquinoline-1-oxide	0.26 R	0.26 R	0.25 R	0.26 R	0.26 R
7,12-Dimethylbenz(a)anthracene	0.2 U	0.2 U	0.2 U	0.2 U	0.21 UJ
Acenaphthene	0.022 U	0.022 U	0.022 U	0.022 U	0.023 UJ
Acenaphthylene	0.019 U	0.019 U	0.019 U	0.019 UJ	0.02 UJ
Acetophenone	1.2	0.19 U	0.19 UJ	0.21 J	0.45 J
alpha,alpha-Dimethyl phenethylamine	1.3 U	1.3 U	1.2 U	1.3 U	1.3 UJ
Aniline	0.4 U	0.4 U	0.39 U	0.4 U	0.4 UJ
Anthracene	0.025 U	0.025 U	0.025 U	0.025 U	0.025 UJ
Aramite, Total	0.49 U	0.49 U	0.47 U	0.49 U	0.49 UJ
Benzo[a]anthracene	0.049 U	0.049 U	0.047 U	0.049 U	0.049 UJ
Benzo[a]pyrene	0.017 U	0.017 U	0.016 UJ	0.017 U	0.017 UJ
Benzo[b]fluoranthene	0.02 U	0.02 U	0.02 UJ	0.02 UJ	0.021 UJ
Benzo[g,h,i]perylene	0.049 U	0.049 U	0.047 UJ	0.049 UJ	0.049 UJ
Benzo[k]fluoranthene	0.034 U	0.034 U	0.033 U	0.034 U	0.034 UJ
Benzyl alcohol	6.7	0.65 J	1	1.6	1.8 J
Bis(2-chloroethoxy)methane	0.15 U	0.15 U	0.14 U	0.15 U	0.15 UJ
Bis(2-chloroethyl)ether	0.14 U	0.14 U	0.13 U	0.14 U	0.14 UJ
Bis(2-ethylhexyl) phthalate	0.34 U	0.34 UJ	0.33 UJ	0.43 J	0.56 J
Butyl benzyl phthalate	1.5	0.17 U	0.16 U	0.17 J	0.91 J
Chrysene	0.049 U	0.049 U	0.047 U	0.049 U	0.049 UJ
Diallate	0.19 U	0.19 U	0.19 U	0.19 U	0.2 UJ
Dibenz(a,h)anthracene	0.021 U	0.021 U	0.021 UJ	0.021 UJ	0.022 UJ
Dibenzofuran	0.097 U	0.097 U	0.094 U	0.097 U	0.098 UJ
Diethyl phthalate	5	0.18 U	0.18 U	0.18 U	2.3 J
Dimethyl phthalate	0.17 U	0.17 U	0.17 U	0.17 U	0.18 UJ
Di-n-butyl phthalate	3	0.11 UJ	0.15 J	0.21 J	2.2 J
Di-n-octyl phthalate	0.097 U	0.097 U	0.094 UJ	0.097 U	0.098 UJ
Dinoseb	0.49 UJ	0.49 U	0.47 UJ	0.49 U	0.49 UJ
Ethyl methanesulfonate	0.23 U	0.23 U	0.23 U	0.23 U	0.24 UJ
Fluoranthene	0.018 U	0.018 U	0.018 U	0.018 U	0.019 UJ
Fluorene	0.025 U	0.025 U	0.025 U	0.025 UJ	0.025 UJ
Hexachlorobenzene	0.16 U	0.16 U	0.15 U	0.16 U	0.16 UJ
Hexachlorobutadiene	0.13 U	0.13 U	0.12 U	0.13 U	0.13 UJ
Hexachlorocyclopentadiene	0.49 UJ	0.49 U	0.47 UJ	0.49 UJ	0.49 UJ
Hexachloroethane	0.15 U	0.15 U	0.14 U	0.15 U	0.15 UJ
Hexachlorophene	49 U	49 U	47 R	49 UJ	49 UJ
Hexachloropropene	0.12 U	0.12 U	0.11 U	0.12 U	0.12 UJ
Indeno[1,2,3-cd]pyrene	0.049 U	0.049 U	0.047 UJ	0.049 UJ	0.049 UJ

APPENDIX C

**SUMMARY OF ANALYTICAL RESULTS - EQUIPMENT RINSATE AND FIELD BLANKS
SWMU 70 - DISPOSAL AREA NORTHWEST OF LANDFILL
PHASE I RFI REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO**

Sample ID	JAN09-ER03	JAN09-ER04	JAN09-ER05	JAN09-ER06	JAN09-ER08
Date	1/14/2009	1/15/2009	1/17/2009	1/17/2009	1/20/2009
Semivolatile Organic Compounds (ug/L)					
Isophorone	0.15 U	0.15 U	0.14 U	0.15 UJ	0.15 UJ
Isosafrole	0.3 U	0.3 U	0.29 U	0.3 U	0.3 UJ
Methapyrilene	0.26 UJ	0.26 U	0.25 U	0.26 U	0.26 UJ
Methyl methanesulfonate	0.46 U	0.46 U	0.44 U	0.46 U	0.46 UJ
Naphthalene	0.025 U	0.025 U	0.035 J	0.025 U	0.025 UJ
Nitrobenzene	0.14 U	0.14 U	0.13 U	0.14 U	0.14 UJ
N-Nitro-o-toluidine	0.24 U	0.24 U	0.24 U	0.24 U	0.25 UJ
N-Nitrosodiethylamine	0.32 U	0.32 U	0.31 U	0.32 U	0.32 UJ
N-Nitrosodimethylamine	0.19 U	0.19 UJ	0.19 U	0.19 U	0.2 UJ
N-Nitrosodi-n-butylamine	0.18 U	0.18 U	0.18 U	0.18 U	0.19 UJ
N-Nitrosodi-n-propylamine	0.13 U	0.13 U	0.12 U	0.13 UJ	0.13 UJ
N-Nitrosodiphenylamine	0.17 U	0.17 U	0.17 U	0.17 UJ	0.18 UJ
N-Nitrosomethylethylamine	0.28 U	0.28 U	0.27 U	0.28 U	0.28 UJ
N-Nitrosomorpholine	0.19 U	0.19 U	0.19 U	0.19 U	0.2 UJ
N-Nitrosopiperidine	0.22 U	0.22 U	0.22 U	0.22 U	0.23 UJ
N-Nitrosopyrrolidine	0.25 U	0.25 U	0.25 U	0.25 U	0.25 UJ
p-Dimethylamino azobenzene	0.6 U	0.6 U	0.58 U	0.6 U	0.61 UJ
Pentachlorobenzene	0.27 U	0.27 U	0.26 U	0.27 U	0.27 UJ
Pentachloronitrobenzene	0.3 U	0.3 U	0.29 U	0.3 U	0.3 UJ
Pentachlorophenol	0.18 U	0.18 U	0.18 U	0.18 UJ	0.19 UJ
Phenacetin	0.2 U	0.2 U	0.2 U	0.2 U	0.21 UJ
Phenanthrene	0.03 U	0.03 U	0.029 U	0.03 U	0.03 UJ
Phenol	0.8 J	0.14 U	0.13 U	0.14 UJ	0.14 UJ
p-Phenylene diamine	2.4 UJ	2.4 U	2.4 U	2.4 U	2.5 UJ
Pronamide	0.25 U	0.25 U	0.25 U	0.25 U	0.25 UJ
Pyrene	0.021 U	0.021 U	0.021 U	0.021 U	0.022 UJ
Pyridine	0.22 U	0.22 U	0.22 U	0.22 U	0.23 UJ
Safrole, Total	0.23 U	0.23 U	0.23 U	0.23 U	0.24 UJ
Pesticides (ug/L)					
4,4'-DDD	0.0057 U	0.0057 U	NA	0.0056 U	NA
4,4'-DDE	0.0095 U	0.0095 U	NA	0.0092 U	NA
4,4'-DDT	0.015 U	0.015 U	NA	0.014 U	NA
Aldrin	0.0058 U	0.0058 U	NA	0.0057 U	NA
alpha-BHC	0.0079 U	0.0079 U	NA	0.0076 U	NA
beta-BHC	0.008 U	0.008 U	NA	0.0077 U	NA
Chlordane (technical)	0.048 U	0.048 U	NA	0.046 U	NA
Chlorobenzilate	0.14 U	0.14 U	NA	0.13 U	NA
delta-BHC	0.0067 U	0.0067 U	NA	0.0065 U	NA
Dieldrin	0.0076 U	0.0076 U	NA	0.0074 U	NA
Endosulfan I	0.0053 U	0.0053 U	NA	0.0052 U	NA
Endosulfan II	0.0049 U	0.0049 U	NA	0.0047 U	NA
Endosulfan sulfate	0.0068 U	0.0068 U	NA	0.0066 U	NA
Endrin	0.0076 U	0.0076 U	NA	0.0074 U	NA
Endrin aldehyde	0.0087 U	0.0087 U	NA	0.0085 U	NA
gamma-BHC (Lindane)	0.0057 U	0.0057 U	NA	0.0056 U	NA
Heptachlor	0.0044 U	0.0044 U	NA	0.0042 U	NA

APPENDIX C

**SUMMARY OF ANALYTICAL RESULTS - EQUIPMENT RINSATE AND FIELD BLANKS
SWMU 70 - DISPOSAL AREA NORTHWEST OF LANDFILL
PHASE I RFI REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO**

	Sample ID	JAN09-ER03	JAN09-ER04	JAN09-ER05	JAN09-ER06	JAN09-ER08
	Date	1/14/2009	1/15/2009	1/17/2009	1/17/2009	1/20/2009
Pesticides (ug/L)						
Heptachlor epoxide		0.0068 U	0.0068 U	NA	0.0066 U	NA
Isodrin		0.0096 U	0.0096 U	NA	0.0093 U	NA
Kepone		0.049 U	0.049 U	NA	0.047 U	NA
Methoxychlor		0.022 U	0.022 U	NA	0.022 U	NA
Toxaphene		1.3 U	1.3 U	NA	1.2 U	NA
PCBs (ug/L)						
PCB-1016		0.094 U	NA	NA	0.092 U	NA
PCB-1221		0.39 U	NA	NA	0.38 U	NA
PCB-1232		0.081 U	NA	NA	0.078 U	NA
PCB-1242		0.093 U	NA	NA	0.091 U	NA
PCB-1248		0.081 U	NA	NA	0.078 U	NA
PCB-1254		0.088 U	NA	NA	0.086 U	NA
PCB-1260		0.097 U	NA	NA	0.094 U	NA
Total Metals (ug/L)						
Antimony		1.4 J	1.1 J	0.61 J	0.51 J	NA
Arsenic		0.55 J	0.7 J	0.28 U	0.29 J	NA
Barium		2 U	2 U	2 U	2 U	NA
Beryllium		0.065 U	0.065 U	0.065 U	0.065 U	NA
Cadmium		0.12 U	0.12 U	0.12 U	0.12 U	NA
Chromium		1.4 J	0.86 J	0.6 U	0.6 U	NA
Cobalt		0.029 U	0.029 U	0.029 U	0.029 U	NA
Copper		1.2 U	1.2 U	5.2	1.2 U	NA
Lead		0.15 U	0.15 U	0.15 U	0.15 U	NA
Mercury		0.08 U	0.08 U	0.08 U	0.08 U	NA
Nickel		0.4 J	0.33 J	0.32 U	0.32 U	NA
Selenium		0.6 U	0.6 U	0.6 U	0.6 U	NA
Silver		0.09 U	0.09 U	0.09 U	0.09 U	NA
Thallium		0.55 U	0.55 U	0.55 U	0.55 U	NA
Tin		0.9 U	0.9 U	0.9 U	0.9 U	NA
Vanadium		1 J	0.99 J	0.8 U	0.8 U	NA
Zinc		6.5 U	6.5 U	6.5 U	6.5 U	NA
TPH DRO and GRO (mg/L)						
Diesel Range Organics		0.26	0.028 U	0.24	0.038 J	0.32
Gasoline Range Organics		0.012 U				

APPENDIX C

**SUMMARY OF ANALYTICAL RESULTS - EQUIPMENT RINSATE AND FIELD BLANKS
SWMU 70 - DISPOSAL AREA NORTHWEST OF LANDFILL
PHASE I RFI REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO**

	Sample ID Date	JAN09-ER10 1/22/2009	JAN09-FB01 1/14/2009	JAN09-FB02 1/20/2009
Volatile Organic Compounds (ug/L)				
1,1,1,2-Tetrachloroethane		0.29 U	0.29 U	0.29 U
1,1,1-Trichloroethane		0.39 U	0.39 U	0.39 U
1,1,2,2-Tetrachloroethane		0.26 U	0.26 U	0.26 U
1,1,2-Trichloroethane		0.51 U	0.51 U	0.51 U
1,1-Dichloroethane		0.32 U	0.32 U	0.32 U
1,1-Dichloroethene		0.36 U	0.36 U	0.36 U
1,2,3-Trichloropropane		0.42 U	0.42 U	0.42 U
1,2-Dibromo-3-Chloropropane		0.48 U	0.48 U	0.48 U
1,2-Dichloroethane		0.31 U	0.31 U	0.31 U
1,2-Dichloropropane		0.36 U	0.36 U	0.36 U
2-Butanone (MEK)		0.6 U	0.75 J	0.6 U
2-Chloro-1,3-butadiene		0.35 UJ	0.35 U	0.35 UJ
2-Hexanone		0.68 U	0.68 U	0.68 U
3-Chloro-1-propene		0.46 U	0.46 U	0.46 U
4-Methyl-2-pentanone (MIBK)		0.6 U	0.6 U	0.6 U
Acetone		6.3 J	5 U	5 U
Acetonitrile		15 U	15 U	15 U
Acrolein		18 U	18 U	18 U
Acrylonitrile		3.8 U	3.8 U	3.8 U
Benzene		0.32 U	0.32 U	0.32 U
Bromoform		0.41 UJ	0.41 U	0.41 U
Bromomethane		0.5 UJ	0.5 UJ	0.5 UJ
Carbon disulfide		0.6 U	0.6 U	0.6 U
Carbon tetrachloride		0.27 U	0.27 U	0.27 U
Chlorobenzene		0.34 U	0.34 U	0.34 U
Chlorodibromomethane		0.3 U	0.3 U	4.1
Chloroethane		1 U	1 U	1 U
Chloroform		0.29 U	0.29 U	53
Chloromethane		0.28 U	0.28 U	0.28 U
cis-1,3-Dichloropropene		0.37 U	0.37 U	0.37 U
Dibromomethane		0.29 U	0.29 U	0.29 U
Dichlorobromomethane		0.34 U	0.34 U	13
Dichlorodifluoromethane		0.33 U	0.33 U	0.33 U
Ethyl methacrylate		1 U	1 U	1 U
Ethylbenzene		0.3 U	0.3 U	0.3 U
Ethylene Dibromide		0.3 U	0.3 U	0.3 U
Iodomethane		1 UJ	1 U	1 U
Isobutanol		19 R	19 R	19 R
Methacrylonitrile		6.6 U	6.6 U	6.6 U
Methyl methacrylate		0.38 U	0.38 U	0.38 U
Methylene Chloride		1 U	1 U	1 U
Pentachloroethane		1.3 UJ	1.3 UJ	1.3 UJ
Propionitrile		9.2 U	9.2 U	9.2 U
Styrene		0.36 U	0.36 U	0.36 U
Tetrachloroethene		0.28 U	0.28 U	0.28 U

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**SUMMARY OF ANALYTICAL RESULTS - EQUIPMENT RINSATE AND FIELD BLANKS
SWMU 70 - DISPOSAL AREA NORTHWEST OF LANDFILL
PHASE I RFI REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO**

	Sample ID Date	JAN09-ER10 1/22/2009	JAN09-FB01 1/14/2009	JAN09-FB02 1/20/2009
Volatile Organic Compounds (ug/L)				
Toluene		0.31 U	0.31 U	0.31 U
trans-1,2-Dichloroethene		0.3 U	0.3 U	0.3 U
trans-1,3-Dichloropropene		0.27 U	0.27 U	0.27 U
trans-1,4-Dichloro-2-butene		0.83 U	0.83 U	0.83 U
Trichloroethene		0.4 U	0.4 U	0.4 U
Trichlorofluoromethane		0.29 U	0.29 U	0.29 U
Vinyl acetate		0.62 U	0.62 UJ	0.62 U
Vinyl chloride		0.2 U	0.2 U	0.2 U
Xylenes, Total		0.87 U	0.87 U	0.87 U
Semivolatile Organic Compounds (ug/L)				
1,2,4,5-Tetrachlorobenzene		NA	0.23 U	0.23 R
1,2,4-Trichlorobenzene		NA	0.13 U	0.13 R
1,2-Dichlorobenzene		NA	0.13 U	0.13 R
1,3,5-Trinitrobenzene		NA	0.2 U	0.2 R
1,3-Dichlorobenzene		NA	0.12 U	0.12 R
1,3-Dinitrobenzene		NA	0.22 U	0.22 R
1,4-Dichlorobenzene		NA	0.12 U	0.12 R
1,4-Dioxane		NA	0.49 U	0.49 R
1,4-Naphthoquinone		NA	0.16 U	0.16 R
1-Methylnaphthalene		0.021 U	NA	NA
1-Naphthylamine		NA	0.33 U	0.33 R
2,2'-oxybis[1-chloropropane]		NA	0.097 U	0.097 R
2,3,4,6-Tetrachlorophenol		NA	0.29 U	0.29 R
2,4,5-Trichlorophenol		NA	0.16 U	0.16 R
2,4,6-Trichlorophenol		NA	0.16 U	0.16 R
2,4-Dichlorophenol		NA	0.15 U	0.15 R
2,4-Dimethylphenol		NA	0.4 U	0.4 R
2,4-Dinitrophenol		NA	2.4 UJ	2.4 R
2,4-Dinitrotoluene		NA	0.17 U	0.17 R
2,6-Dichlorophenol		NA	0.21 U	0.21 R
2,6-Dinitrotoluene		NA	0.15 U	0.15 R
2-Acetylaminofluorene		NA	0.19 U	0.19 R
2-Chloronaphthalene		NA	0.12 U	0.12 R
2-Chlorophenol		NA	0.15 U	0.15 R
2-Methylnaphthalene		0.022 U	0.022 U	0.022 R
2-Methylphenol		NA	0.15 U	0.15 R
2-Naphthylamine		NA	1.1 U	1.1 R
2-Nitroaniline		NA	0.14 U	0.14 R
2-Nitrophenol		NA	0.17 U	0.17 R
2-Picoline		NA	0.57 U	0.57 R
2-Toluidine		NA	0.32 U	0.32 R
3 & 4 Methylphenol		NA	0.15 U	0.15 R
3,3'-Dichlorobenzidine		NA	3.7 UJ	3.7 R
3,3'-Dimethylbenzidine		NA	3.7 U	3.7 R
3-Methylcholanthrene		NA	0.2 U	0.2 R
3-Nitroaniline		NA	0.28 U	0.28 R

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**SUMMARY OF ANALYTICAL RESULTS - EQUIPMENT RINSATE AND FIELD BLANKS
SWMU 70 - DISPOSAL AREA NORTHWEST OF LANDFILL
PHASE I RFI REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO**

Sample ID	JAN09-ER10	JAN09-FB01	JAN09-FB02
Date	1/22/2009	1/14/2009	1/20/2009
Semivolatile Organic Compounds (ug/L)			
4,6-Dinitro-2-methylphenol	NA	0.49 UJ	0.49 R
4-Aminobiphenyl	NA	0.68 U	0.68 R
4-Bromophenyl phenyl ether	NA	0.16 U	0.16 R
4-Chloro-3-methylphenol	NA	0.16 U	0.16 R
4-Chloroaniline	NA	0.4 U	0.4 R
4-Chlorophenyl phenyl ether	NA	0.15 U	0.15 R
4-Nitroaniline	NA	0.26 U	0.26 R
4-Nitrophenol	NA	0.18 U	0.18 R
4-Nitroquinoline-1-oxide	NA	0.26 R	0.26 R
7,12-Dimethylbenz(a)anthracene	NA	0.2 U	0.2 R
Acenaphthene	0.022 U	0.022 U	0.022 R
Acenaphthylene	0.019 U	0.019 U	0.019 R
Acetophenone	NA	0.19 U	0.19 R
alpha,alpha-Dimethyl phenethylamine	NA	1.3 U	1.3 R
Aniline	NA	0.4 U	0.4 R
Anthracene	0.025 U	0.025 U	0.025 R
Aramite, Total	NA	0.49 U	0.49 R
Benzo[a]anthracene	0.049 U	0.049 U	0.049 R
Benzo[a]pyrene	0.017 U	0.017 U	0.017 R
Benzo[b]fluoranthene	0.02 U	0.02 U	0.02 R
Benzo[g,h,i]perylene	0.049 U	0.049 U	0.049 R
Benzo[k]fluoranthene	0.034 U	0.034 U	0.034 R
Benzyl alcohol	NA	3.6	0.16 R
Bis(2-chloroethoxy)methane	NA	0.15 U	0.15 R
Bis(2-chloroethyl)ether	NA	0.14 U	0.14 R
Bis(2-ethylhexyl) phthalate	NA	0.34 U	0.34 R
Butyl benzyl phthalate	NA	1	0.17 R
Chrysene	0.049 U	0.049 U	0.049 R
Diallate	NA	0.19 U	0.19 R
Dibenz(a,h)anthracene	0.021 U	0.021 U	0.021 R
Dibenzofuran	NA	0.097 U	0.097 R
Diethyl phthalate	NA	0.18 U	0.18 R
Dimethyl phthalate	NA	0.17 U	0.17 R
Di-n-butyl phthalate	NA	3.5	0.11 R
Di-n-octyl phthalate	NA	0.097 U	0.097 R
Dinoseb	NA	0.49 UJ	0.49 R
Ethyl methanesulfonate	NA	0.23 U	0.23 R
Fluoranthene	0.018 U	0.018 U	0.018 R
Fluorene	0.025 U	0.025 U	0.025 R
Hexachlorobenzene	NA	0.16 U	0.16 R
Hexachlorobutadiene	NA	0.13 U	0.13 R
Hexachlorocyclopentadiene	NA	0.49 UJ	0.49 R
Hexachloroethane	NA	0.15 U	0.15 R
Hexachlorophene	NA	49 U	49 R
Hexachloropropene	NA	0.12 U	0.12 R
Indeno[1,2,3-cd]pyrene	0.049 U	0.049 U	0.049 R

APPENDIX C

**SUMMARY OF ANALYTICAL RESULTS - EQUIPMENT RINSATE AND FIELD BLANKS
SWMU 70 - DISPOSAL AREA NORTHWEST OF LANDFILL
PHASE I RFI REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO**

	Sample ID	JAN09-ER10	JAN09-FB01	JAN09-FB02
	Date	1/22/2009	1/14/2009	1/20/2009
Semivolatile Organic Compounds (ug/L)				
Isophorone		NA	0.15 U	0.15 R
Isosafrole		NA	0.3 U	0.3 R
Methapyrilene		NA	0.26 UJ	0.26 R
Methyl methanesulfonate		NA	0.46 U	0.46 R
Naphthalene		0.025 U	0.025 U	0.025 R
Nitrobenzene		NA	0.14 U	0.14 R
N-Nitro-o-toluidine		NA	0.24 U	0.24 R
N-Nitrosodiethylamine		NA	0.32 U	0.32 R
N-Nitrosodimethylamine		NA	0.19 U	0.19 R
N-Nitrosodi-n-butylamine		NA	0.18 U	0.18 R
N-Nitrosodi-n-propylamine		NA	0.13 U	0.13 R
N-Nitrosodiphenylamine		NA	0.17 U	0.17 R
N-Nitrosomethylethylamine		NA	0.28 U	0.28 R
N-Nitrosomorpholine		NA	0.19 U	0.19 R
N-Nitrosopiperidine		NA	0.22 U	0.22 R
N-Nitrosopyrrolidine		NA	0.25 U	0.25 R
p-Dimethylamino azobenzene		NA	0.6 U	0.6 R
Pentachlorobenzene		NA	0.27 U	0.27 R
Pentachloronitrobenzene		NA	0.3 U	0.3 R
Pentachlorophenol		NA	0.18 U	0.18 R
Phenacetin		NA	0.2 U	0.2 R
Phenanthrene		0.03 U	0.03 U	0.03 R
Phenol		NA	0.5 J	0.14 R
p-Phenylene diamine		NA	2.4 UJ	2.4 R
Pronamide		NA	0.25 U	0.25 R
Pyrene		0.021 U	0.021 U	0.021 R
Pyridine		NA	0.22 U	0.22 R
Safrole, Total		NA	0.23 U	0.23 R
Pesticides (ug/L)				
4,4'-DDD		NA	0.0057 U	0.0057 U
4,4'-DDE		NA	0.0095 U	0.0095 U
4,4'-DDT		NA	0.015 U	0.015 U
Aldrin		NA	0.0058 U	0.0058 U
alpha-BHC		NA	0.0079 U	0.0079 U
beta-BHC		NA	0.008 U	0.008 U
Chlordane (technical)		NA	0.048 U	0.048 U
Chlorobenzilate		NA	0.14 U	0.14 UJ
delta-BHC		NA	0.0067 U	0.0067 U
Dieldrin		NA	0.0076 U	0.0076 U
Endosulfan I		NA	0.0053 U	0.0053 U
Endosulfan II		NA	0.0049 U	0.0049 U
Endosulfan sulfate		NA	0.0068 U	0.0068 U
Endrin		NA	0.0076 U	0.0076 U
Endrin aldehyde		NA	0.0087 U	0.0087 U
gamma-BHC (Lindane)		NA	0.0057 U	0.0057 U
Heptachlor		NA	0.0044 U	0.0044 U

APPENDIX C

**SUMMARY OF ANALYTICAL RESULTS - EQUIPMENT RINSATE AND FIELD BLANKS
SWMU 70 - DISPOSAL AREA NORTHWEST OF LANDFILL
PHASE I RFI REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO**

	Sample ID	JAN09-ER10	JAN09-FB01	JAN09-FB02
	Date	1/22/2009	1/14/2009	1/20/2009
Pesticides (ug/L)				
Heptachlor epoxide		NA	0.0068 U	0.0068 U
Isodrin		NA	0.0096 U	0.0096 U
Kepone		NA	0.049 U	0.049 UJ
Methoxychlor		NA	0.022 U	0.022 U
Toxaphene		NA	1.3 U	1.3 U
PCBs (ug/L)				
PCB-1016		NA	0.094 U	0.094 U
PCB-1221		NA	0.39 U	0.39 U
PCB-1232		NA	0.081 U	0.081 U
PCB-1242		NA	0.093 U	0.093 U
PCB-1248		NA	0.081 U	0.081 U
PCB-1254		NA	0.088 U	0.088 U
PCB-1260		NA	0.097 U	0.097 U
Total Metals (ug/L)				
Antimony		NA	1.2 J	1.1 J
Arsenic		NA	0.54 J	0.74 J
Barium		NA	2 U	2 U
Beryllium		NA	0.065 U	0.065 U
Cadmium		NA	0.12 U	0.12 U
Chromium		NA	0.94 J	0.79 J
Cobalt		NA	0.029 U	0.034 J
Copper		NA	1.2 U	18
Lead		NA	0.15 U	0.6 J
Mercury		NA	0.08 U	0.08 U
Nickel		NA	0.32 U	0.32 U
Selenium		NA	0.6 U	0.6 U
Silver		NA	0.09 U	0.09 U
Thallium		NA	0.55 U	0.55 U
Tin		NA	0.9 U	0.9 U
Vanadium		NA	1.1 J	2.7 J
Zinc		NA	7.2 J	30
TPH DRO and GRO (mg/L)				
Diesel Range Organics		0.27	0.25	0.028 U
Gasoline Range Organics		0.012 R	0.012 U	0.016 J

APPENDIX D
PHASE I RFI DATA VALIDATION SUMMARIES

TEST AMERICA SAVANNAH SDG NAPR43925-1

DataQual

Environmental Services, LLC

Michael Baker, Jr., Inc.
Airside Business Park
100 Airside Drive
Moon Township, PA 15108

March 26, 2008
SDG# NAPR43925-1, Test America-Savannah
NAPR SWMU 70, Puerto Rico

Dear Mr. Kimes,

The following Data Validation report is provided as requested for the parameters noted in the table below for SDG # NAPR43925-1. 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 8082A, October2006-SOP #HW-45), 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, 6020B 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	PCB	GRO	DRO	Metals
70SB01-00	680-43925-1	soil	X	X	X	X	X	X
70SB01-01	680-43925-2	soil	X	X	X	X	X	X
70SB02-00	680-43925-3	soil	X	X	X	X	X	X
70SB02-01	680-43925-4	soil	X	X	X	X	X	X
JAN09-TB02	680-43925-7	water	X			X		

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 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 sample vials for sample JAN09-TB02 were received at the laboratory with headspace. As according to Region II guidelines when all the vials for a sample have air bubbles or the VOA vial analyzed had air bubbles, all positive results were qualified as estimated (J) and non-detected results were rejected (R).

The initial and continuing calibration exhibited some compounds with low RRF values, which resulted in qualifying non-detected values as rejected for these compounds. Due to high %D values, in the 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

The initial and continuing calibration exhibited some compounds with low RRF values, which resulted in qualifying non-detected values as rejected for these compounds. Due to high %RSD 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.

PCB

No qualifications to the data were required.

GRO

The sample vials for sample JAN09-TB02 were received at the laboratory with headspace. As according to Region II guidelines when all the vials for a sample have air bubbles or the VOA vial analyzed had air bubbles, all positive results were qualified as estimated (J) and non-detected results were rejected (R).

DRO

Blank contamination was noted in the associated field QC blanks. Qualifications to the data were required.

Metals

Blank contamination was noted and qualification was required in the samples in this SDG.

The serial dilution submitted in this SDG exhibited a non-compliant %D for several analytes. All results for non-compliant analytes were qualified as estimated J/UJ.

Specific Evaluation of Data

Data Completeness

Resubmissions were required. Retention times were not correctly transcribed from raw data to data summary forms in the PCB fraction. The laboratory was contacted and corrected forms were received. A copy of the e-mail correspondence is included in the validation worksheets. Corrections to the metals case narrative were requested and received due to typographical errors.

Sample Condition

VOA and GRO

The sample vials for sample JAN09-TB02 were received at the laboratory with headspace. As according to Region II guidelines when all the vials for a sample have air bubbles or the VOA vial analyzed had air bubbles, all positive results were qualified as estimated (J) and non-detected results were rejected (R).

Technical Holding Times

According to chain of custody records, sampling was performed on 01/14/09 and samples were received at the laboratory 01/15/09. All sample preparation and analysis was performed within Region II and/or method holding time requirements.

Initial/Continuing Calibration

VOA

Calibration standards exhibited RRF, %RSD and %Ds 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
CC 01/16/09	acrolein acrylonitrile	49.0% 44.9%	70SB01-00, 70SB01-01, 70SB02-00, 70SB02-01	J/UJ
IC 01/07/09	isobutanol	0.0329	JAN09-TB02	J/R
CC 01/16/09	isobutanol	0.02906	JAN09-TB02	J/R
	pentachloroethane bromomethane trichlorofluoromethane bromoform	44.3% 24.6% 25.6% 20.6%		J/UJ

SVOA

Calibration standards exhibited RRF, %RSD and %Ds 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 01/15/09	4-nitroquinoline-1-oxide dimethyl phthalate acenaphthylene dibenzofuran	0.0334 0.0426 0.0499 0.0499	70SB01-00, 70SB02-00	J/R
CC 01/21/09	hexachlorocyclopentadiene benzo(b)fluoranthene p-phenylene diamine 2-naphthylamine 3,3'-dimethylbenzidine hexachlorophene 4-nitroquinoline-1-oxide	25.9% 20.8% 47.6% 30.4% 31.0% 24.7% 0.0318	70SB02-00	J/UJ J/R

Standard ID	Compound(s)	RRF, %RSD, %D	Samples	Q Flag
CC 01/22/09	hexachlorocyclopentadiene	27.5%	70SB01-00	J/UJ
	2,4-dinitrophenol	31.0%		
	4,6-dinitro-2-methylphenol	21.2%		
	dibenz(a,h)anthracene	23.3%		
	indeno(1,2,3-cd)pyrene	41.3%		
	benzo(g,h,i)perylene	32.0%		
	aramite, total	34.0%		
	p-phenylene diamine	54.5%		
	1,2,4,5-tetrachlorobenzene	22.1%		
	1-naphthylamine	25.7%		
	2-naphthylamine	45.7%		
	1,3,5-trinitrobenzene	40.9%		
	3,3'-dimethylbenzidine	45.6%		
hexachlorophene	23.7%			
4-nitroquinoline-1-oxide	0.0303	J/R		

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. Please note that the laboratory reported non-detect results down to the MDL for this project. Therefore, the blank flagging actions were modified as follows to take this into consideration. Positive results greater than the MDL but less than the CRQL are qualified as U at the reported concentration when affected by blank contamination.

Blank ID	Compound	Concentration	Reporting Limit	Action Level
JAN09-TB02	acetone	9.8J ug/L	25 ug/L	2X RL
	2-butanone	0.74J	10	2X RL
JAN09-ER03	2-butanone	1.0J ug/L	10 ug/L	2X RL
JAN09-FB01	2-butanone	0.75J ug/L	10 ug/L	2X RL

Associated samples and required qualifications are noted in the following table.

Sample ID	Compound	Q Flag
70SB01-01, 70SB02-01	acetone	U at reported value
70SB02-01	2-butanone	U at reported value

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. Please note that the laboratory reported non-detect results down to the MDL for this project. Therefore, the blank flagging actions were modified as follows to take this into consideration. Positive results greater than the MDL but less than the

Michael Baker, Jr., Inc.
NAPR SWMU 70, Puerto Rico
SDG# NAPR43925-1

CRQL are qualified as U at the reported concentration when affected by blank contamination.

Blank ID	Compound	Concentration	Reporting Limit	Action Level
Method Blank	bis(2-ethylhexyl)phthalate	7.7J ug/Kg	33 ug/Kg	2X RL

Associated samples and required qualifications are noted in the following table.

Sample ID	Compound	Q Flag
all samples	bis(2-ethylhexyl)phthalate	U at reported value

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. Please note that the laboratory reported non-detect results down to the MDL for this project. Therefore, the blank flagging actions were modified as follows to take this into consideration. Positive results greater than the MDL but less than the CRQL are qualified as U at the reported concentration when affected by blank contamination.

Blank ID	Compound	Concentration	Action Level	Q Flag
JAN09-FB01	DRO	0.25 mg/L	8.325 mg/Kg	U
JAN09-ER03	DRO	0.26 mg/L	8.658 mg/Kg	U

Associated samples and required qualifications are noted in the following table.

Sample ID	Compound	Q Flag
all samples	DRO	U

Metals

Associated blanks exhibited contamination as noted in the following table. The laboratory reported non-detect results to the MDL for this project. Therefore, the blank flagging actions were modified to take this into consideration. Please see the Glossary of Qualification Flags and Abbreviations for details.

Blank ID	Analyte	Concentration	Action Level	Q Flag
MB 680-127817/20-A	antimony	0.26J mg/Kg	>MDL up to RL	U
	vanadium	0.15J mg/Kg	>MDL up to RL	U
	zinc	0.88J mg/Kg		
JAN09-ER03	arsenic	0.55J ug/L	>MDL up to RL	U
	chromium	1.4J ug/L		
JAN09-FB02	copper	18 ug/L	>blank level up to 10X blank level	J
	lead	0.60 ug/L	>MDL up to RL	U

Please note, when qualifying samples for CCB contamination, associated samples are those just prior to or just following a CCB. Therefore, not all analytes in all samples are flagged for CCB contamination. Please note that JAN09-FB02 was only associated with the soil borings with a -01 in the sample ID.

Associated samples and required qualifications are noted in the following table.

Sample ID	Analyte	Q Flag
70SB01-00, 70SB01-01	antimony	U
70SB01-01	vanadium	U
70SB01-00, 70SB02-00, 70SB02-01	zinc	U
70SB02-00	arsenic	U
70SB01-01	chromium	U
70SB02-01	lead	U
70SB02-01	copper	J

Serial Dilutions

Metals

The serial dilution analysis submitted in this SDG exhibited a non-compliant %D for several analytes, requiring qualification in the field samples. A summary of these non-compliances and affected samples are noted in the following table.

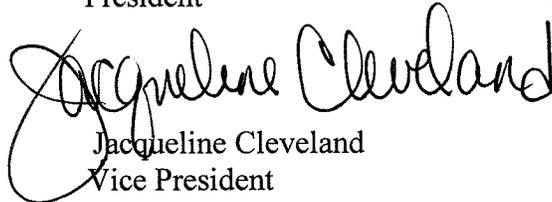
SD	Analytes	Samples	%D	Q Flag
60SB05-00 (from SDG NAPR43925-2)	barium	all samples	28	J/UJ
	chromium		30	
	cobalt		27	
	copper		22	
	lead		22	
	nickel		24	
	vanadium		33	
	zinc		15	

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
JAN09-TB02	all results	+/-	J/R
70SB01-00, 70SB01-01, 70SB02-00, 70SB02-01	acrolein acrylonitrile	+/-	J/UJ
JAN09-TB02	isobutanol	+/-	J/R
JAN09-TB02	isobutanol	+/-	J/R
JAN09-TB02	pentachloroethane bromomethane trichlorofluoromethane bromoform	+/-	J/UJ
70SB01-01, 70SB02-01	acetone	+	U at reported value
70SB02-01	2-butanone	+	U at reported value

SVOA

Sample ID	Compound	Results	Q flag
70SB01-00, 70SB02-00	4-nitroquinoline-1-oxide dimethyl phthalate acenaphthylene dibenzofuran	+/-	J/R
70SB02-00	hexachlorocyclopentadiene benzo(b)fluoranthene p-phenylene diamine 2-naphthylamine 3,3'-dimethylbenzidine hexachlorophene	+/-	J/UJ
70SB02-00	4-nitroquinoline-1-oxide	+/-	J/R
70SB01-00	hexachlorocyclopentadiene 2,4-dinitrophenol 4,6-dinitro-2-methylphenol dibenz(a,h)anthracene indeno(1,2,3-cd)pyrene benzo(g,h,i)perylene aramite, total p-phenylene diamine 1,2,4,5-tetrachlorobenzene 1-naphthylamine 2-naphthylamine 1,3,5-trinitrobenzene 3,3'-dimethylbenzidine hexachlorophene	+/-	J/UJ
70SB01-00	4-nitroquinoline-1-oxide	+/-	J/R
all samples	bis(2-ethylhexyl)phthalate	+	U at reported value

Summary of Data Qualifications

PCB

Sample ID	Compound	Results	Q flag
No qualifications were required			

GRO

Sample ID	Compound	Results	Q flag
JAN09-TB02	all results	+/-	J/R

DRO

Sample ID	Compound	Results	Q flag
all samples	DRO	+	U

Metals

Sample ID	Analyte	Results	Q flag
70SB01-00, 70SB01-01	antimony	+J	U
70SB01-01	vanadium	+J	U
70SB01-00, 70SB02-00, 70SB02-01	zinc	+J	U
70SB02-00	arsenic	+J	U
70SB01-01	chromium	+J	U
70SB02-01	lead	+J	U
70SB02-01	copper	+ >RL up to 10X blank level	J
all samples	barium chromium cobalt copper lead nickel vanadium zinc	+/-	J/UJ

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

TEST AMERICA SAVANNAH SDG NAPR43961-1

DataQual

Environmental Services, LLC

Michael Baker, Jr., Inc.
Airside Business Park
100 Airside Drive
Moon Township, PA 15108

March 26, 2008
SDG# NAPR4396-1, Test America-Savannah
NAPR SWMU 70, Puerto Rico

Dear Mr. Kimes,

The following Data Validation report is provided as requested for the parameters noted in the table below for SDG # NAPR43961-1. 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 8082A, October2006-SOP #HW-45), 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, 6020B 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	PCB	GRO	DRO	Metals
70SB03-00	680-43961-1	soil	X	X	X	X	X	X
70SB03-01	680-43961-2	soil	X	X	X	X	X	X
70SB04-00	680-43961-3	soil	X	X	X	X	X	X
70SB04-00D	680-43961-4	soil	X	X	X	X	X	X
70SB04-01	680-43961-5	soil	X	X	X	X	X	X
70SB04-01D	680-43961-6	soil	X	X	X	X	X	X
70SB04-00 MS	680-43961-3MS	soil	X	X	X	X	X	X
70SB04-00 MSD	680-43961-3MSD	soil	X	X	X	X	X	X
70SB04-01 MS	680-43961-5MS	soil	X	X	X	X	X	X
70SB04-01 MSD	680-43961-5MSD	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 *
- 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

Due to high %D values, in the continuing calibrations, some compounds were qualified as estimated.

The matrix spike exhibited no recovery for vinyl acetate; therefore qualifications were added to the associated sample.

SVOA

The initial and continuing calibration exhibited some compounds with low RRF values, which resulted in qualifying non-detected values as rejected for these compounds. Due to high %RSD 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 field duplicate pair did not exhibit comparable results for one compound that resulted in qualifying results as estimated.

PCB

No qualifications to the data were required.

GRO

Blank contamination was noted in the method and/or QC blanks associated with samples in this batch. Qualifications were added to the data.

DRO

Blank contamination was noted in the associated field QC blanks. Qualifications to the data were required.

Metals

Blank contamination was noted and qualification was required in the samples in this SDG.

The associated matrix spikes pair exhibited non-compliant recoveries in both the MS and the MSD for the analyte zinc for which qualifications were required. All results for zinc in the metals samples were qualified as estimated J/UJ. This spike pair was of a client sample from the same site in SDG NAPR43961-1.

The serial dilution submitted in this SDG exhibited non-compliant %Ds for several analytes. All results for non-compliant analytes were qualified as estimated J/UJ.

Specific Evaluation of Data

Data Completeness

Retention times were not correctly transcribed from raw data to data summary forms for the PCB fraction. The laboratory was contacted and corrected forms were received. A copy of the e-mail correspondence is included in the validation worksheets. Corrections to the metals case narrative were requested and received due to typographical errors.

Technical Holding Times

According to chain of custody records, sampling was performed on 01/14-15/09 and samples were received at the laboratory 01/16/09. All sample preparation and analysis was performed within Region II and/or method holding time requirements.

Initial/Continuing Calibration

VOA

Calibration standards exhibited %Ds 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
CC 01/18/09	2-chloro-1,3-butadiene	24.1%	all samples	J/UJ
	pentachloroethane	24.9%		
	bromomethane	27.1%		
	chloroethane	20.5%		
	trichlorofluoromethane	28.1%		

SVOA

Calibration standards exhibited RRF, %RSD and %Ds 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 01/15/09	4-nitroquinoline-1-oxide	0.0334	all samples	J/R
	dimethyl phthalate	0.0426		
	acenaphthylene	0.0499		
	dibenzofuran	0.0499		
CC 01/21/09	hexachlorocyclopentadiene	25.9%	70SB03-00, 70SB04-01	J/UJ
	benzo(b)fluoranthene	20.8%		
	p-phenylene diamine	47.6%		
	2-naphthylamine	30.4%		
	3,3'-dimethylbenzidine	31.0%		
	hexachlorophene	24.7%		
	4-nitroquinoline-1-oxide	0.0318		J/R
CC 01/22/09	hexachlorocyclopentadiene	27.5%	70SB03-01, 70SB04-00, 70SB04-00D, 70SB04-01D	J/UJ
	2,4-dinitrophenol	31.0%		
	4,6-dinitro-2-methylphenol	21.2%		
	dibenz(a,h)anthracene	23.3%		
	indeno(1,2,3-cd)pyrene	41.3%		
	benzo(g,h,i)perylene	32.0%		
	aramite, total	34.0%		
	p-phenylene diamine	54.5%		
	1,2,4,5-tetrachlorobenzene	22.1%		
	1-naphthylamine	25.7%		
	2-naphthylamine	45.7%		
	1,3,5-trinitrobenzene	40.9%		
	3,3'-dimethylbenzidine	45.6%		
	hexachlorophene	23.7%		
	4-nitroquinoline-1-oxide	0.0303	J/R	

Blanks

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. Please note that the laboratory reported non-detect results down to the MDL for this project. Therefore, the blank flagging actions were modified as follows to take this into consideration. Positive results greater than the MDL but less than the CRQL are qualified as U at the reported concentration when affected by blank contamination.

Blank ID	Compound	Concentration	Reporting Limit	Action Level
Method Blank	bis(2-ethylhexyl)phthalate	7.7J ug/Kg	33 ug/Kg	2X RL

Associated samples and required qualifications are noted in the following table.

Sample ID	Compound	Q Flag
all samples	bis(2-ethylhexyl)phthalate	U at reported value

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. Please note that the laboratory reported non-detect results down to the MDL for this project. Therefore, the blank flagging actions were modified as follows to take this into consideration. Positive results greater than the MDL but less than the CRQL are qualified as U at the reported concentration when affected by blank contamination.

Blank ID	Compound	Concentration	Reporting Limit	Action Level
JAN09-FB02	GRO	0.016J mg/L	0.050 mg/L	RL

Associated samples and required qualifications are noted in the following table.

Sample ID	Compound	Q Flag
70SB03-00	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. Please note that the laboratory reported non-detect results down to the MDL for this project. Therefore, the blank flagging actions were modified as follows to take this into consideration. Positive results greater than the MDL but less than the CRQL are qualified as U at the reported concentration when affected by blank

contamination.

Blank ID	Compound	Concentration	Action Level	Q Flag
JAN09-FB01	DRO	0.25 mg/L	8.325 mg/Kg	U
JAN09-ER03	DRO	0.26 mg/L	8.658 mg/Kg	U

Associated samples and required qualifications are noted in the following table.

Sample ID	Compound	Q Flag
70SB03-01, 70SB04-00, 70SB04-00D, 70SB04-01, 70SB04-01D	DRO	U

Metals

Associated blanks exhibited contamination as noted in the following table. The laboratory reported non-detect results to the MDL for this project. Therefore, the blank flagging actions were modified to take this into consideration. Please see the Glossary of Qualification Flags and Abbreviations for details.

Blank ID	Analyte	Concentration	Action Level	Q Flag
MB 680-127817/20-A	antimony	0.26J mg/Kg	>MDL up to RL	U
	vanadium	0.051J mg/Kg		
	zinc	0.88J mg/Kg		
JAN09-ER03	chromium	1.4J ug/L	>MDL up to RL	U
JAN09-FB02	copper	18 ug/L	>MDL up to RL	U

Please note, when qualifying samples for CCB contamination, associated samples are those just prior to or just following a CCB. Therefore, not all analytes in all samples are flagged for CCB contamination.

Associated samples and required qualifications are noted in the following table.

Sample ID	Analyte	Q Flag
all samples	antimony	U
70SB04-00D, 70SB04-01, 70SB04-01D	silver	U
all samples	zinc	U
70SB03-00, 70SB04-00, 70SB04-00D, 70SB04-01, 70SB04-01D	chromium	U
70SB03-01	copper	U

Matrix Spikes

VOA

The matrix spike, associated with sample 70SB04-00 and duplicate 70SB04-00D, exhibited 0% recovery for vinyl acetate (QC limit 10-254%); therefore results were qualified as estimated (J/UJ).

Metals

The matrix spike pair submitted in this SDG exhibited non-compliant %R's for zinc, requiring qualification in the field samples. A summary of these non-compliances and affected samples are noted in the following table.

MS	Analytes	Samples	%R	Q Flag
70SB04-01	zinc	all samples	136/134	J

Serial Dilutions

Metals

The serial dilution analysis submitted in this SDG exhibited a non-compliant %D for several 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
60SB05-00 (from SDG NAPR43925-2)	barium	all samples	28	J/UJ
	chromium		30	
	cobalt		27	
	copper		22	
	lead		22	
	nickel		24	
	vanadium		33	
zinc	15			

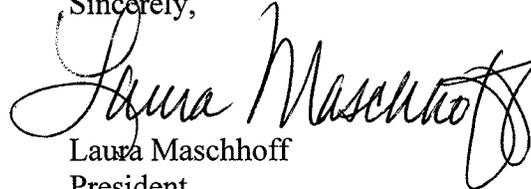
Field Duplicates

SVOA

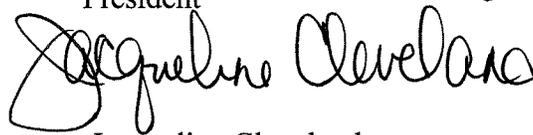
Sample 70SB04-00 and duplicate 70SB04-00D exhibited non-comparable results with 179% RPD for 2-methylnaphthalene; therefore results were qualified as estimated (J).

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

Michael Baker, Jr., Inc.
NAPR SWMU 70, Puerto Rico
SDG# NAPR43961-1

Summary of Data Qualifications

VOA

Sample ID	Compound	Results	Q flag
all samples	2-chloro-1,3-butadiene pentachloroethane bromomethane chloroethane trichlorofluoromethane	+/-	J/UJ
70SB04-00, 70SB04D	vinyl acetate	+/-	J/UJ

SVOA

Sample ID	Compound	Results	Q flag
all samples	4-nitroquinoline-1-oxide dimethyl phthalate acenaphthylene dibenzofuran	+/-	J/R
70SB03-00, 70SB04-01	hexachlorocyclopentadiene benzo(b)fluoranthene p-phenylene diamine 2-naphthylamine 3,3'-dimethylbenzidine hexachlorophene	+/-	J/UJ
70SB03-00, 70SB04-01	4-nitroquinoline-1-oxide	+/-	J/R
70SB03-01, 70SB04-00, 70SB04-00D, 70SB04-01D	hexachlorocyclopentadiene 2,4-dinitrophenol 4,6-dinitro-2-methylphenol dibenz(a,h)anthracene indeno(1,2,3-cd)pyrene benzo(g,h,i)perylene aramite, total p-phenylene diamine 1,2,4,5-tetrachlorobenzene 1-naphthylamine 2-naphthylamine 1,3,5-trinitrobenzene 3,3'-dimethylbenzidine hexachlorophene	+/-	J/UJ
70SB03-01, 70SB04-00, 70SB04-00D, 70SB04-01D	4-nitroquinoline-1-oxide	+/-	J/R
all samples	bis(2-ethylhexyl)phthalate	+	U at reported value
70SB04-00, 70SB04-00D	2-methylnaphthalene	+/-	J

PCB

Sample ID	Compound	Results	Q flag
No qualifications were required			

Summary of Data Qualifications

GRO

Sample ID	Compound	Results	Q flag
70SB03-00	GRO	+	U at RL

DRO

Sample ID	Compound	Results	Q flag
70SB03-01, 70SB04-00, 70SB04-00D, 70SB04-01, 70SB04-01D	DRO	+	U

Metals

Sample ID	Analyte	Results	Q flag
all samples	antimony	+J	U
70SB04-00D, 70SB04-01, 70SB04-01D	silver	+J	U
all samples	zinc	+J	U
70SB03-00, 70SB04-00, 70SB04-00D, 70SB04-01, 70SB04-01D	chromium	+J	U
70SB03-01	copper	+J	U
all samples	zinc	+	J
all samples	barium chromium cobalt copper lead nickel vanadium zinc	+/-	J/UJ

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

TEST AMERICA SAVANNAH SDG NAPR43961-2

DataQual

Environmental Services, LLC

Michael Baker, Jr., Inc.
Airside Business Park
100 Airside Drive
Moon Township, PA 15108

March 26, 2008
SDG# NAPR43961-2, Test America-Savannah
NAPR QC, Puerto Rico

Dear Mr. Kimes,

The following Data Validation report is provided as requested for the parameters noted in the table below for SDG # NAPR43961-2. 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, 8081B, October 2006-SOP#HW-44, and 8082A, October 2006-SOP #HW-45), 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, 6020B 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	Pest	PCB	GRO	DRO	Metals
JAN09-TB03	680-43961-7	water	X				X		
JAN09-ER03	680-43961-8	water	X	X	X	X	X	X	X
JAN09-FB01	680-43961-9	water	X	X	X	X	X	X	X

The following quality control samples were provided with this SDG: sample JAN09-TB03- trip blank; sample JAN09-FB01- field blank and sample JAN09-ER03- equipment blank. 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 NA
- Matrix Duplicate RPDs NA
- 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 calibration exhibited some compounds with low RRF values, which resulted in qualifying non-detected values as rejected for these compounds. Due to high %D values, in the continuing calibrations, some compounds were qualified as estimated.

SVOA

The initial and continuing calibration exhibited some compounds with low RRF values, which resulted in qualifying non-detected values as rejected for these compounds. Due to high %D values, in the continuing calibrations, some compounds were qualified as estimated.

Pesticides

No qualifications to the data were required.

PCB

No qualifications to the data were required.

GRO

Sample JAN09-TB03 was received with headspace; therefore the non-detected GRO result was qualified as rejected, as according to Region II guidelines.

DRO

No qualifications to the data were required.

Metals

No qualifications to the data were required.

Specific Evaluation of Data

Data Completeness

Resubmissions were required. Retention times were not correctly transcribed from raw data to data summary forms in the Pesticide/PCB fraction. The laboratory was contacted and corrected forms were received. A copy of the e-mail correspondence is included in the validation worksheets.

Sample Condition

GRO

Sample JAN09-TB03 was received with headspace; therefore the non-detected GRO result was qualified as rejected, as according to Region II guidelines.

Technical Holding Times

According to chain of custody records, sampling was performed on 01/14/09 and samples were received at the laboratory 01/16/09. 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 01/20/09	isobutanol	0.0460	all samples	J/R
CC 01/26/09	pentachloroethane	27.0%	all samples	J/UJ
	bromomethane	32.5%		
	vinyl acetate	21.5%		
	isobutanol	0.0414		J/R

SVOA

Calibration standards exhibited RRF and %Ds 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.

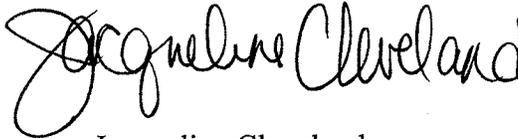
Standard ID	Compound(s)	RRF, %RSD, %D	Samples	Q Flag
IC 02/05/09	4-nitroquinoline-1-oxide	0.0212	all samples	J/R
CC 02/05/09	hexachlorocyclopentadiene	20.5%	all samples	J/UJ
	2,4-dinitrophenol	42.1%		
	4,6-dinitro-2-methylphenol	34.4%		
	dinoseb	26.6%		
	3,3'-dichlorobenzidine	32.0%		
	p-phenylene diamine	24.1%		
	methapyrilene	26.1%		
	4-nitroquinoline-1-oxide	0.0275		J/R

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	isobutanol	+/-	J/R
all samples	pentachloroethane bromomethane vinyl acetate	+/-	J/UJ
all samples	isobutanol	+/-	J/R

SVOA

Sample ID	Compound	Results	Q flag
all samples	4-nitroquinoline-1-oxide	+/-	J/R
all samples	hexachlorocyclopentadiene 2,4-dinitrophenol 4,6-dinitro-2-methylphenol dinoseb 3,3'-dichlorobenzidine p-phenylene diamine methapyrilene	+/-	J/UJ
all samples	4-nitroquinoline-1-oxide	+/-	J/R

Pesticides

Sample ID	Compound	Results	Q flag
No qualifications			

PCB

Sample ID	Compound	Results	Q flag
No qualifications			

GRO

Sample ID	Compound	Results	Q flag
JAN09-TB03	GRO	-	R

DRO

Sample ID	Compound	Results	Q flag
No qualifications			

Metals

Sample ID	Analyte	Results	Q flag
No qualifications			

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

TEST AMERICA SAVANNAH SDG NAPR43991-1

DataQual

Environmental Services, LLC

Michael Baker, Jr., Inc.
Airside Business Park
100 Airside Drive
Moon Township, PA 15108

March 26, 2008
SDG# NAPR43991-1, Test America-Savannah
NAPR SWMU 70, Puerto Rico

Dear Mr. Kimes,

The following Data Validation report is provided as requested for the parameters noted in the table below for SDG # NAPR43991-1. 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 8082A, October2006-SOP #HW-45), 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, 6020B 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	PCB	GRO	DRO	Metals	TOC
70SD06	680-43991-1	soil	X	X	X	X	X	X	X
70SD07	680-43991-2	soil	X	X	X	X	X	X	X
70SD08	680-43991-3	soil	X	X	X	X	X	X	X
70SD08 MS	680-43991-3MS	soil		X					
70SD08 MSD	680-43991-3MSD	soil		X					

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

Due to high %D values, in the 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

The initial and continuing calibration exhibited some compounds with low RRF values, which resulted in qualifying non-detected values as rejected for these compounds. Due to high %RSD and %D values, in the initial and continuing calibrations, some compounds were qualified as estimated.

The associated laboratory control spike exhibited non-compliant recovery for several compounds; therefore all samples were qualified as estimated for these compounds. All associated samples were re-extracted due to the LCS recoveries however due to exceeded extraction holding times these analyses were not used.

The matrix spike and matrix spike duplicate exhibited below 10% recovery for two compounds that resulted in qualifications to the associated sample.

Blank contamination was noted in the method and/or QC blanks associated with samples in this batch. Qualifications were added to the data.

Michael Baker, Jr., Inc.
NAPR SWMU 70, Puerto Rico
SDG# NAPR43991-1
Page 2

PCB

No qualifications to the data were required.

GRO

No qualifications to the data were required.

DRO

Blank contamination was noted in the associated field QC blanks. Qualifications to the data were required.

Metals

Blank contamination was noted and qualification was required in the samples in this SDG.

The associated matrix spikes pair exhibited non-compliant recoveries in both the MS and the MSD for the analyte zinc for which qualifications were required. All results for zinc in the metals samples were qualified as estimated J/UJ. This spike pair was of a client sample from the same site in SDG NAPR43961-1.

The serial dilution submitted in this SDG exhibited non-compliant %Ds for several analytes. All results for non-compliant analytes were qualified as estimated J/UJ.

Please note that the laboratory diluted the sample extracts due to matrix issues. The reporting limits and method detection limits were adjusted accordingly.

TOC

No qualifications to the data were required.

Specific Evaluation of Data

Data Completeness

Retention times were not correctly transcribed from raw data to data summary forms in the PCB fraction. The laboratory was contacted and corrected forms were received. A copy of the e-mail correspondence is included in the validation worksheets. Corrections to the metals case narrative were requested and received due to typographical errors.

Technical Holding Times

Michael Baker, Jr., Inc.
NAPR SWMU 70, Puerto Rico
SDG# NAPR43991-1

Page 3

003

According to chain of custody records, sampling was performed on 01/15/09 and samples were received at the laboratory 01/17/09. All sample preparation and analysis was performed within Region II and/or method holding time requirements.

Initial/Continuing Calibration

VOA

Calibration standards exhibited %Ds 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
CC 01/21/09	iodomethane bromomethane trichlorofluoromethane tetrachloroethene	28.1% 27.9% 29.6% 24.6%	all samples	J/UJ

SVOA

Calibration standards exhibited RRF, %RSD and %Ds 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 02/05/09	p-phenylene diamine	20.1%	all samples	J/UJ
	3,3'-dimethylbenzidine	31.3%		J/R
	4-nitroquinoline-1-oxide	0.0212		J/R
CC 02/06/09	3,3'-dichlorobenzidine	37.5%	all samples	J/UJ
	hexachloropropene	29.1%		
	p-phenylene diamine	29.8%		
	1,3,5-trinitrobenzene	28.1%		
	3,3'-dimethylbenzidine	20.7%		
	hexachlorophene	26.0%		
4-nitroquinoline-1-oxide	0.0299	J/R		

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. Please note that the laboratory reported non-detect results down to the MDL for this project. Therefore, the blank flagging actions were modified as follows to take this into consideration. Positive results greater than the MDL but less than the CRQL are qualified as U at the reported concentration when affected by blank

Michael Baker, Jr., Inc.
NAPR SWMU 70, Puerto Rico
SDG# NAPR43991-1

contamination.

Blank ID	Compound	Concentration	Reporting Limit	Action Level
JAN09-ER03	2-butanone	1.0J ug/L	10 ug/L	2X RL
JAN09-FB01	2-butanone	0.75J ug/L	10 ug/L	2X RL

Associated samples and required qualifications are noted in the following table.

Sample ID	Compound	Q Flag
70SD06, 70SD08	2-butanone	U at reported value

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. Please note that the laboratory reported non-detect results down to the MDL for this project. Therefore, the blank flagging actions were modified as follows to take this into consideration. Positive results greater than the MDL but less than the CRQL are qualified as U at the reported concentration when affected by blank contamination.

Blank ID	Compound	Concentration	Reporting Limit	Action Level
Method Blank	bis(2-ethylhexyl)phthalate	12J ug/Kg	33 ug/Kg	2X RL

Associated samples and required qualifications are noted in the following table.

Sample ID	Compound	Q Flag
all samples	bis(2-ethylhexyl)phthalate	U at reported value

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. Please note that the laboratory reported non-detect results down to the MDL for this project. Therefore, the blank flagging actions were modified as follows to take this into consideration. Positive results greater than the MDL but less than the CRQL are qualified as U at the reported concentration when affected by blank contamination.

Blank ID	Compound	Concentration	Action Level	Q Flag
JAN09-FB01	DRO	0.25 mg/L	8.325 mg/Kg	U
JAN09-ER03	DRO	0.26 mg/L	8.658 mg/Kg	U

Associated samples and required qualifications are noted in the following table.

Sample ID	Compound	Q Flag
70SD06, 70SD08	DRO	U

Michael Baker, Jr., Inc.
 NAPR SWMU 70, Puerto Rico
 SDG# NAPR43991-1

Metals

Associated blanks exhibited contamination as noted in the following table. The laboratory reported non-detect results to the MDL for this project. Therefore, the blank flagging actions were modified to take this into consideration. Please see the Glossary of Qualification Flags and Abbreviations for details.

Blank ID	Analyte	Concentration	Action Level	Q Flag
MB 680-127817/20-A	antimony	0.26J mg/Kg	>MDL up to RL	U
	silver	0.051J mg/Kg		
	zinc	0.88J mg/Kg		
ICB	beryllium	0.026J ug/L	>MDL up to RL	U
JAN09-FB02	arsenic	0.74J ug/L	>MDL up to RL	U
	lead	0.60J ug/L	>blank level up to 10X blank level	J
	copper	18 ug/L		
	zinc	30 ug/L		

Please note, when qualifying samples for CCB contamination, associated samples are those just prior to or just following a CCB. Therefore, not all analytes in all samples are flagged for CCB contamination.

Associated samples and required qualifications are noted in the following table.

Sample ID	Analyte	Q Flag
all samples	antimony	U
70SD06	silver	U
70SD08	zinc	U
70SD06	beryllium	U
70SD07	arsenic	U
70SD07, 70SD08	lead	U
all samples	copper	J
70SD06, 70SD07	zinc	J

Laboratory Control Samples

SVOA

The LCS associated with all the samples exhibited low recovery at 37% for 4-bromophenyl phenyl ether (QC limit 43-110%), 43% for 2-chloronaphthalene (QC limit 46-110%), 42% for di-n-octyl phthalate (QC limit 49-122%), 41% for hexachlorobenzene (QC limit 50-110%), 41% for hexachlorobutadiene (QC limit 44-110%), 41% for isophorone (QC limit 44-110%), 44% for n-nitrosodiphenylamine (QC limit 53-110%), 13% for pentachlorophenol (QC limit 28-117%), 39% for 1,2,4-trichlorobenzene (QC limit 42-110%) and 47% for 2,4,5-trichlorophenol (QC limit 48-110%); therefore all samples were qualified as estimated (J/UJ) for these compounds.

Matrix Spikes

SVOA

Michael Baker, Jr., Inc.
NAPR SWMU 70, Puerto Rico
SDG# NAPR43991-1

The matrix spike and matrix spike duplicate associated with sample 70SD08 exhibited low recovery for 3,3'-dichlorobenzidine at 7% and 8% (QC limit 27-110) and hexachlorocyclopentadiene at 0% and 1% (Qc limit 26-110%); there fore the results for these compounds were qualified as estimated (J/UJ) in the associated sample.

Metals

The matrix spike pair submitted in this SDG exhibited non-compliant %R's for zinc, requiring qualification in the field samples. A summary of these non-compliances and affected samples are noted in the following table.

MS	Analytes	Samples	%R	Q Flag
70SB04-01	zinc	all samples	136/134	J+

Serial Dilutions

Metals

The serial dilution analysis submitted in this SDG exhibited a non-compliant %D for several 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
60SB05-00 (from SDG NAPR43925-2)	barium	all samples	28	J/UJ
	chromium		30	
	cobalt		27	
	copper		22	
	lead		22	
	nickel		24	
	vanadium		33	
zinc	15			

Identification/Quantitation

SVOA

All samples were re-extracted due to the LCS recoveries however due to exceeded extraction holding times these analyses were not used in favor of the initial analysis.

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	iodomethane bromomethane trichlorofluoromethane tetrachloroethene	+/-	J/UJ
70SD06, 70SD08	2-butanone	+	U at reported value

SVOA

Sample ID	Compound	Results	Q flag
all samples	p-phenylene diamine 3,3'-dimethylbenzidine	+/-	J/UJ
all samples	4-nitroquinoline-1-oxide	+/-	J/R
all samples	3,3'-dichlorobenzidine hexachloropropene p-phenylene diamine 1,3,5-trinitrobenzene 3,3'-dimethylbenzidine hexachlorophene	+/-	J/UJ
all samples	4-nitroquinoline-1-oxide	+/-	J/R
all samples	bis(2-ethylhexyl)phthalate	+	U at reported value
all samples	4-bromophenyl phenyl ether, 2-chloronaphthalene, di-n-octyl phthalate, hexachlorobenzene, hexachlorobutadiene, isophorone, n-nitrosodiphenylamine, pentachlorophenol, 1,2,4-trichlorobenzene, 2,4,5-trichlorophenol	+/-	J/UJ
70SD08	3,3'-dichlorobenzidine, hexachlorocyclopentadiene	+/-	J/UJ
70SD06RE, 70SD07RE, 70SD08RE	all results	+/-	R

PCB

Sample ID	Compound	Results	Q flag
No qualifications were required			

Summary of Data Qualifications

GRO

Sample ID	Compound	Results	Q flag
No qualifications required.			

DRO

Sample ID	Compound	Results	Q flag
70SD06, 70SD08	DRO	+	U

Metals

Sample ID	Analyte	Results	Q flag
all samples	antimony	+J	U
70SD06	silver	+J	U
70SD08	zinc	+J	U
70SD06	beryllium	+J	U
70SD07	arsenic	+J	U
70SD07, 70SD08	lead	+J	U
all samples	copper	+>RL up to 10X blank level	J
70SD06, 70SD07	zinc	+>RL up to 10X blank level	J
all samples	zinc	+	J
all samples	barium chromium cobalt copper lead nickel vanadium zinc	+/-	J/UJ

TOC

Sample ID	Parameter	Results	Q flag
No qualifications 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

TEST AMERICA SAVANNAH SDG NAPR43991-2

DataQual

Environmental Services, LLC

Michael Baker, Jr., Inc.
Airside Business Park
100 Airside Drive
Moon Township, PA 15108

March 26, 2008
SDG# NAPR43991-2, Test America-Savannah
NAPR QC, Puerto Rico

Dear Mr. Kimes,

The following Data Validation report is provided as requested for the parameters noted in the table below for SDG # NAPR43991-2. 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 8081B, October 2006-SOP#HW-44), 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, 6020B 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	Pest	GRO	DRO	Metals
JAN09-ER04	680-43991-4	water	X	X	X	X	X	X
JAN09-TB04	680-43991-5	water	X			X		

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 NA
- Matrix Duplicate RPDs NA
- 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 calibration exhibited some compounds with low RRF values, which resulted in qualifying non-detected values as rejected for these compounds. Due to high %D values, in the continuing calibrations, some compounds were qualified as estimated.

SVOA

The initial and continuing calibration exhibited some compounds with low RRF values, which resulted in qualifying non-detected values as rejected for these compounds. Due to high %D values, in the continuing calibrations, some compounds were qualified as estimated.

Pesticides

No qualifications to the data were required.

GRO

No qualifications to the data were required.

DRO

No qualifications to the data were required.

Metals

No qualifications to the data were required.

Specific Evaluation of Data

Data Completeness

Resubmissions were required. The data package did not contain cooler temperature information. The laboratory was contacted and the required information was provided. Retention times were not correctly transcribed from raw data to data summary forms in the Pesticide fraction. The laboratory was contacted and corrected forms were received. A copy of the e-mail correspondence is included in the validation worksheets.

Technical Holding Times

According to chain of custody records, sampling was performed on 01/15/09 and samples were received at the laboratory 01/17/09. All sample preparation and analysis was performed within Region II and/or method holding time requirements.

Initial/Continuing Calibration

VOA

Calibration standards exhibited RRF and %Ds 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 01/21/09	isobutanol	0.04600	all samples	J/R
CC 01/21/09	isobutanol	0.04138	all samples	J/R
	bromomethane	32.5%		J/UJ
	vinyl acetate	21.5%		
	pentachloroethane	27.0%		

SVOA

Calibration standards exhibited RRF and %Ds 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.

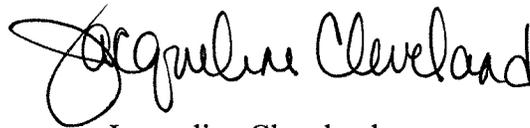
Standard ID	Compound(s)	RRF, %RSD, %D	Samples	Q Flag
IC 01/23/09	4-nitroquinoline-1-oxide	0.0334	all samples	J/R
CC 01/29/09	4-nitroquinoline-1-oxide	0.0320	all samples	J/R
	n-nitrosodimethylamine	30.0%		J/UJ
	2-nitroaniline	27.6%		
	2,6-dinitrotoluene	22.3%		
	di-n-butyl phthalate	302%		
	bis(2-ethylhexyl)phthalate	22.5%		
	3,3'-dichlorobenzidine	43.1%		
1-naphthylamine	31.0%			
2-naphthylamine	54.1%			

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	isobutanol	+/-	J/R
all samples	isobutanol	+/-	J/R
all samples	bromomethane vinyl acetate pentachloroethane	+/-	J/UJ

SVOA

Sample ID	Compound	Results	Q flag
all samples	4-nitroquinoline-1-oxide	+/-	J/R
all samples	4-nitroquinoline-1-oxide	+/-	J/R
all samples	n-nitrosodimethylamine 2-nitroaniline 2,6-dinitrotoluene di-n-butyl phthalate bis(2-ethylhexyl)phthalate 3,3'-dichlorobenzidine 1-naphthylamine 2-naphthylamine	+/-	J/UJ

Pesticides

Sample ID	Compound	Results	Q flag
No qualifications required.			

GRO

Sample ID	Compound	Results	Q flag
No qualifications required.			

DRO

Sample ID	Compound	Results	Q flag
No qualifications required.			

Metals

Sample ID	Analyte	Results	Q flag
No qualifications 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

TEST AMERICA SAVANNAH SDG NAPR44016-1

DataQual

Environmental Services, LLC

Michael Baker, Jr., Inc.
Airside Business Park
100 Airside Drive
Moon Township, PA 15108

March 26, 2008
SDG# NAPR44016-1, Test America-Savannah
NAPR SWMU 60, Puerto Rico

Dear Mr. Kimes,

The following Data Validation report is provided as requested for the parameters noted in the table below for SDG # NAPR44016-1. 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 8081B, October 2006-SOP#HW-44), 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, 6020B 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	PEST	GRO	DRO	TM	DM
60GW05	680-44016-1	water	X	X	X	X	X	X	X
60GW02	680-44016-2	water	X	X	X	X	X	X	X
JAN09-TB06	680-44016-3	water	X			X			

The following quality control samples were provided with this SDG: sample JAN09-TB06- trip blank. 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 NA

- Matrix Duplicate RPDs NA
- 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. Please note that the reviewer added an F to the ID to distinguish a dissolved metals sample from a total metals sample as needed.

VOA

The continuing calibration exhibited some compounds with low RRF values, which resulted in qualifying non-detected values as rejected for these compounds. Due to high %D values, in the continuing calibrations, some compounds were qualified as estimated.

SVOA

The initial and continuing calibration exhibited some compounds with low RRF values, which resulted in qualifying non-detected values as rejected for these compounds. Due to high %RSD 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.

One sample exhibited low recovery for four of the six surrogates that resulted in qualifying all results as estimated.

Pesticides

No qualifications to the data were required.

GRO

No qualifications to the data were required.

DRO

No qualifications to the data were required.

Metals

Blank contamination was noted and qualification was required in the samples in this SDG.

The matrix spikes pairs submitted in this SDG exhibited non-compliant recoveries in both the MS and the MSD for the analytes copper and mercury for which qualifications were required.

Specific Evaluation of Data

Data Completeness

Resubmissions were required. Retention times were not correctly transcribed from raw data to data summary forms in the Pesticide fraction. The laboratory was contacted and corrected forms were received. A copy of the e-mail correspondence is included in the validation worksheets.

Technical Holding Times

According to chain of custody records, sampling was performed on 01/18/09 and samples were received at the laboratory 01/20/09. 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
CC 01/22/09	iodomethane	45.8%	all samples	J/UJ
	2-chloro-1,3-butadiene	43.8%		
	pentachloroethane	37.6%		
	isobutanol	0.03212	J/R	

SVOA

Calibration standards exhibited RRF and %Ds 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 02/05/09	4-nitroquinoline-1-oxide	0.0212	all samples	J/R
CC 02/06/09	3,3'-dichlorobenzidene	37.5%	60GW02	J/UJ
	hexachloropropene	29.1%		
	p-phenylene diamine	29.8%		
	1,3,5-trinitrobenzene	28.1%		
	3,3'-dimethylbenzidine	20.7%		
	hexachlorophene	26.0%		
	4-nitroquinoline-1-oxide	0.0299		J/R
CC 02/09/09	hexachlorocyclopentadiene	28.5%	60GW05	J/UJ
	benzo(b)fluoranthene	20.7%		
	indeno(1,2,3-cd)pyrene	26.5%		
	dibenz(a,h)anthracene	34.1%		
	benzo(g,h,i)perylene	38.9%		
	hexachloropropene	20.6%		
	1-naphthylamine	23.5%		
	2-naphthylamine	43.6%		
	3,3'-dimethylbenzidine	28.8%		
4-nitroquinoline-1-oxide	0.0314	J/R		

Blanks

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. Please note that the laboratory reported non-detect results down to the MDL for this project. Therefore, the blank flagging actions were modified as follows to take this into consideration. Positive results greater than the MDL but less than the CRQL are qualified as U at the reported concentration when affected by blank contamination.

Blank ID	Compound	Concentration	Reporting Limit	Action Level
Method Blank	di-n-butylphthalate	0.12J ug/L	1 ug/L	2X RL
JAN09-FB01	phenol	0.5J	0.97	RL

Associated samples and required qualifications are noted in the following table.

Sample ID	Compound	Q Flag
60GW05	di-n-butylphthalate	U at reported value
60GW05, 60GW02	phenol	U at reported value

Metals

Associated blanks exhibited contamination as noted in the following table. The laboratory reported non-detect results to the MDL for this project. Therefore, the blank flagging actions were modified to take this into consideration. Please see the Glossary of Qualification Flags and Abbreviations for details.

Blank ID	Analyte	Concentration	Action Level	Q Flag
CCB	cobalt	0.012J ug/L	>MDL up to RL	U
JAN09-ER04	chromium	0.86J ug/L	>MDL up to RL	U

Please note, when qualifying samples for CCB contamination, associated samples are those just prior to or just following a CCB. Therefore, not all analytes in all samples are flagged for CCB contamination.

Associated samples and required qualifications are noted in the following table.

Sample ID	Analyte	Q Flag
all samples >MDL up to RL	cobalt	U
60GW05	chromium	U

Surrogates

SVOA

Sample 60GW02 exhibited low recoveries for 2-fluorophenol at 31% (QC limit 36-110%), phenol-d5 at 34% (QC limit 38-116%), nitrobenzene-d5 at 34% (QC limit 45-112%) and 2-fluorobiphenyl at 40% (QC limit 50-113%); therefore all results were qualified as estimated (J/UJ). The sample was re-analyzed out of holding time, however low recoveries were also exhibited.

Matrix Spikes

Metals

The matrix spike pairs submitted in this SDG exhibited non-compliant %R's for copper and mercury, requiring qualification in the field samples. A summary of these non-compliances and affected samples are noted in the following table.

MS	Analytes	Samples	%R	Q Flag
70GW02	copper	all samples	73/66	J/UJ
44002-1	mercury	all samples	68/63	J/UJ

Identification/Quantitation

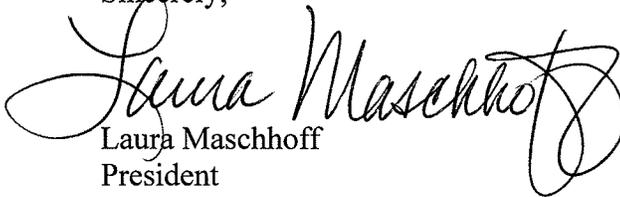
SVOA

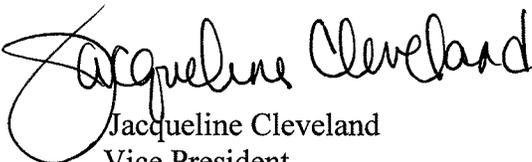
Sample 60GW02RE was not used in favor of the initial analysis due to exceeded holding times and non-compliant surrogate recoveries.

Michael Baker, Jr., Inc.
NAPR SWMU 60, Puerto Rico
SDG# NAPR44016-1

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	iodomethane 2-chloro-1,3-butadiene pentachloroethane	+/-	J/UJ
all samples	isobutanol	+/-	J/R

SVOA

Sample ID	Compound	Results	Q flag
all samples	4-nitroquinoline-1-oxide	+/-	J/R
60GW02	3,3'-dichlorobenzidene hexachloropropene p-phenylene diamine 1,3,5-trinitrobenzene 3,3'-dimethylbenzidine hexachlorophene	+/-	J/UJ
60GW02	4-nitroquinoline-1-oxide	+/-	J/R
60GW05	hexachlorocyclopentadiene benzo(b)fluoranthene indeno(1,2,3-cd)pyrene dibenz(a,h)anthracene benzo(g,h,i)perylene hexachloropropene 1-naphthylamine 2-naphthylamine 3,3'-dimethylbenzidine	+/-	J/UJ
60GW05	4-nitroquinoline-1-oxide	+/-	J/R
60GW05	di-n-butylphthalate	+	U at reported value
60GW05, 60GW02	phenol	+	U at reported value
60GW02	all results	+/-	J/UJ
60GW02RE	all results	+/-	R

Pesticides

Sample ID	Compound	Results	Q flag
No qualifications			

GRO

Sample ID	Compound	Results	Q flag
No qualifications			

Summary of Data Qualifications

DRO

Sample ID	Compound	Results	Q flag
No qualifications			

Metals

Sample ID	Analyte	Results	Q flag
all samples >MDL up to RL	cobalt	>MDL up to RL	U
60GW05	chromium	>MDL up to RL	U
all dissolved metals samples	copper mercury	+/-	J/UJ

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

TEST AMERICA SAVANNAH SDG NAPR44027-1

DataQual

Environmental Services, LLC

Michael Baker, Jr., Inc.
Airside Business Park
100 Airside Drive
Moon Township, PA 15108

March 26, 2008
SDG# NAPR44027-1, Test America-Savannah
NAPR SWMU 70, Puerto Rico

Dear Mr. Kimes,

The following Data Validation report is provided as requested for the parameters noted in the table below for SDG # NAPR44027-1. 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 8082A, October2006-SOP #HW-45), 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, 6020B 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 qualifications is provided.

Sample ID	Lab ID	Matrix	VOA App IX	SVOA App IX	PCB	GRO	DRO	TM	DM
70GW06	680-44027-1	water	X	X	X	X	X	X	X
70GW07	680-44027-2	water	X	X	X	X	X	X	X
70GW08	680-44027-3	water	X	X	X	X	X	X	X
70GW02	680-44027-8	water	X	X	X	X	X	X	X
70GW03	680-44027-9	water	X	X	X	X	X	X	X
70GW02D	680-44027-10	water	X	X	X	X	X	X	X
70GW01	680-44027-11	water	X	X	X	X	X	X	X
70GW04	680-44027-12	water	X	X	X	X	X	X	X
JAN09-ER05	680-44027-13	water	X	X	X	X	X	X	X
70GW02 MS	680-44027-8MS	water	X	X	X	X	X	X	X
70GW02 MSD	680-44027-8MSD	water	X	X	X	X	X	X	X

The following quality control samples were provided with this SDG: sample 9GW02D was the field duplicate of sample 9GW02; sample JAN09-ER05-equipment blank. 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. Please note that the reviewer added an F to the sample ID to indicate dissolved metals analysis when necessary.

VOA

Two samples were received at the laboratory with headspace; therefore all positive results were qualified as estimated (J) and non-detected results as rejected (R).

The continuing calibration exhibited some compounds with low RRF values, which resulted in qualifying non-detected values as rejected for these compounds. Due to high %D values, in the 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

The initial and continuing calibration exhibited some compounds with low RRF values, which resulted in qualifying non-detected values as rejected for these compounds. Due to

Michael Baker, Jr., Inc.
 NAPR SWMU 70, Puerto Rico
 SDG# NAPR44027-1

high %D values, in the 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.

Non-compliant internal standard area results were exhibited in one sample that resulted in qualifying the associated compound results as estimated. The sample was re-analyzed with similar results.

The associated matrix spike and matrix spike duplicate exhibited several low recoveries that resulted in qualifications to the data.

The field duplicate pair did not exhibit comparable results for one compound; therefore results were qualified as estimated.

PCB

No qualifications to the data were required. Please note that samples were diluted due to the matrix. The reporting limits and method detection limits were adjusted accordingly.

GRO

Two samples were received at the laboratory with headspace; therefore all non-detected GRO results were qualified as rejected (R).

Samples 70GW02 and 70GW02D were received with insufficient preservation with a pH>2; therefore analysis must be analyzed within 7 days, as according to Region II guidelines. These samples exceeded the 7-day holding time by three days and therefore the non-detected GRO results were qualified as rejected (R).

DRO

Blank contamination was noted in the associated field QC blanks. Qualifications to the data were required.

Metals

Blank contamination was noted and qualification was required in the samples in this SDG.

The matrix spikes pair submitted in this SDG for the dissolved metals analysis exhibited non-compliant recoveries in both the MS and the MSD for the analytes copper and

mercury for which qualifications were required. All results for copper and mercury in the dissolved metals samples were qualified as estimated J/UJ.

The field duplicate analyzed for the total metals fraction required qualification as estimated for one analyte.

Please note that some samples were diluted due to matrix issues. The reporting limits and method detection limits were adjusted accordingly.

Specific Evaluation of Data

Data Completeness

Resubmissions were required. For all fractions, the chain of custody did not list several samples; the laboratory was contacted to supply documentation of the sample data and date the samples were received at the laboratory. A "Sample Summary" form was supplied by the laboratory and submitted with this report and data package. The VOA fraction data package was missing a Form VII. Retention times were not correctly transcribed from raw data to data summary forms for the PCB fraction. The laboratory was contacted and corrected forms were received. A copy of the e-mail correspondence is included in the validation worksheets.

Sample Condition

VOA and GRO

Samples 70GW02 and 70GW02D were received at the laboratory with headspace; therefore, as in accordance with Region II guidelines, the positive results were qualified as estimated (J) and non-detected results were qualified as rejected (R).

Technical Holding Times

According to chain of custody records, sampling was performed on 01/17/09 and samples were received at the laboratory 01/20/09. All sample preparation and analysis was performed within Region II and/or method holding time requirements with the following exceptions.

GRO

Samples 70GW02 and 70GW02D were received with insufficient preservation with a pH>2; therefore analysis must be analyzed within 7 days, as according to Region II guidelines. These samples exceeded the 7-day holding time by three days and therefore the non-detected GRO results were qualified as rejected (R).

Initial/Continuing Calibration

Michael Baker, Jr., Inc.
NAPR SWMU 70, Puerto Rico
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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
CC 01/22/09	iodomethane	45.8%	all samples	J/UJ
	2-chloro-1,3-butadiene	43.8%		
	pentachloroethane	37.6%		
	isobutanol	0.03212		J/R

SVOA

Calibration standards exhibited RRF and %Ds 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 02/05/09	4-nitroquinoline-1-oxide	0.0212	all samples	J/R
CC 02/09/09	hexachlorocyclopentadiene	28.5%	70GW06, 70GW07, 70GW08, 70GW02, 70GW03	J/UJ
	benzo(b)fluoranthene	20.7%		
	indeno(1,2,3-cd)pyrene	26.5%		
	dibenz(a,h)anthracene	34.1%		
	benzo(g,h,i)perylene	38.9%		
	hexachlorophene	20.6%		
	1-naphthylamine	23.5%		
	2-naphthylamine	43.6%		
	4-nitroquinoline-1-oxide	0.0314		J/R
CC 02/11/09	4-nitroquinoline-1-oxide	0.0323	JAN09-ER05, 70GW04, 70GW02D, 70GW01	J/R
	hexachlorophene	0.438		
	hexachlorocyclopentadiene	27.9%		J/UJ
	2,4-dinitrophenol	38.4%		
	4,6-dinitro-2-methylphenol	36.0%		
	dinoseb	45.2%		
	bis(2-ethylhexyl)phthalate	26.2%		
	indeno(1,2,3-cd)pyrene	39.0%		
	dibenz(a,h)anthracene	26.0%		
	benzo(g,h,i)perylene	30.1%		
	2-naphthylamine	38.5%		
	1,3,5-trinitrobenzene	28.5%		
	4-aminobiphenyl	24.0%		
	3,3'-dimethylbenzidine	21.1%		

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

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NAPR SWMU 70, Puerto Rico
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the following table. Please note that the laboratory reported non-detect results down to the MDL for this project. Therefore, the blank flagging actions were modified as follows to take this into consideration. Positive results greater than the MDL but less than the CRQL are qualified as U at the reported concentration when affected by blank contamination.

Blank ID	Compound	Concentration	Reporting Limit	Action Level
Method Blanks	carbon disulfide	0.74J ug/L	2 ug/L	RL

Associated samples and required qualifications are noted in the following table.

Sample ID	Compound	Q Flag
70GW02D, 70GW01	carbon disulfide	U at reported value

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. Please note that the laboratory reported non-detect results down to the MDL for this project. Therefore, the blank flagging actions were modified as follows to take this into consideration. Positive results greater than the MDL but less than the CRQL are qualified as U at the reported concentration when affected by blank contamination.

Blank ID	Compound	Concentration	Reporting Limit	Action Level
Method Blanks	di-n-butylphthalate	0.12J ug/L	1 ug/L	2X RL
JAN09-ER04	benzyl alcohol	0.65J	0.97	RL
JAN09-FB01	benzyl alcohol	3.6	0.97	RL
	phenol	0.50J	0.97	RL

Associated samples and required qualifications are noted in the following table.

Sample ID	Compound	Q Flag
70GW07, 70GW02, 70GW03, 70GW04, 70GW02D	di-n-butylphthalate	U at reported value
70GW02, 70GW01	benzyl alcohol	U at reported value
70GW01, 70GW04	phenol	U at reported value

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. Please note that the laboratory reported non-detect results down to the MDL for this project. Therefore, the blank flagging actions were modified as follows to take this into consideration. Positive results greater than the MDL but less than the CRQL are qualified as U at the reported concentration when affected by blank contamination.

Blank ID	Compound	Concentration	Action Level	Q Flag
JAN09-FB01	DRO	0.25 mg/L	0.25 mg/L	U

Associated samples and required qualifications are noted in the following table.

Sample ID	Compound	Q Flag
all samples up to 0.25 mg/L	DRO	U

Metals

Associated blanks exhibited contamination as noted in the following table. The laboratory reported non-detect results to the MDL for this project. Therefore, the blank flagging actions were modified to take this into consideration. Please see the Glossary of Qualification Flags and Abbreviations for details.

Blank ID	Analyte	Concentration	Action Level	Q Flag
MB 680-128064/17-A Total	arsenic	0.47J ug/L	>MDL up to RL	U
CCB Total	silver	0.019J ug/L	>MDL up to RL	U
	cobalt	0.012J ug/L		
CCB Dissolved	silver	0.040J ug/L	>MDL up to RL	U
	cobalt	0.012J ug/L		

Please note, when qualifying samples for CCB contamination, associated samples are those just prior to or just following a CCB. Therefore, not all analytes in all samples are flagged for CCB contamination.

Associated samples and required qualifications are noted in the following table.

Sample ID	Analyte	Q Flag
all total samples >MDL up to RL	arsenic	U
all samples > MDL up to RL	silver	U
all samples > MDL up to RL	cobalt	U

Internal Standards

SVOA

Sample JAN09-ER05 exhibited low internal standard area recovery for perylene-d12; therefore all compound results associated with this standard were qualified as estimated (J/UJ). The sample was re-analyzed with similar results.

Matrix Spikes

SVOA

The matrix spike and matrix spike duplicate exhibited low recoveries for the following compounds listed in the table below, the associated sample, 70GW02 was qualified as estimated (J/UJ) for these compounds.

Compound	MS % Rec	MSD % Rec	QC Limit
benzo(g,h,i)perylene	33	26	46-117
benzo(k)fluoranthene	50	46	53-119
bis(2-ethylhexyl)phthalate	34	28	47-134
dibenz(a,h)anthracene	32	31	42-112
3,3'-dichlorobenzidine	5	0	10-113
di-n-octylphthalate	22	19	44-134
hexachlorocyclopentadiene	8	9	10-110
indeno(1,2,3-cd)pyrene	25	21	39-125

Metals

The matrix spike pair submitted for the dissolved metals analysis exhibited non-compliant %R's for copper and mercury, requiring qualification in the field samples. A summary of these non-compliances and affected samples are noted in the following table.

MS	Analytes	Samples	%R	Q Flag
70GW02F	copper	all dissolved metals	73/66	J/UJ
	mercury	samples	71/72	

Field Duplicate

SVOA

Sample 70GW02 and duplicate 70GW02D did not exhibit comparable results for bis(2-ethylhexyl)phthalate at 114% RPD; therefore the results for this compound were qualified as estimated (J).

Metals

The field duplicate pair of total metals samples 70GW02 and 70GW02D did not exhibit an acceptable RPD for the analyte vanadium (34%); therefore the results for this analyte were qualified as estimated (J) in the total metals field duplicate pair.

Identification/Quantitation

SVOA

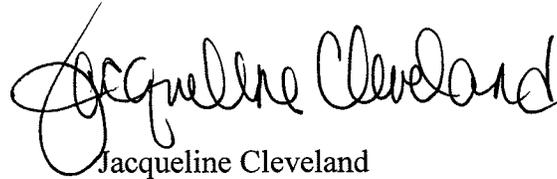
The re-analysis of sample JAN09-ER05 was not used, in favor of the initial analysis, due to non-compliant internal standard area recoveries.

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
70GW02, 70GW02D	all results	+/-	J/R
all samples	iodomethane 2-chloro-1,3-butadiene pentachloroethane	+/-	J/UJ
all samples	isobutanol	+/-	J/R
70GW02D, 70GW01	carbon disulfide	+	U at reported value

SVOA

Sample ID	Compound	Results	Q flag
all samples	4-nitroquinoline-1-oxide	+/-	J/R
70GW06, 70GW07, 70GW08, 70GW02, 70GW03	hexachlorocyclopentadiene benzo(b)fluoranthene indeno(1,2,3-cd)pyrene dibenz(a,h)anthracene benzo(g,h,i)perylene hexachlorophene 1-naphthylamine 2-naphthylamine	+/-	J/UJ
70GW06, 70GW07, 70GW08, 70GW02, 70GW03	4-nitroquinoline-1-oxide	+/-	J/R
JAN09-ER05, 70GW04, 70GW02D, 70GW01	4-nitroquinoline-1-oxide hexachlorophene	+/-	J/R
JAN09-ER05, 70GW04, 70GW02D, 70GW01	hexachlorocyclopentadiene 2,4-dinitrophenol 4,6-dinitro-2-methylphenol dinoseb bis(2-ethylhexyl)phthalate indeno(1,2,3-cd)pyrene dibenz(a,h)anthracene benzo(g,h,i)perylene 2-naphthylamine 1,3,5-trinitrobenzene 4-aminobiphenyl 3,3'-dimethylbenzidine	+/-	J/UJ
70GW07, 70GW02, 70GW03, 70GW04, 70GW02D	di-n-butylphthalate	+	U at reported value
70GW02, 70GW01	benzyl alcohol	+	U at reported value
70GW01, 70GW04	phenol	+	U at reported value
JAN09-ER05	all compounds associated with: perylene-d12	+/-	J/UJ

Summary of Data Qualifications

SVOA

Sample ID	Compound	Results	Q flag
70GW02, 70GW02D	benzo(g,h,i)perylene benzo(k)fluoranthene bis(2-ethylhexyl)phthalate dibenz(a,h)anthracene 3,3'-dichlorobenzidine di-n-octylphthalate hexachlorocyclopentadiene indeno(1,2,3-cd)pyrene	+/-	J/UJ
70GW02, 70GW02D	bis(2-ethylhexyl)phthalate	+/-	J/UJ
JAN09-ER05RA	all results	+/-	R

PCB

Sample ID	Compound	Results	Q flag
No qualifications were required			

GRO

Sample ID	Compound	Results	Q flag
79GW02, 70GW02D	GRO	-	R

DRO

Sample ID	Compound	Results	Q flag
all samples <0.25 mg/L	DRO	+	U

Metals

Sample ID	Analyte	Results	Q flag
all total samples	arsenic	>MDL up to RL	U
all samples	silver	>MDL up to RL	U
all samples	cobalt	>MDL up to RL	U
all dissolved samples	copper mercury	+/-	J/UJ
70GW02, 70GW02D	vanadium	+	J

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.

Michael Baker, Jr., Inc.
NAPR SWMU 70, Puerto Rico
SDG# NAPR44027-1

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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

TEST AMERICA SAVANNAH SDG NAPR44027-2

DataQual

Environmental Services, LLC

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100 Airside Drive
Moon Township, PA 15108

March 26, 2008
SDG# NAPR44027-2, Test America-Savannah
NAPR SWMU 70, Puerto Rico

Dear Mr. Kimes,

The following Data Validation report is provided as requested for the parameters noted in the table below for SDG # NAPR44027-2. 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 8082A, October2006-SOP #HW-45), 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, 6020B 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	PCB	GRO	DRO	Metals
70SD01	680-44027-1	soil	X	X	X	X	X	X
70SD02	680-44027-2	soil	X	X	X	X	X	X
70SD01MS	680-44027-1MS	soil					X	
70SD01MSD	680-44027-1MSD	soil					X	

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

The initial and continuing calibration exhibited some compounds with low RRF values, which resulted in qualifying non-detected values as rejected for these compounds. Due to high %D values, in the 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

The initial and continuing calibration exhibited some compounds with low RRF values, which resulted in qualifying non-detected values as rejected for these compounds. Due to high %RSD 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 associated LCS exhibited low recovery for two compounds that resulted in adding qualifications to the data.

PCB

No qualifications to the data were required.

GRO

No qualifications to the data were required.

DRO

Blank contamination was noted in the associated field QC blanks. Qualifications to the data were required.

Metals

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 analyte antimony for which qualifications were required. All results for antimony in the metals samples were qualified as estimated J/UJ.

Specific Evaluation of Data

Data Completeness

Resubmissions were required for the PCB fraction. Retention times were not correctly transcribed from raw data to data summary forms. The laboratory was contacted and corrected forms were received. A copy of the e-mail correspondence is included in the validation worksheets. The VOA fraction Form I results were initially calculated based on the method sample value and not the actual sample value. The laboratory was contacted and corrected forms were submitted and are included in this report.

Technical Holding Times

According to chain of custody records, sampling was performed on 01/17/09 and samples were received at the laboratory 01/20/09. All sample preparation and analysis was performed within Region II and/or method holding time requirements.

Initial/Continuing Calibration

VOA

Calibration standards exhibited RRF and %Ds 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.

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NAPR SWMU 70, Puerto Rico
SDG# NAPR44027-2

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Standard ID	Compound(s)	RRF, %RSD, %D	Samples	Q Flag
IC 01/22/09	acetone	0.048	all samples	J/R
CC 01/23/09	acetone	0.038	all samples	J/R
	isobutanol	0.021		J/UJ
	bromomethane	30.3%		
	acetonitrile	20.3%		
	pentachloroethane	20.9%		

SVOA

Calibration standards exhibited RRF, %RSD and %Ds 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 02/05/09	4-nitroquinoline-1-oxide	0.0212	all samples	J/R
CC 02/06/09	3,3'-dichlorobenzidine	37.5%	all samples	J/UJ
	hexachloropropene	29.1%		
	p-phenylene diamine	29.8%		
	1,3,5-trinitrobenzene	28.1%		
	3,3'-dimethylbenzidine	20.7%		
	hexachlorophene	26.0%		
	4-nitroquinoline-1-oxide	0.0299		J/R

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. Please note that the laboratory reported non-detect results down to the MDL for this project. Therefore, the blank flagging actions were modified as follows to take this into consideration. Positive results greater than the MDL but less than the CRQL are qualified as U at the reported concentration when affected by blank contamination.

Blank ID	Compound	Concentration	Reporting Limit	Action Level
JAN09-FB01	2-butanone	0.75J ug/L	10 ug/L	2X RL

Associated samples and required qualifications are noted in the following table.

Sample ID	Compound	Q Flag
all samples	2-butanone	U at reported value

SVOA

The associated method and/or QC blanks exhibited contamination as noted in the

Michael Baker, Jr., Inc.
NAPR SWMU 70, Puerto Rico
SDG# NAPR44027-2
Page 4

following table. Compounds for which there was no action required, are not included in the following table. Please note that the laboratory reported non-detect results down to the MDL for this project. Therefore, the blank flagging actions were modified as follows to take this into consideration. Positive results greater than the MDL but less than the CRQL are qualified as U at the reported concentration when affected by blank contamination.

Blank ID	Compound	Concentration	Reporting Limit	Action Level
Method Blank	bis(2-ethylhexyl)phthalate	9.4J ug/Kg	33 ug/Kg	2X RL
JAN09-FB01	phenol	0.5J ug/L	0.97 ug/L	RL

Associated samples and required qualifications are noted in the following table.

Sample ID	Compound	Q Flag
all samples	bis(2-ethylhexyl)phthalate	U at reported value
70SD02	phenol	U at reported value

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. Please note that the laboratory reported non-detect results down to the MDL for this project. Therefore, the blank flagging actions were modified as follows to take this into consideration. Positive results greater than the MDL but less than the CRQL are qualified as U at the reported concentration when affected by blank contamination.

Blank ID	Compound	Concentration	Action Level	Q Flag
JAN09-FB01	DRO	0.25 mg/L	8.325 mg/Kg	U

Associated samples and required qualifications are noted in the following table.

Sample ID	Compound	Q Flag
70SD01	DRO	U at reported conc.

Metals

Associated blanks exhibited contamination as noted in the following table. The laboratory reported non-detect results to the MDL for this project. Therefore, the blank flagging actions were modified to take this into consideration. Please see the Glossary of Qualification Flags and Abbreviations for details.

Blank ID	Analyte	Concentration	Action Level	Q Flag
MB 680-128333/27-A	antimony	0.26J mg/Kg	RL	U at reported value
	silver	0.019J mg/Kg	RL	U at reported value
JAN09-FB01	zinc	7.2J ug/L	RL	U at reported value

Please note, when qualifying samples for CCB contamination, associated samples are those just prior to or just following a CCB. Therefore, not all analytes in all samples are flagged for CCB contamination.

Michael Baker, Jr., Inc.
 NAPR SWMU 70, Puerto Rico
 SDG# NAPR44027-2

Associated samples and required qualifications are noted in the following table.

Sample ID	Analyte	Q Flag
all samples >MDL up to RL	antimony	U
all samples >MDL up to RL	silver	U
all samples >MDL up to RL	zinc	U

Matrix Spikes

Metals

The matrix spike pair submitted in this SDG exhibited non-compliant %R's for antimony, requiring qualification in the field samples. A summary of these non-compliances and affected samples are noted in the following table.

MS	Analytes	Samples	%R	Q Flag
CABSS04	antimony	all samples	67/60	J/UJ

Laboratory Control Spike

SVOA

The LCS associated with the samples exhibited low recovery for 3,3'-dichlorobenzidine at 6% (QC limit 27-110%) and pentachlorophenol at 21% (QC limit 28-117%); therefore all results for this compound were qualified as estimated (J/UJ).

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

Michael Baker, Jr., Inc.
NAPR SWMU 70, Puerto Rico
SDG# NAPR44027-2

Summary of Data Qualifications

VOA

Sample ID	Compound	Results	Q flag
all samples	acetone	+/-	J/R
all samples	acetone isobutanol	+/-	J/R
all samples	bromomethane acetonitrile pentachloroethane	+/-	J/UJ
all samples	2-butanone	+	U at reported value

SVOA

Sample ID	Compound	Results	Q flag
all samples	4-nitroquinoline-1-oxide	+/-	J/R
all samples	3,3'-dichlorobenzidine hexachloropropene p-phenylene diamine 1,3,5-trinitrobenzene 3,3'-dimethylbenzidine hexachlorophene	+/-	J/UJ
all samples	4-nitroquinoline-1-oxide	+/-	J/R
all samples	bis(2-ethylhexyl)phthalate	+	U at reported value
70SD02	phenol	+	U at reported value
all samples	3,3'-dichlorobenzidine pentachlorophenol	+/-	J/UJ

PCB

Sample ID	Compound	Results	Q flag
No qualifications required			

GRO

Sample ID	Compound	Results	Q flag
No qualifications required			

Summary of Data Qualifications

DRO

Sample ID	Compound	Results	Q flag
70SD01	DRO	+	U

Metals

Sample ID	Analyte	Results	Q flag
all samples >MDL up to RL	antimony	>MDL up to RL	U
all samples >MDL up to RL	antimony	>MDL up to RL	U
all samples >MDL up to RL	cobalt	>MDL up to RL	U
all samples	antimony	+/-	J/UJ

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

TEST AMERICA SAVANNAH SDG NAPR44044-3

DataQual

Environmental Services, LLC

Michael Baker, Jr., Inc.
Airside Business Park
100 Airside Drive
Moon Township, PA 15108

March 26, 2008
SDG# NAPR44044-3, Test America-Savannah
NAPR SWMU 9, Puerto Rico

Dear Mr. Kimes,

The following Data Validation report is provided as requested for the parameters noted in the table below for SDG # NAPR44044-3. 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 and 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, 6020B 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 qualifications is provided.

Sample ID	Lab ID	Matrix	VOA App IX	LL PAH	GRO	DRO	Metals
JAN09-TB07	680-44044-24	water	X		X		
9GW37	680-44044-36	water	X	X	X	X	
9GW44	680-440144-38	water	X	X	X	X	
13GW05	680-44044-39	water	X	X	X	X	
JAN09-ER07	680-44044-40	water	X	X	X	X	X
JAN09-TB08	680-44044-41	water	X		X		

The following quality control samples were provided with this SDG: samples JAN09-TB07 and JAN09-TB08- trip blanks and sample JAN09-ER07- equipment blank. 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 NA
- Matrix Duplicate RPDs NA
- 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 continuing calibration exhibited some compounds with low RRF values, which resulted in qualifying non-detected values as rejected for these compounds. Due to high %D values, in the continuing calibrations, some compounds were qualified as estimated.

PAH

The associated LCS exhibited several low recoveries that resulted in qualifications to the data.

GRO

No qualifications to the data were required.

DRO

No qualifications to the data were required.

Metals

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 01/18-20/09 and samples were received at the laboratory 01/21/09. 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
CC 01/23/09	iodomethane	39.5%	JAN09-ER07 JAN09-TB08 JAN09-TB07	J/UJ
	2-chloro-1,3-butadiene	43.6%		
	pentachloroethane	45.4%		
	bromomethane	44.4%		
	chloroethane	49.1%		
	isobutanol	0.03638		J/R
CC 01/26/09	2-chloro-1,3-butadiene	43.3%	9GW37 9GW44	J/UJ
	pentachloroethane	46.5%		
	bromomethane	25.3%		
	isobutanol	0.03589		
CC 01/29/09	2-chloro-1,3-butadiene	31.3%	13GW05	J/UJ
	pentachloroethane	33.5%		
	dichlorodifluoromethane	21.4%		
	bromomethane	21.0%		
	isobutanol	0.03849		

Laboratory Control Samples

PAH

The LCS exhibited low recoveries for the following compounds listed in the table below, all associated samples were qualified as estimated (J/UJ) for these compounds.

Michael Baker, Jr., Inc.
NAPR SWMU 9, Puerto Rico
SDG# NAPR44044-3

Compound	% Rec	QC Limit
acenaphthene	46	54-110
acenaphthylene	49	50-110
1-methylnaphthalene	49	51-110
benzo(k)fluoranthene	51	53-119
fluoranthene	47	110
fluorene	50	57-110
anthracene	51	54-110
phenanthrene	47	58-110

Identification/Quantitation

PAH

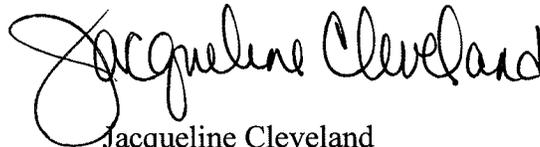
Samples 9GW37RE, 13GW05RE, JAN09-ER07 and 9GW44RE were not used in favor of the initial analysis due to exceeded holding times.

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
JAN09-ER07, JAN09-TB08, JAN09-TB07	iodomethane 2-chloro-1,3-butadiene pentachloroethane bromomethane chloroethane	+/-	J/UJ
JAN09-ER07, JAN09-TB08, JAN09-TB07	isobutanol	+/-	J/R
9GW37, 9GW44	2-chloro-1,3-butadiene pentachloroethane bromomethane	+/-	J/UJ
9GW37, 9GW44	isobutanol	+/-	J/R
13GW05	2-chloro-1,3-butadiene pentachloroethane dichlorodifluoromethane bromomethane	+/-	J/UJ
13GW05	isobutanol	+/-	J/R

SVOA

Sample ID	Compound	Results	Q flag
all samples	acenaphthene acenaphthylene 1-methylnaphthalene benzo(k)fluoranthene fluoranthene fluorene anthracene phenanthrene	+/-	J/UJ
9GW37RE, 13GW05RE, JAN09-ER07, 9GW44RE	all results	+/-	R

GRO

Sample ID	Compound	Results	Q flag
No qualifications			

DRO

Sample ID	Compound	Results	Q flag
No qualifications			

Metals

Sample ID	Analyte	Results	Q flag
No qualifications			

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

TEST AMERICA SAVANNAH SDG NAPR44056-2

DataQual

Environmental Services, LLC

Michael Baker, Jr., Inc.
Airside Business Park
100 Airside Drive
Moon Township, PA 15108

March 26, 2008
SDG# NAPR44056-2, Test America-Savannah
NAPR QC, Puerto Rico

Dear Mr. Kimes,

The following Data Validation report is provided as requested for the parameters noted in the table below for SDG # NAPR44056-2. 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, 8081B, October 2006-SOP#HW-44, and 8082A, October 2006-SOP #HW-45), 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, 6020B 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	Pest	PCB	GRO	DRO	Metals
JAN09-ER06	680-44056-7	water	X	X	X	X	X	X	X

The following quality control samples were provided with this SDG: sample JAN09-ER06- equipment blank. 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 NA
- Matrix Duplicate RPDs NA

- 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 continuing calibration exhibited some compounds with low RRF values, which resulted in qualifying non-detected values as rejected for these compounds. Due to high %D values, in the continuing calibrations, some compounds were qualified as estimated.

SVOA

The initial and continuing calibration exhibited some compounds with low RRF values, which resulted in qualifying non-detected values as rejected for these compounds. Due to high %D values, in the continuing calibrations, some compounds were qualified as estimated.

The associated LCS and LCSD exhibited several low recoveries that resulted in qualifications to the data.

Pesticides

No qualifications to the data were required.

PCB

No qualifications to the data were required.

GRO

No qualifications to the data were required.

DRO

No qualifications to the data were required.

Metals

No qualifications to the data were required.

Specific Evaluation of Data

Data Completeness

Resubmissions were required. Retention times were not correctly transcribed from raw data to data summary forms in the Pesticide/PCB fraction. The laboratory was contacted and corrected forms were received. A copy of the e-mail correspondence is included in the validation worksheets.

Technical Holding Times

According to chain of custody records, sampling was performed on 01/17/09 and samples were received at the laboratory 01/22/09. 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
CC 01/23/09	iodomethane	39.5%	JAN09-ER06	J/UJ
	2-chloro-1,3-butadiene	43.6%		
	pentachloroethane	45.4%		
	bromomethane	44.4%		
	chloroethane	49.1%		
	isobutanol	0.03638		J/R

SVOA

Calibration standards exhibited RRF and %Ds 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 02/05/09	4-nitroquinoline-1-oxide	0.0212	all samples	J/R
CC 02/09/09	hexachlorocyclopentadiene	28.5%	JAN09-ER06	J/UJ
	benzo(b)fluoranthene	20.7%		
	indeno(1,2,3-cd)pyrene	26.5%		
	dibenz(a,h)anthracene	34.1%		
	benzo(g,h,i)perylene	38.9%		
	hexachlorophene	20.6%		
	1-naphthylamine	23.5%		
	2-naphthylamine	43.6%		
	3,3'-dimethylbenzidine	28.8%		
	4-nitroquinoline-1-oxide	0.0314		J/R

Laboratory Control Samples

SVOA

The LCS and LCSD exhibited low recoveries for the following compounds listed in the table below, all associated samples were qualified as estimated (J/UJ) for these compounds.

Compound	LCS % Rec	LCSD % Rec	QC Limit
acenaphthene	38	19	50-110
4-chloro-3-methylphenol	44	29	46-118
2-chlorophenol	36	23	47-110
3,3'-dichlorobenzidine	4	6	10-113
2,4-dichlorophenol	43	23	46-115
2,4-dimethylphenol	26	22	36-110
4,6-dinitro-2-methylphenol	12	2	29-167
2,4-dinitrophenol	4	0	10-189
fluorene	55	29	57-110
hexachlorocyclopentadiene	4	0	10-110
isophorone	49	24	50-111
2-methylphenol	31	26	46-110
3&4-methylphenol	29	24	43-110
2-nitroaniline	34	31	45-122
3-nitroaniline	21	17	30-116
4-nitroaniline	12	21	36-125
2-nitrophenol	34	13	42-120
n-nitroso-di-n-propylamine	29	3	45-112
n-nitrosodiphenylamine	8	12	47-119
acenaphthene	49	24	54-110
pentachlorophenol	33	16	37-132
phenol	15	12	39-110

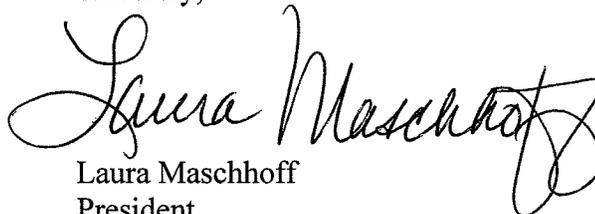
Identification/Quantitation

SVOA

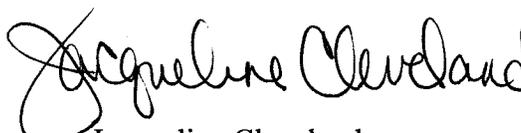
Sample JAN09-ER06RE was not used due to exceeded holding time.

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
JAN09-ER06	iodomethane 2-chloro-1,3-butadiene pentachloroethane bromomethane chloroethane	+/-	J/UJ
JAN09-ER06	isobutanol	+/-	J/R

SVOA

Sample ID	Compound	Results	Q flag
all samples	4-nitroquinoline-1-oxide	+/-	J/R
JAN09-ER06	hexachlorocyclopentadiene benzo(b)fluoranthene indeno(1,2,3-cd)pyrene dibenz(a,h)anthracene benzo(g,h,i)perylene hexachlorophene 1-naphthylamine 2-naphthylamine 3,3'-dimethylbenzidine	+/-	J/UJ
JAN09-ER06	4-nitroquinoline-1-oxide	+/-	J/R
JAN09-ER06	acenaphthene 4-chloro-3-methylphenol 2-chlorophenol 3,3'-dichlorobenzidine 2,4-dichlorophenol 2,4-dimethylphenol 4,6-dinitro-2-methylphenol 2,4-dinitrophenol fluorene hexachlorocyclopentadiene isophorone 2-methylphenol 3&4-methylphenol 2-nitroaniline 3-nitroaniline 4-nitroaniline 2-nitrophenol n-nitroso-di-n-propylamine n-nitrosodiphenylamine acenaphthene pentachlorophenol phenol	+/-	J/UJ
JAN09-ER06RE	all results	+/-	R

Summary of Data Qualifications

Pesticides

Sample ID	Compound	Results	Q flag
No qualifications required.			

PCBs

Sample ID	Compound	Results	Q flag
No qualifications required.			

GRO

Sample ID	Compound	Results	Q flag
No qualifications required.			

DRO

Sample ID	Compound	Results	Q flag
No qualifications required.			

Metals

Sample ID	Compound	Results	Q flag
No qualifications 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

TEST AMERICA SAVANNAH SDG NAPR44077-3

DataQual

Environmental Services, LLC

Michael Baker, Jr., Inc.
Airside Business Park
100 Airside Drive
Moon Township, PA 15108

March 26, 2008
SDG# NAPR44077-3, Test America-Savannah
NAPR SWMU 9, Puerto Rico

Dear Mr. Kimes,

The following Data Validation report is provided as requested for the parameters noted in the table below for SDG # NAPR44077-3. 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, 8081B, October 2006-SOP#HW-44, and 8082A, October 2006-SOP #HW-45), 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, 6020B 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	LL PAH	Pest	PCB	GRO	DRO	Metals
9GW40	680-44077-17	water	X		X			X	X	
9GW41	680-44077-18	water	X		X			X	X	
9GW41D	680-44077-19	water	X		X			X	X	
9GW42	680-44077-20	water	X		X			X	X	
JAN09-FB02	680-44077-21	water	X	X		X	X	X	X	X
JAN09-TB09	680-44077-22	water	X					X		
JAN90-ER08	680-44077-23	water	X	X				X	X	

The following quality control samples were provided with this SDG: sample 9GW41D was the field duplicate of sample 9GW41; sample JAN09-TB09- trip blank; sample JAN09-FB02- field blank and sample JAN09-ER08- equipment blank. 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 NA
- Matrix Duplicate RPDs NA
- 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 continuing calibration exhibited some compounds with low RRF values, which resulted in qualifying non-detected values as rejected for these compounds. Due to high %D values, in the 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

The initial and continuing calibration exhibited some compounds with low RRF values, which resulted in qualifying non-detected values as rejected for these compounds. Due to high %D values, in the continuing calibrations, some compounds were qualified as estimated.

Non-compliant surrogates were exhibited for one sample that resulted in qualifying all results as estimated. Due to surrogate results below 10% for one sample all positive results were qualified as estimated and non-detected results were rejected.

The associated LCS exhibited several low recoveries that resulted in qualifications to the data.

PAH

No qualifications to the data were required.

Pesticides

The sample was qualified due to some non-compliant continuing calibration %Ds.

PCB

No qualifications to the data were required.

GRO

One sample dilution was analysis exceeded the holding time and positive results were qualified as estimated.

The field duplicate pair did not exhibit comparable results and therefore qualifications were added to the data.

DRO

One sample was re-extracted outside holding time due to low surrogate recoveries. The DRO result for this sample was qualified as estimated J. The original sample was not used in favor of the re-extracted sample.

Blank contamination was noted in the field QC blanks and qualification was required in one of the samples in this SDG.

Metals

No qualifications to the data were required.

Specific Evaluation of Data

Data Completeness

Resubmissions were required. Retention times were not correctly transcribed from raw data to data summary forms in the Pesticide/PCB fraction. The laboratory was contacted and corrected forms were received. A copy of the e-mail correspondence is included in the validation worksheets.

Technical Holding Times

According to chain of custody records, sampling was performed on 01/20/09 and samples were received at the laboratory 01/22/09. All sample preparation and analysis was performed within Region II and/or method holding time requirements with the following exceptions.

GRO

Sample 9GW42DL was analyzed outside the 14 day holding time; therefore all positive results were qualified as estimated (J).

DRO

Sample 9GW40 was extracted 2 days outside the holding time due to very low surrogate recovery in the original analysis. The RE sample was reported instead of the original analysis and the reported DRO result was flagged as estimated J. Please note that this result was below the RL and was negated due to field blank contamination so the flag on the result is UJ.

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
CC 01/23/09	iodomethane	39.5%	JAN09-TB09	J/UJ
	2-chloro-1,3-butadiene	43.6%		
	pentachloroethane	45.4%		
	bromomethane	44.4%		
	chloroethane	49.1%		
	isobutanol	0.03638		J/R
CC 01/26/09	2-chloro-1,3-butadiene	43.3%	JAN09-FB02, 9GW40, 9GW41, 9GW41D, JAN09-ER08, 9GW42	J/UJ
	pentachloroethane	46.5%		
	bromomethane	25.3%		
	isobutanol	0.03589		J/R

SVOA

Calibration standards exhibited RRF and %Ds 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 02/05/09	4-nitroquinoline-1-oxide	0.0212	all samples	J/R
CC 02/06/09	hexachloropropene	29.1%	JAN09-FB02	J/UJ
	p-phenylene diamine	29.8%		
	1,3,5-trinitrobenzene	28.1%		
	3,3'-dimethylbenzidine	20.7%		
	4-nitroquinoline-1-oxide	0.0299		J/R
CC 02/09/09	hexachlorocyclopentadiene	28.5%	JAN09-ER08	J/UJ
	benzo(b)fluoranthene	20.7%		
	indeno(1,2,3-cd)pyrene	26.5%		
	dibenz(a,h)anthracene	34.1%		
	benzo(g,h,i)perylene	38.9%		
	hexachlorophene	20.6%		
	1-naphthylamine	23.5%		
	2-naphthylamine	43.6%		
	4-nitroquinoline-1-oxide	0.0314		J/R

Pesticides

Calibration standards exhibited %Ds 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. Please note that these compounds co-elute on the CLPI column, however they are sufficiently separated on the CLPII column.

Standard ID	Compound(s)	%D	Samples	Q Flag
MB06047	chlorobenzilate	26.8	JAN09-FB02	J/UJ
	kepone	26.8/85.2		

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. Please note that the laboratory reported non-detect results down to the MDL for this project. Therefore, the blank flagging actions were modified as follows to take this into consideration. Positive results greater than the MDL but less than the CRQL are qualified as U at the reported concentration when affected by blank contamination.

Blank ID	Compound	Concentration	Reporting Limit	Action Level
JAN09-ER10	acetone	6.3J	25	2X RL

Associated samples and required qualifications are noted in the following table.

Sample ID	Compound	Q Flag
9GW40, 9GW41, 9GW41D	acetone	U at reported value

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. Please note that the laboratory reported non-detect results down to the MDL for this project. Therefore, the blank flagging actions were modified as follows to take this into consideration. Positive results greater than the MDL but less than the CRQL are qualified as U at the reported concentration when affected by blank contamination.

Blank ID	Compound	Concentration	Action Level	Q Flag
JAN09-FB01	DRO	0.25 mg/L	0.25 mg/L	U
JAN09-ER10	DRO	0.27 mg/L	0.27 mg/L	U

Associated samples and required qualifications are noted in the following table.

Sample ID	Compound	Q Flag
9GW40RE	DRO	U

Surrogates

SVOA

Sample JAN09-FB02 exhibited 1% recovery for phenol-d5 (QC limit 38-116%); therefore all positive results were qualified as estimated (J) and non-detected results were qualified as rejected (R). Sample JAN09-ER08 exhibited low recoveries for 2-fluorophenol at 16% (QC limit 36-110%), phenol-d5 at 13% (QC limit 38-116%), nitrobenzene-d5 at 41% (QC limit 45-112%) and 2-fluorobiphenyl at 37% (QC limit 50-113%); therefore all results were qualified as estimated (J/UJ).

Laboratory Control Samples

SVOA

The LCS and LCSD exhibited low recoveries for the following compounds listed in the table below. All associated samples were qualified as estimated (J/UJ) for these compounds.

Compound	LCS % Rec	LCSD % Rec	QC Limit
acenaphthene	38	19	50-110
4-chloro-3-methylphenol	44	29	46-118
2-chlorophenol	36	23	47-110
3,3'-dichlorobenzidine	4	6	10-113
2,4-dichlorophenol	43	23	46-115
2,4-dimethylphenol	26	22	36-110
4,6-dinitro-2-methylphenol	12	2	29-167
2,4-dinitrophenol	4	0	10-189

Michael Baker, Jr., Inc.
NAPR SWMU 9, Puerto Rico
SDG# NAPR44077-3

Compound	LCS % Rec	LCSD % Rec	QC Limit
fluorene	55	29	57-110
hexachlorocyclopentadiene	4	0	10-110
isophorone	49	24	50-111
2-methyphenol	31	26	46-110
3&4-methylphenol	29	24	43-110
2-nitroaniline	34	31	45-122
3-nitroaniline	21	17	30-116
4-nitroaniline	12	21	36-125
2-nitrophenol	34	13	42-120
n-nitroso-di-n-propylamine	29	3	45-112
n-nitrosodiphenylamine	8	12	47-119
acenaphthene	49	24	54-110
pentachlorophenol	33	16	37-132
phenol	15	12	39-110

Field Duplicates

GRO

Sample 9GW41 and duplicate sample 9GW41D did not exhibit comparable results for GRO with 114% RPD; therefore results were qualified as estimated (J).

Identification/Quantitation

VOA

Sample JAN09-FB02 was re-analyzed to confirm positive results; therefore the re-analysis was not used in favor of the initial analysis.

SVOA

Samples JAN09-FB02RE and JAN09-ER08RE were not used due to exceeded holding times.

GRO

Sample 9GW42 was not used in favor of the dilution.

DRO

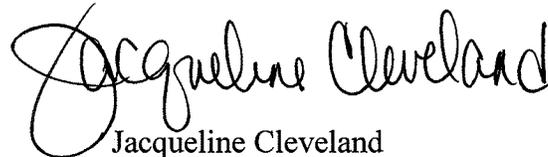
Sample 9GW40 was not used in favor of the reanalysis.

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
JAN09-TB09	iodomethane 2-chloro-1,3-butadiene pentachloroethane bromomethane chloroethane	+/-	J/UJ
JAN09-TB09	isobutanol	+/-	J/R
JAN09-FB02, 9GW40, 9GW41, 9GW41D, JAN09-ER08, 9GW42	2-chloro-1,3-butadiene pentachloroethane bromomethane	+/-	J/UJ
JAN09-FB02, 9GW40, 9GW41, 9GW41D, JAN09-ER08, 9GW42	isobutanol	+/-	J/R
9GW40, 9GW41, 9GW41D	acetone	+	U at reported value
JAN09-FB02RE	all results	+/-	R

SVOA

Sample ID	Compound	Results	Q flag
all samples	4-nitroquinoline-1-oxide	+/-	J/R
JAN09-FB02	hexachloropropene p-phenylene diamine 1,3,5-trinitrobenzene 3,3'-dimethylbenzidine	+/-	J/UJ
JAN09-FB02	4-nitroquinoline-1-oxide	+/-	J/R
JAN09-ER08	hexachlorocyclopentadiene benzo(b)fluoranthene indeno(1,2,3-cd)pyrene dibenz(a,h)anthracene benzo(g,h,i)perylene hexachlorophene 1-naphthylamine 2-naphthylamine	+/-	J/UJ
JAN09-ER08	4-nitroquinoline-1-oxide	+/-	J/R
JAN09-FB02	all results	+/-	J/R
JAN09-ER08	all results	+/-	J/UJ
all samples	acenaphthene, 4-chloro-3-methylphenol, 2-chlorophenol, 3,3'-dichlorobenzidine, 2,4-dichlorophenol, 2,4-dimethylphenol, 4,6-dinitro-2-methylphenol, 2,4-dinitrophenol, fluorine, hexachlorocyclopentadiene, isophorone, 2-methylphenol, 3&4-methylphenol, 2-nitroaniline, 3-nitroaniline, 4-nitroaniline, 2-nitrophenol, n-nitroso-di-n-propylamine, n-nitrosodiphenylamine, acenaphthene, pentachlorophenol, phenol	+/-	J/UJ
JAN09-FB02RE, JAN09-ER08RE	all results	+/-	R

Summary of Data Qualifications

PAH

Sample ID	Compound	Results	Q flag
No qualifications			

Pesticides

Sample ID	Compound	Results	Q flag
JAN09-FB02	chlorobenzilate kepone	+/-	J/UJ

PCB

Sample ID	Compound	Results	Q flag
No qualifications			

GRO

Sample ID	Compound	Results	Q flag
9GW42DL	GRO	+	J
9GW41, 9GW41D	GRO	+	J
9GW42	GRO	+	R

DRO

Sample ID	Compound	Results	Q flag
9GW40RE	DRO	+JH	J
9GW40RE	DRO	+JH	U
9GW40	DRO	+J	R

Metals

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

TEST AMERICA SAVANNAH SDG NAPR44109-1

DataQual

Environmental Services, LLC

Michael Baker, Jr., Inc.
Airside Business Park
100 Airside Drive
Moon Township, PA 15108

March 26, 2008
SDG# NAPR44109-1, Test America-Savannah
NAPR SWMU 70, Puerto Rico

Dear Mr. Kimes,

The following Data Validation report is provided as requested for the parameters noted in the table below for SDG # NAPR44109-1. 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 8082A, October2006-SOP #HW-45), and professional judgment. Region II has not developed a validation checklist SOP for the methods used to assess the inorganic methods in this SDG (SW-846 methods 6020B, 7471A) or the organic methods for hydrocarbons (SW-846 methods 8015_DRO and 8015_GRO). 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	PCB	GRO	DRO	Metals
70SB05-00	680-44109-1	soil	X	X	X	X	X	X
70SB05-01	680-44109-2	soil	X	X	X	X	X	X
70SB05-01D	680-44109-3	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 *
- 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 calibration exhibited some compounds with low RRF values, which resulted in qualifying non-detected values as rejected for these compounds. Due to high %D values, in the 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 LCS associated with the data package exhibited low recovery for methylene chloride that resulted in qualification to the data.

SVOA

The initial and continuing calibration exhibited some compounds with low RRF values, which resulted in qualifying non-detected values as rejected for these compounds. Due to high %RSD and %D values, in the initial and continuing calibrations, some compounds were qualified as estimated.

The associated laboratory control spike exhibited non-compliant recovery for several compounds; therefore all samples were qualified as estimated for these compounds.

Blank contamination was noted in the method and/or QC blanks associated with samples in this batch. Qualifications were added to the data.

PCBs

No qualifications to the data were required.

GRO

All samples exceeded the analysis holding time that resulted in the qualification of all positive results as estimated and non-detected results as rejected.

One samples was not used, in favor of the re-analysis, due to non-compliant internal standard area recoveries.

DRO

Blank contamination was noted and qualification was required in the samples in this SDG.

Metals

Blank contamination was noted and qualification was required in the samples in this SDG.

The field duplicate pair exhibited non-compliant RPDs for three analytes. These analytes were qualified as estimated in the field duplicate pair.

Specific Evaluation of Data

Data Completeness

Resubmissions were required for the PCB fraction. Retention times were not correctly transcribed from raw data to data summary forms. The laboratory was contacted and corrected forms were received. A copy of the e-mail correspondence is included in the validation worksheets.

Technical Holding Times

According to chain of custody records, sampling was performed on 01/20/09 and samples were received at the laboratory 01/22/09. All sample preparation and analysis was performed within Region II and/or method holding time requirements with the exception of the following.

GRO

All samples exceeded the analysis holding time of fourteen days by 1 to 3 days; therefore all positive result were qualified as estimated (J) and non-detected results were rejected (R), as according to Region II guidelines.

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 01/22/09	acetone	0.048	all samples	J/R	
CC 02/02/09	acrolein	27.7%	all samples	J/UJ	
	iodomethane	28.5%			
	acrylonitrile	20.3%			
	propionitrile	31.3%			
	pentachloroethane	38.8%			
	dichlorodifluoromethane	20.9%			
	bromomethane	60.7%			
	chloroethane	23.7%			
	methylene chloride	22.8%			
	chlorodibromomethane	21.1%			
	bromoform	25.0%			
	1,2-dibromo-3-chloropropane	21.2%			
	acetonitrile	0.03597			J/R
	isobutanol	0.01679			

SVOA

Calibration standards exhibited RRF and %Ds 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 02/05/09	4-nitroquinoline-1-oxide	0.0212	all samples	J/R
CC 02/11/09	hexachlorocyclopentadiene	27.9%	all samples	J/UJ
	2,4-dinitrophenol	38.4%		
	4,6-dinitro-2-methylphenol	36.0%		
	dinoseb	45.2%		
	bis(2-ethylhexyl)phthalate	26.2%		
	indeno(1,2,3-cd)pyrene	39.0%		
	dibenz(a,h)anthracene	26.0%		
	benzo(g,h,i)perylene	30.1%		
	2-naphthylamine	38.5%		
	1,3,5-trinitrobenzene	28.5%		
	4-aminobiphenyl	24.0%		
	3,3'-dimethylbenzidine	21.1%		
	4-nitroquinoline-1-oxide	0.0323		
	hexachlorophene	0.0438		

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. Please note that the laboratory reported non-detect results down to the MDL for this project. Therefore, the blank flagging actions were modified as follows to take this into consideration. Positive results greater than the MDL but less than the CRQL are qualified as U at the reported concentration when affected by blank contamination.

Blank ID	Compound	Concentration	Reporting Limit	Action Level
Method Blank	acetone	6.3J ug/Kg	50 ug/Kg	2X RL
JAN09-ER06	toluene	0.45J ug/L	1 ug/L	RL
JAN09-FB01	2-butanone	0.75J ug/L	10 ug/L	2X RL

Associated samples and required qualifications are noted in the following table.

Sample ID	Compound	Q Flag
all samples	acetone	U at reported value
70SB05-01	2-butanone	U at reported value
70SB05-01	toluene	U at reported value

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. Please note that the laboratory reported non-detect results down to

Michael Baker, Jr., Inc.
NAPR SWMU 70, Puerto Rico
SDG# NAPR44109-1

the MDL for this project. Therefore, the blank flagging actions were modified as follows to take this into consideration. Positive results greater than the MDL but less than the CRQL are qualified as U at the reported concentration when affected by blank contamination.

Blank ID	Compound	Concentration	Reporting Limit	Action Level
Method Blank	bis(2-ethylhexyl)phthalate	6.2J ug/Kg	33 ug/Kg	2X RL

Associated samples and required qualifications are noted in the following table.

Sample ID	Compound	Q Flag
all samples	bis(2-ethylhexyl)phthalate	U at reported value

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. Please note that the laboratory reported non-detect results down to the MDL for this project. Therefore, the blank flagging actions were modified as follows to take this into consideration. Positive results greater than the MDL but less than the CRQL are qualified as U at the reported concentration when affected by blank contamination.

Blank ID	Compound	Concentration	Action Level	Q Flag
JAN09-ER03	DRO	0.26 mg/L	8.325 mg/Kg	U
JAN09-FB01	DRO	0.25 mg/L		U

Associated samples and required qualifications are noted in the following table.

Sample ID	Compound	Q Flag
070SB05-01, 70SB05-01D	DRO	U at reported conc.

Metals

Associated blanks exhibited contamination as noted in the following table. The laboratory reported non-detect results to the MDL for this project. Therefore, the blank flagging actions were modified to take this into consideration. Please see the Glossary of Qualification Flags and Abbreviations for details.

Blank ID	Analyte	Concentration	Action Level	Q Flag
MB 680-128337/17-A	antimony	0.12J mg/Kg	RL	U at reported value
	zinc	0.79J mg/Kg	RL	U at reported value
CCB	selenium	0.20J ug/L	RL	U at reported value
JAN09-FB02	copper	18 ug/L	>RL up to blank conc.	R
	lead	0.60J ug/L	RL	U at reported value
	zinc	30 ug/L	>RL up to blank conc.	R

Please note, when qualifying samples for CCB contamination, associated samples are those just prior to or just following a CCB. Therefore, not all analytes in all samples are flagged for CCB contamination.

Associated samples and required qualifications are noted in the following table.

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Sample ID	Analyte	Q Flag
all samples >MDL up to RL	antimony	U
all samples >MDL up to RL	zinc	U
all samples >MDL up to RL	selenium	U
all samples >MDL up to RL	lead	U
70SB05-01, 70SB05-01D (>RL up to blank concentration)	copper	R
70SB05-01, 70SB05-01D (> RL up to blank concentration)	zinc	R

Laboratory Control Samples

VOA

The LCS associated with all the samples exhibited low recovery at 62% for methylene chloride (QC limit 65-126%); therefore all samples were qualified as estimated (J/UJ) for this compound.

SVOA

The LCS and LCSD associated with all the samples exhibited low recovery at 24% and 22% for hexachlorocyclopentadiene (QC limit 26-110%) and 23% and 21% for pentachlorophenol (QC limit 28-117%); therefore all samples were qualified as estimated (J/UJ) for these compounds.

Field Duplicates

Metals

The field duplicate pair of samples 70SB05-01 and 70SB05-01D exhibited metals results that did not compare. The analytes cobalt, nickel and vanadium exhibited RPDs that were $\geq 35\%$ but less than 120% and were qualified as estimated J in both samples.

Identification/Quantitation

GRO

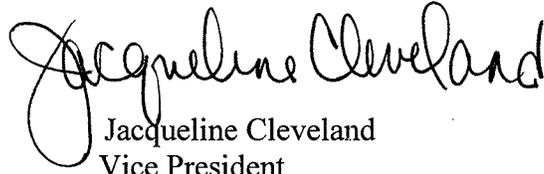
Sample 70SB05-01 was not used in favor of the re-analysis, due to non-compliant internal standard area recoveries.

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	acetone	+/-	J/R
all samples	acrolein iodomethane acrylonitrile propionitrile pentachloroethane dichlorodifluoromethane bromomethane chloroethane methylene chloride chlorodibromomethane bromoform 1,2-dibromo-3-chloropropane	+/-	J/UJ
all samples	acetonitrile isobutanol	+/-	J/R
all samples	acetone	+	U at reported value
70SB05-01	2-butanone	+	U at reported value
70SB05-01	toluene	+	U at reported value
all samples	methylene chloride	+/-	J/UJ

SVOA

Sample ID	Compound	Results	Q flag
all samples	4-nitroquinoline-1-oxide	+/-	J/R
all samples	hexachlorocyclopentadiene 2,4-dinitrophenol 4,6-dinitro-2-methylphenol dinoseb bis(2-ethylhexyl)phthalate indeno(1,2,3-cd)pyrene dibenz(a,h)anthracene benzo(g,h,i)perylene 2-naphthylamine 1,3,5-trinitrobenzene 4-aminobiphenyl 3,3'-dimethylbenzidine	+/-	J/UJ
all samples	4-nitroquinoline-1-oxide hexachlorophene	+/-	J/R

Summary of Data Qualifications

SVOA

Sample ID	Compound	Results	Q flag
all samples	bis(2-ethylhexyl)phthalate	+	U at reported value
all samples	hexachlorocyclopentadiene pentachlorophenol	+/-	J/UJ

GRO

Sample ID	Compound	Results	Q flag
all samples	all results	+/-	J/R
70SB05-01	all results	+/-	R

DRO

Sample ID	Compound	Results	Q flag
070SB05-01, 70SB05-01D	DRO	+J	U

Metals

Sample ID	Analyte	Results	Q flag
all samples >MDL up to RL	antimony	+J	U
all samples >MDL up to RL	zinc	+J	U
all samples >MDL up to RL	selenium	+J	U
all samples >MDL up to RL	lead	+J	U
70SB05-01, 70SB05-01D	copper	>RL up to 18 mg/Kg	R
70SB05-01, 70SB05-01D	zinc	>RL up to 30 mg/Kg	R
70SB05-01, 70SB05-01D	cobalt nickel vanadium	+	J

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

TEST AMERICA SAVANNAH SDG NAPR44109-2

DataQual

Environmental Services, LLC

Michael Baker, Jr., Inc.
Airsides Business Park
100 Airside Drive
Moon Township, PA 15108

March 26, 2008
SDG# NAPR44109-2, Test America-Savannah
NAPR SWMU70, Puerto Rico

Dear Mr. Kimes,

The following Data Validation report is provided as requested for the parameters noted in the table below for SDG # NAPR44109-2. 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 8082A, October2006-SOP #HW-45), 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, 6020B 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	PCB	GRO	DRO	TM	DM
70GW05	680-44109-4	soil	X	X	X	X	X	X	X
70GW05MS	680-44109-4MS	soil						X	
70GW05MSD	680-44109-4MSD	soil						X	

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 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. Please note that the reviewer added an F to the sample ID to indicate dissolved metals analysis when necessary.

VOA

Sample 70GW05 was not preserved at a pH below 2, therefore according to the Region II guidelines, the sample should be analyzed within seven days of collection. Analysis exceeded this holding time and therefore was qualified.

Due to high %D values, in the 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

The initial and continuing calibration exhibited some compounds with low RRF values, which resulted in qualifying non-detected values as rejected for these compounds. Due to high %RSD and %D values, in the initial and continuing calibrations, some compounds were qualified as estimated.

The associated laboratory control spike exhibited non-compliant recovery for several compounds; therefore all samples were qualified as estimated for these compounds.

Blank contamination was noted in the method and/or QC blanks associated with samples in this batch. Qualifications were added to the data.

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 NAPR SWMU 70, Puerto Rico
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PCB

No qualifications were required.

GRO

Sample 70GW05 was not preserved at a pH below 2, therefore according the Region II guidelines, the sample should be analyzed within seven days of collection however analysis exceeded this holding time and therefore was qualified.

DRO

Blank contamination was noted and qualification was required in the sample in this SDG.

Metals

Blank contamination was noted and qualification was required in the samples in this SDG.

The total metals analysis of the MS/MSD pair exhibited non-compliant recoveries for mercury. This analyte was flagged as estimated in the total metals analysis of the field sample.

Please note that the samples were diluted due to matrix issues. The reporting limits and method detection limits were adjusted accordingly.

Specific Evaluation of Data

Data Completeness

Resubmissions were required for the PCB fraction. Retention times were not correctly transcribed from raw data to data summary forms. The laboratory was contacted and corrected forms were received. A copy of the e-mail correspondence is included in the validation worksheets.

Technical Holding Times

According to chain of custody records, sampling was performed on 01/20/09 and samples were received at the laboratory 01/22/09. All sample preparation and analysis was performed within Region II and/or method holding time requirements with the exception of the following.

VOA and GRO

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Sample 70GW05 was not preserved at a pH below 2, therefore according the Region II guidelines, the sample should be analyzed within seven days of collection. Analysis exceeded this holding time. Therefore, all positive results were qualified as estimated and non-detected compounds were qualified as rejected.

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
CC 01/28/09	iodomethane	34.6%	all samples	J/UJ
	2-chloro-1,3-butadiene	41.8%		
	pentachloroethane	34.5%		
	bromomethane	23.5%		
	dibromochloromethane	20.4%		
	bromoform	22.6%		
	isobutanol	0.03691		J/R

SVOA

Calibration standards exhibited RRF and %Ds 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 02/05/09	4-nitroquinoline-1-oxide	0.0212	all samples	J/R
CC 02/09/09	hexachlorocyclopentadiene	28.5%	all samples	J/UJ
	benzo(b)fluoranthene	20.7%		
	indeno(1,2,3-cd)pyrene	26.5%		
	dibenz(a,h)anthracene	34.1%		
	benzo(g,h,i)perylene	38.9%		
	hexachlorophene	20.6%		
	1-naphthylamine	23.5%		
	2-naphthylamine	43.6%		
	4-nitroquinoline-1-oxide	0.0314		J/R

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. Please note that the laboratory reported non-detect results down to

Michael Baker, Jr., Inc.
 NAPR SWMU 70, Puerto Rico
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the MDL for this project. Therefore, the blank flagging actions were modified as follows to take this into consideration. Positive results greater than the MDL but less than the CRQL are qualified as U at the reported concentration when affected by blank contamination.

Blank ID	Compound	Concentration	Reporting Limit	Action Level
JAN09-FB01	2-butanone	0.75J ug/L	10 ug/L	2X RL

Associated samples and required qualifications are noted in the following table.

Sample ID	Compound	Q Flag
70GW05	2-butanone	U at reported value

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. Please note that the laboratory reported non-detect results down to the MDL for this project. Therefore, the blank flagging actions were modified as follows to take this into consideration. Positive results greater than the MDL but less than the CRQL are qualified as U at the reported concentration when affected by blank contamination.

Blank ID	Compound	Concentration	Reporting Limit	Action Level
JAN09-ER04	benzyl alcohol	0.65 ug/L	0.97 ug/L	RL
JAN09-FB01	benzyl alcohol	3.6	0.97	RL
	phenol	0.5J	0.97	RL

Associated samples and required qualifications are noted in the following table.

Sample ID	Compound	Q Flag
70GW05	benzyl alcohol	U at reported value
70GW05	phenol	U at reported value

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. Please note that the laboratory reported non-detect results down to the MDL for this project. Therefore, the blank flagging actions were modified as follows to take this into consideration. Positive results greater than the MDL but less than the CRQL are qualified as U at the reported concentration when affected by blank contamination.

Blank ID	Compound	Concentration	Action Level	Q Flag
JAN09-FB01	DRO	0.25 mg/L	0.25 mg/Kg	U

Associated samples and required qualifications are noted in the following table.

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Sample ID	Compound	Q Flag
70GW05	DRO	U at reported conc.

Metals

Associated blanks exhibited contamination as noted in the following table. The laboratory reported non-detect results to the MDL for this project. Therefore, the blank flagging actions were modified to take this into consideration. Please see the Glossary of Qualification Flags and Abbreviations for details.

Blank ID	Analyte	Concentration	Action Level	Q Flag
MB 680-128521/6-A	antimony	1.6J ug/L	RL	U at reported value
	arsenic	0.5J ug/L	RL	
CCB	cobalt	0.013J ug/L	RL	U at reported value

Please note, when qualifying samples for CCB contamination, associated samples are those just prior to or just following a CCB. Therefore, not all analytes in all samples are flagged for CCB contamination.

Associated samples and required qualifications are noted in the following table.

Sample ID	Analyte	Q Flag
all samples >MDL up to RL	antimony	U
	arsenic	U
	cobalt	

Laboratory Control Samples

SVOA

The LCS and LCSD associated with all the samples exhibited low recoveries for the following compounds listed in the table below; therefore all samples were qualified as estimated (J/UJ) for these compounds.

Compound	LCS % Rec	LCSD % Rec	QC Limit
acenaphthylene	19	38	50-110
4-chloro-3-methylphenol	29	44	46-118
2-chlorophenol	23	36	47-110
3,3'-dichlorobenzidine	6	4	10-113
2,4-dichlorophenol	23	43	46-115
2,4-dimethylphenol	22	26	36-110
4,6-dinitro-2-methylphenol	2	12	29-167
2,4-dinitrophenol	0	4	10-189
fluorene	29	55	57-110
hexachlorocyclopentadiene	0	4	10-110
isophorone	24	49	50-111
2-methylphenol	26	31	46-110
3&4-methylphenol	24	29	43-110
2-nitroaniline	31	34	45-122
3-nitroaniline	17	21	30-116
4-nitroaniline	21	12	36-125
2-nitrophenol	13	34	42-120

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Compound	LCS % Rec	LCSD % Rec	QC Limit
n-nitroso-di-n-propylamine	3	29	45-112
n-nitrosodiphenylamine	12	8	47-119
acenaphthene	24	49	54-110
pentachlorophenol	16	33	37-132
phenol	12	15	39-110

Matrix Spikes

Metals

The matrix spike pair submitted for the total metals fraction exhibited non-compliant %R's for mercury, requiring qualification in the field samples. A summary of these non-compliances and affected samples are noted in the following table.

MS	Analytes	Samples	%R	Q Flag
70GW05	mercury	70GW05	54/52	J/UJ

Identification/Quantitation

SVOA

Sample 70GW05 was re-analyzed due to non-compliant LCS recoveries. The re-extraction exceeded holding time and therefore was not used.

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

Michael Baker, Jr., Inc.
NAPR SWMU 70, Puerto Rico
SDG# NAPR44109-2

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Summary of Data Qualifications

VOA

Sample ID	Compound	Results	Q flag
70GW05	all results	+/-	J/R
all samples	iodomethane 2-chloro-1,3-butadiene pentachloroethane bromomethane dibromochloromethane bromoform	+/-	J/UJ
all samples	isobutanol	+/-	J/R
70GW05	2-butanone	+	U at reported value

SVOA

Sample ID	Compound	Results	Q flag
all samples	4-nitroquinoline-1-oxide	+/-	J/R
all samples	hexachlorocyclopentadiene benzo(b)fluoranthene indeno(1,2,3-cd)pyrene dibenz(a,h)anthracene benzo(g,h,i)perylene hexachlorophene 1-naphthylamine 2-naphthylamine	+/-	J/UJ
all samples	4-nitroquinoline-1-oxide	+/-	J/R
all samples	benzyl alcohol phenol	+	U at reported value
all samples	acenaphthylene 4-chloro-3-methylphenol 2-chlorophenol 3,3'-dichlorobenzidine 2,4-dichlorophenol 2,4-dimethylphenol 4,6-dinitro-2-methylphenol 2,4-dinitrophenol fluorene hexachlorocyclopentadiene isophorone 2-methylphenol 3&4-methylphenol 2-nitroaniline 3-nitroaniline 4-nitroaniline 2-nitrophenol n-nitroso-di-n-propylamine n-nitrosodiphenylamine acenaphthene pentachlorophenol phenol	+/-	J/UJ
70GW05RE	all results	+/-	R

Michael Baker, Jr., Inc.
NAPR SWMU 70, Puerto Rico
SDG# NAPR44109-2

Summary of Data Qualifications

PCB

Sample ID	Compound	Results	Q flag
No qualifications were required			

GRO

Sample ID	Compound	Results	Q flag
70GW05	all results	+/-	J/R

DRO

Sample ID	Compound	Results	Q flag
70GW05	DRO	+	U

Metals

Sample ID	Analyte	Results	Q flag
all samples	antimony	>MDL up to RL	U
all samples	arsenic	>MDL up to RL	U
all samples	cobalt	>MDL up to RL	U
70GW05	mercury	+/-	J/UJ

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

TEST AMERICA SAVANNAH SDG NAPR44158-1

DataQual

Environmental Services, LLC

Michael Baker, Jr., Inc.
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March 26, 2008
SDG# NAPR44158-1, Test America-Savannah
NAPR SWMU 70, Puerto Rico

Dear Mr. Kimes,

The following Data Validation report is provided as requested for the parameters noted in the table below for SDG # NAPR44158-1. 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 8082A, October2006-SOP #HW-45), 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, 6020B 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	PCBs	GRO	DRO	Metals
70SD03	680-44158-1	soil	X	X	X	X	X	X
70SD03D	680-44158-2	soil	X	X	X	X	X	X
70SD03MS	680-44158-1	soil					X	
70SD03MSD	680-44158-1	soil					X	

The following quality control samples were provided with this SDG: sample 70SD03D was the field duplicate of sample 70SD03. The samples were evaluated based on the following criteria:

- Data Completeness *
- Sample Condition
- Technical Holding Times *
- GC/MS Tuning *
- GC Performance *
- Initial/Continuing Calibrations
- ICESA/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.

All Fractions

All samples contained 50-90% water; therefore as according to Region II guidelines all results were qualified as estimated (J/UJ).

VOA

The initial and continuing calibration exhibited some compounds with low RRF values, which resulted in qualifying non-detected values as rejected for these compounds. Due to high %D values, in the 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 associated LCS exhibited low recovery for methylene chloride that resulted in qualifying the results for this compound as estimated in all samples.

The matrix spike and matrix spike duplicate exhibited low recovery that required qualifications to the data.

SVOA

The initial and continuing calibration exhibited some compounds with low RRF values, which resulted in qualifying non-detected values as rejected for these compounds. Due to high %RSD 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.

One sample exhibited low internal standard area recoveries that resulted in qualify the associated compounds as estimated.

The matrix spike and matrix spike duplicate exhibited low recoveries that required qualifications to the data.

The associated LCS exhibited low recovery for di-n-octyl phthalate that resulted in qualifying the results for this compound as estimated in all samples.

PCBs

No additional qualifications were required.

GRO

No additional qualifications were required.

DRO

Blank contamination was noted and qualification was required in one of the samples in this SDG.

Metals

Blank contamination was noted and qualification was required in the samples in this SDG.

Specific Evaluation of Data

Data Completeness

Resubmissions were required for the PCB fraction. Retention times were not correctly transcribed from raw data to data summary forms. The laboratory was contacted and corrected forms were received. A copy of the e-mail correspondence is included in the validation worksheets.

Sample Condition

All Fractions

The following sediment samples contained 50-90% water. All results in these samples were qualified as estimated J/UJ.

Sample ID	% Moisture	Qualifier
70SD03	57.8	J/UJ
70SD03D	50.4	J/UJ

Technical Holding Times

According to chain of custody records, sampling was performed on 01/22/09 and samples were received at the laboratory 01/24/09. All sample preparation and analysis was performed within Region II and/or method holding time requirements.

Initial/Continuing Calibration

VOA

Calibration standards exhibited RRF and %Ds 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 01/22/09	acetone	0.048	all samples	J/R
CC 02/02/09	acetone	0.061	all samples	J/R
	isobutanol	0.017		
	acrolein	27.7%		J/UJ
	iodomethane	28.5%		
	acetonitrile	56.5%		
	acrylonitrile	20.3%		
	propionitrile	31.6%		
	pentachloroethane	38.8%		
	dichlorodifluoromethane	20.9%		
	bromomethane	60.7%		
	chloroethane	23.7%		
	acetone	34.7%		
	methylene chloride	22.8%		
	bromoform	25.0%		
1,2-dibromo-3-chloropropane	21.2%			

SVOA

Calibration standards exhibited RRF and %Ds 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 02/05/09	4-nitroquinoline-1-oxide	0.0212	all samples	J/R
CC 02/12/09	3,3'-dichlorobenzidine	22.1%	70SD03	J/UJ
	bis(2-ethylhexyl)phthalate	22.3%		
	indeno(1,2,3-cd)pyrene	30.5%		
	dibenz(a,h)anthracene	22.6%		
	benzo(g,h,i)perylene	22.8%		
	hexachloropropene	24.6%		
	p-phenylene diamine	33.8%		
	1-naphthylamine	20.8%		
	2-naphthylamine	43.7%		
	3,3'-dimethylbenzidine	55.0%		
hexachlorophene	23.6%			
	4-nitroquinoline-1-oxide	0.0307		J/R
CC 02/13/09	3,3'-dichlorobenzidine	28.6%	70SD03D	J/UJ
	2-naphthylamine	34.0%		
	1,3,5-trinitrobenzene	33.5%		
	4-nitroquinoline-1-oxide	0.0300		
	hexachlorophene	0.0370		

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. Please note that the laboratory reported non-detect results down to the MDL for this project. Therefore, the blank flagging actions were modified as follows to take this into consideration. Positive results greater than the MDL but less than the CRQL are qualified as U at the reported concentration when affected by blank contamination.

Blank ID	Compound	Concentration	Reporting Limit	Action Level
JAN09-FB01	2-butanone	0.75J ug/L	10 ug/L	2X RL

Associated samples and required qualifications are noted in the following table.

Sample ID	Compound	Q Flag
all samples	2-butanone	U at reported value

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. Please note that the laboratory reported non-detect results down to the MDL for this project. Therefore, the blank flagging actions were modified as follows to take this into consideration. Positive results greater than the MDL but less than the CRQL are qualified as U at the reported concentration when affected by blank contamination.

Michael Baker, Jr., Inc.
NAPR SWMU 70, Puerto Rico
SDG# NAPR44158-1

Blank ID	Compound	Concentration	Reporting Limit	Action Level
JAN09-FB01	phenol	0.5 ug/L	0.97 ug/L	RL

Associated samples and required qualifications are noted in the following table.

Sample ID	Compound	Q Flag
all samples	phenol	U at reported value

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. Please note that the laboratory reported non-detect results down to the MDL for this project. Therefore, the blank flagging actions were modified as follows to take this into consideration. Positive results greater than the MDL but less than the CRQL are qualified as U at the reported concentration when affected by blank contamination.

Blank ID	Compound	Concentration	Action Level	Q Flag
JAN09-FB01	DRO	0.25 mg/L	8.325 mg/Kg	U

Associated samples and required qualifications are noted in the following table.

Sample ID	Compound	Q Flag
70SD03D	DRO	U at reported conc.

Metals

Associated blanks exhibited contamination as noted in the following table. The laboratory reported non-detect results to the MDL for this project. Therefore, the blank flagging actions were modified to take this into consideration. Please see the Glossary of Qualification Flags and Abbreviations for details.

Blank ID	Analyte	Concentration	Action Level	Q Flag
MB 680-128337/17-A	antimony	0.12J mg/Kg	RL	U at reported value
CCB	selenium	0.20J ug/L	RL	U at reported value
	silver	0.036J mg/L	RL	U at reported value

See validation report for specific samples and qualifications. Only those analytes requiring action are listed here. Negative contamination in a Please note, when qualifying samples for CCB contamination, associated samples are those just prior to or just following a CCB. Therefore, not all analytes in all samples are flagged for CCB contamination.

Associated samples and required qualifications are noted in the following table.

Sample ID	Analyte	Q Flag
all samples >MDL up to RL	antimony	U
all samples >MDL up to RL	selenium	U
all samples >MDL up to RL	silver	U

Internal Standards

SVOA

Sample 70SD03 exhibited low internal standard area recovery for perylene-d12; therefore compound results associated with this standard were qualified as estimated (J/UJ).

Laboratory Control Samples

VOA

The LCS associated with the samples in this data package exhibited low recoveries for methylene chloride at 62% (QC limit 65-126%); therefore results for this compound were qualified as estimated (J/UJ) for all samples.

SVOA

The LCS associated with the samples in this data package exhibited low recoveries for di-n-octyl phthalate at 47% (QC limit 49-122%); therefore results for this compound were qualified as estimated (J/UJ) for all samples.

Matrix Spikes

VOA

The matrix spike and matrix spike duplicate associated with sample 70SD03 and duplicate sample 70SD03D exhibited low recoveries for cis-1,3-dichloropropene at 61% and 39% (QC limit 66-137%); therefore results for this compound were qualified as estimated (J/UJ) for these samples.

SVOA

The matrix spike and matrix spike duplicate associated with sample 70SD03 and duplicate sample 70SD03D exhibited low recoveries for 1,4-dioxane at 1% and 3% (QC limit 10-110%), hexachlorocyclopentadiene at 0% and 0% (QC limit 26-110%) and hexachloroethane at 6% and 10% (QC limit 36-110%); therefore results for these compounds were qualified as estimated (J/UJ) for these samples.

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
70SD03, 70SD03D	all results	+/-	J/UJ
all samples	acetone	+/-	J/R
all samples	acetone isobutanol	+/-	J/R
all samples	acrolein iodomethane acetonitrile acrylonitrile propionitrile pentachloroethane dichlorodifluoromethane bromomethane chloroethane acetone methylene chloride bromoform 1,2-dibromo-3-chloropropane	+/-	J/UJ
all samples	2-butanone	+	U at reported value
all samples	methylene chloride	+/-	J/UJ
70SD03, 70SD03D	cis-1,3-dichloropropene	+/-	J/UJ

SVOA

Sample ID	Compound	Results	Q flag
70SD03, 70SD03D	all results	+/-	J/UJ
all samples	4-nitroquinoline-1-oxide	+/-	J/R
70SD03	3,3'-dichlorobenzidine bis(2-ethylhexyl)phthalate indeno(1,2,3-cd)pyrene dibenz(a,h)anthracene benzo(g,h,i)perylene hexachloropropene p-phenylene diamine 1-naphthylamine 2-naphthylamine 3,3'-dimethylbenzidine hexachlorophene	+/-	J/UJ
70SD03	4-nitroquinoline-1-oxide	+/-	J/R
70SD03D	3,3'-dichlorobenzidine 2-naphthylamine 1,3,5-trinitrobenzene	+/-	J/UJ
70SD03D	4-nitroquinoline-1-oxide hexachlorophene	+/-	J/R
all samples	phenol	+	U at reported value

Summary of Data Qualifications

SVOA

Sample ID	Compound	Results	Q flag
70SD03	all compounds associated with: perylene-d12	+/-	J/UJ
all samples	di-n-octyl phthalate	+/-	J/UJ
70SD03, 70SD03D	1,4-dioxane, hexachlorocyclopentadiene, hexachloroethane	+/-	J/UJ

GRO

Sample ID	Compound	Results	Q flag
70SD03, 70SD03D	all results	+/-	J/UJ

DRO

Sample ID	Compound	Results	Q flag
all samples	all results	+/-	J/UJ
70SD03, 70SD03D	DRO	+/-	J/UJ
70SD03D	DRO	+	U

Metals

Sample ID	Analyte	Results	Q flag
all samples	all analytes	+/-	J/UJ
all samples	antimony	>MDL up to RL	U
all samples	selenium	>MDL up to RL	U
all samples	silver	>MDL up to RL	U

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

TEST AMERICA SAVANNAH SDG NAPR44158-2

DataQual

Environmental Services, LLC

Michael Baker, Jr., Inc.
Airside Business Park
100 Airside Drive
Moon Township, PA 15108

March 23, 2008
SDG# NAPR44158-2, Test America-Savannah
NAPR SWMU 70, Puerto Rico

Dear Mr. Kimes,

The following Data Validation report is provided as requested for the parameters noted in the table below for SDG # NAPR44158-2. 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 and 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 in this SDG (SW-846 methods 8015_DRO and 8015_GRO). 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	LL PAH	GRO	DRO
JAN09-ER10	680-44158-3	water	X	X	X	X
JAN09-TB11	680-44158-4	water	X		X	

The samples were evaluated based on the following criteria:

- Data Completeness *
- Sample Condition *
- Technical Holding Times *
- GC/MS Tuning *
- GC Performance *
- Initial/Continuing Calibrations
- Blanks *
- Internal Standards *
- Surrogate Recoveries *
- Laboratory Control Samples *
- Matrix Spike Recoveries NA
- 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 continuing calibration exhibited some compounds with low RRF values, which resulted in qualifying non-detected values as rejected for these compounds. Due to high %D values, in the continuing calibrations, some compounds were qualified as estimated.

PAH

No qualifications to the data were required.

GRO

No qualifications to the data were required.

DRO

No qualifications to the data were required.

Specific Evaluation of Data

Data Completeness

The SDG was received complete and intact. No resubmissions were required.

Technical Holding Times

According to chain of custody records, sampling was performed on 01/22/09 and samples were received at the laboratory 01/24/09. All sample preparation and analysis was performed within Region II and/or method holding time requirements.

Initial/Continuing Calibration

VOA

Calibration standards exhibited RRF and %Ds 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.

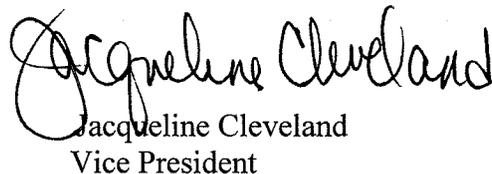
Standard ID	Compound(s)	RRF, %RSD, %D	Samples	Q Flag
CC 01/28/09	isobutanol	0.03691	all samples	J/R
	iodomethane	34.6%		J/UJ
	2-chloro-1,3-butadiene	41.8%		
	pentachloroethane	34.5%		
	bromomethane	23.5%		
	bromoform	22.6%		

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	isobutanol	+/-	J/R
all samples	iodomethane 2-chloro-1,3-butadiene pentachloroethane bromomethane bromoform	+/-	J/UJ

SVOA

Sample ID	Compound	Results	Q flag
No qualifications required			

GRO

Sample ID	Compound	Results	Q flag
No qualifications required.			

DRO

Sample ID	Compound	Results	Q flag
No qualifications 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

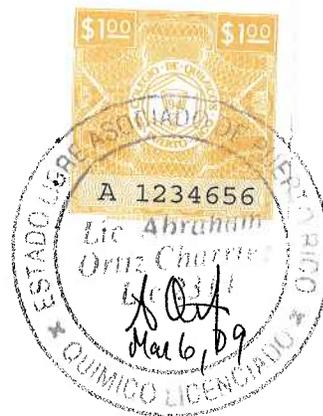
RL	reporting limit
IDL	instrument detection limit
MDL	method detection limit
CRDL	contract required detection limit
CRQL	contract required quantitation limit
+	positive result
-	non-detect result

PUERTO RICAN CHEMIST CERTIFICATIONS

PUERTO RICO CERTIFICATION

I Herby certify that I have reviewed the Quality Assurance Data for Project Number **680-43925-1**, and to the best of my knowledge, the results are correct and reliable.

Abraham Ortiz



PUERTO RICO CERTIFICATION

I Herby certify that I have reviewed the Quality Assurance Data for Project Number **680-43961-1**, and to the best of my knowledge, the results are correct and reliable.

Abraham Ortiz



PUERTO RICO CERTIFICATION

I Herby certify that I have reviewed the Quality Assurance Data for Project Number **680-43961-2**, and to the best of my knowledge, the results are correct and reliable.

Abraham Ortiz



PUERTO RICO CERTIFICATION

I Herby certify that I have reviewed the Quality Assurance Data for Project Number **680-43991-1**, and to the best of my knowledge, the results are correct and reliable.

Abraham Ortiz



PUERTO RICO CERTIFICATION

I Herby certify that I have reviewed the Quality Assurance Data for Project Number **680-43991-2**, and to the best of my knowledge, the results are correct and reliable.

Abraham Ortiz



PUERTO RICO CERTIFICATION

I Herby certify that I have reviewed the Quality Assurance Data for Project Number **680-44016-1**, and to the best of my knowledge, the results are correct and reliable.

Abraham Ortiz



PUERTO RICO CERTIFICATION

I Herby certify that I have reviewed the Quality Assurance Data for Project Number **680-44027-1**, and to the best of my knowledge, the results are correct and reliable.

Abraham Ortiz



PUERTO RICO CERTIFICATION

I Herby certify that I have reviewed the Quality Assurance Data for Project Number **680-44027-2**, and to the best of my knowledge, the results are correct and reliable.

Abraham Ortiz



PUERTO RICO CERTIFICATION

I Herby certify that I have reviewed the Quality Assurance Data for Project Number **680-44044-3**, and to the best of my knowledge, the results are correct and reliable.

Abraham Ortiz



PUERTO RICO CERTIFICATION

I Herby certify that I have reviewed the Quality Assurance Data for Project Number **680-44056-2** and to the best of my knowledge, the results are correct and reliable.

Abraham Ortiz



PUERTO RICO CERTIFICATION

I Herby certify that I have reviewed the Quality Assurance Data for Project Number **680-44077-3** and to the best of my knowledge, the results are correct and reliable.

Abraham Ortiz



PUERTO RICO CERTIFICATION

I Herby certify that I have reviewed the Quality Assurance Data for Project Number **680-44109-1** and to the best of my knowledge, the results are correct and reliable.

Abraham Ortiz



PUERTO RICO CERTIFICATION

I Herby certify that I have reviewed the Quality Assurance Data for Project Number **680-44109-2** and to the best of my knowledge, the results are correct and reliable.

Abraham Ortiz



PUERTO RICO CERTIFICATION

I Herby certify that I have reviewed the Quality Assurance Data for Project Number **680-44158-1** and to the best of my knowledge, the results are correct and reliable.

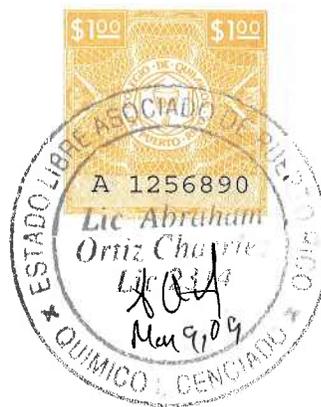
Abraham Ortiz



PUERTO RICO CERTIFICATION

I Herby certify that I have reviewed the Quality Assurance Data for Project Number **680-44158-2** and to the best of my knowledge, the results are correct and reliable.

Abraham Ortiz



APPENDIX E
EQUILIBRIUM PARTITIONING APPROACH

APPENDIX E

EQUILIBRIUM PARTITIONING APPROACH

The United States Environmental Protection Agency (USEPA, 1993) has chosen the equilibrium partitioning (EqP) approach for developing sediment quality criteria for nonionic organic chemicals. This approach was used in this Phase I RCRA Facility Investigation for SWMU 70 to derive sediment screening values for organic chemicals lacking literature-based, bulk sediment screening values.

There are three underlying assumptions to the derivation of sediment quality criteria using EqP. First, it is assumed that sediment toxicity correlates with the concentration of the chemical in the sediment pore water and not the bulk sediment concentration (i.e., the pore water concentration represents the bioavailable fraction). Second, partitioning between sediment pore water and bulk sediment is assumed to be dependent on the organic content of the sediment with little dependence upon other chemical or physical properties. Third, the EqP approach assumes that equilibrium has been attained between the sediment pore water concentration and the bulk sediment concentration.

The relationship between the concentration of a nonionic organic chemical in sediment pore water and bulk sediment is described by the partitioning coefficient, K_p (USEPA, 1993):

$$K_p = (C_s)/(C_{pw}) \quad (\text{Equation E-1})$$

Where C_s is the concentration in bulk sediment and C_{pw} is the concentration in sediment pore water. For a given organic chemical, the partition coefficient can be derived by multiplying the fraction of organic carbon (f_{oc}) present in the sediment by the chemical's organic carbon partition coefficient (K_{oc}) (USEPA, 1993):

$$K_p = (f_{oc})(K_{oc}) \quad (\text{Equation E-2})$$

Combining Equations E-1 and E-2 yields the following:

$$C_s = (K_{oc})(f_{oc})(C_{pw}) \quad (\text{Equation E-3})$$

If the organic carbon content of the sediment is known, a site-specific sediment screening value (SSV) can be calculated for a given organic chemical by setting C_{pw} equivalent to a conservative surface water screening value for that chemical (SWSV):

$$SSV = (K_{oc})(f_{oc})(SWSV) \quad (\text{Equation E-4})$$

In this equation, SSV represents the concentration of the chemical in bulk sediment that, at equilibrium, will result in a sediment pore water concentration equal to the surface water screening value. Sediment concentrations less than SSV would be protective of sediment-associated biota. The use of surface water screening values (i.e., criteria and toxicological benchmarks) in Equation E-4 assumes that the sensitivities of sediment-associated biota and the species typically tested to derive surface water screening values such as USEPA NAWQC (predominantly water column species) are similar. Furthermore, it assumes that levels of protection afforded by the surface water screening values are appropriate for sediment-associated biota. It is noted that the EqP approach can only be used if the total organic carbon (TOC) content in sediment is greater than 0.2 percent (i.e., 2,000 mg/kg). At TOC concentrations less

than 0.2 percent, other factors (e.g., particle size, sorption to nonorganic mineral fractions) become relatively more important (USEPA, 1993).

Although the EqP approach was developed by the USEPA for nonionic organic chemicals (e.g. semi-volatile organic chemicals [SVOCs]), this method was used to derive sediment screening values for all organic chemicals lacking literature-based, bulk sediment screening values, including ionic organic chemicals (e.g., volatile organic chemicals [VOCs]). Application of the EqP approach to ionic organic chemicals likely overestimates their pore water concentrations since adsorption mechanisms other than hydrophobicity may significantly increase the fraction of the chemical sorbed to sediment particles (Jones et al., 1997). The overly conservative nature of sediment quality benchmarks derived using EqP is documented in the literature (Fuschman, 2003). Regardless, application of the EqP approach to the development of sediment screening values for ionic chemicals is documented in the literature (USEPA, 1996 and Jones et al., 1997).

Sediment screening values derived using EqP (see Table 6-3 and 6-4) are conservatively based on a default f_{oc} of 0.01 (USEPA, 1996). K_{oc} values used in the derivation of EqP-based sediment screening values were estimated from the following equation (USEPA, 1993 and 1996):

$$\text{Log } K_{oc} = 0.00028 + (0.983)(\text{Log } K_{ow}) \quad (\text{Equation E-5})$$

In this equation, $\log K_{ow}$ represented the log octanol-water partition coefficient. The surface water screening values used in the derivation of EqP-based sediment screening values for organic chemicals lacking bulk sediment screening values were identified using the procedure described in Section 6.1.2.3. The specific chemicals for which EqP-based screening values were derived, as well as their K_{oc} and SWSV values are summarized in the table below.

Chemical	K_{oc} (L/kg)	SWSV (ug/L)
Acetone	0.58	1,000
Benzene	124	109
Carbon disulfide	92.5	15
Methylene chloride	16.9	2,560

Appendix E References

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